

Hinkley Point C
Consultation Overview Document
January 2024

Document Reference Number 101211889

Revision 01

Company Document

CONSULTATION OVERVIEW DOCUMENT

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Forward

In 2013 NNB Generation Company (HPC) Limited ('NNB') was granted a development consent order ('DCO') authorising the construction and operation of a new nuclear power station at Hinkley Point in Somerset, to be known as 'Hinkley Point C'.

Once operational, Hinkley Point C will provide one of the UK's biggest contributions to combating climate change and ensuring long-term energy security - providing secure, low-carbon electricity to 6 million homes for 60 years.

Following the start of construction in 2016, consents for a number of refinements to the power station have been sought and approved. As we continue to develop our project, we are now proposing to apply for consent to make a number of further changes to our original DCO in order to implement current best practice and make the operational station safer and more efficient.

We are seeking the views of members of the public and relevant stakeholders on our proposed changes through this consultation, which will run from 9 January 2024 to 23:59 on 29 February 2024.

This document provides more information on our proposed changes and we look forward to receiving your views prior to finalising our proposals.

Stuart Crooks

Managing Director – Hinkley Point C

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Introduction

NNB is proposing to make an application to the Secretary of State for Energy Security and Net Zero for a material change to the Hinkley Point C DCO ('Material Change Application'). The DCO gives permission to construct and operate the power station and is the equivalent of planning permission for nationally significant infrastructure projects. In the 12 years since the original application was submitted, technology has advanced, best practice has developed, and more efficient methods of operating the power station have emerged. We have continued a process of detailed design which has included:

- learning from other power stations;
- listening to our stakeholders and the local community; and
- continuing to make design improvements including:
 - refinement of our safety and security measures; and
 - adoption of the latest engineering and construction techniques.

Four non-material change applications have so far been approved, authorising changes to the plans for the new power station.

NNB is now proposing changes to six further elements of the power station's design (see Chapters 1 to 5). These are referred to as the 'proposed changes on-site'. In addition, we are proposing a package of compensatory habitat measures that will ensure that the overall coherence of the National Sites Network is protected following the removal of the requirement to fit the Acoustic Fish Deterrent ('AFD') (see Chapter 6). These are referred to as the 'proposed changes off-site'. The construction, operation, and eventual decommissioning of the power station at HPC, including the proposed on-site changes and off-site changes, represent the Project.

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Each of the changes is addressed in the following chapters of this Consultation Overview Document:

Chapter 1 - Interim Spent Fuel Store and Equipment Storage Building

A change from a 'wet' interim spent fuel store to a 'dry' interim spent fuel store, and associated increase in the building's size.

The previously proposed access control building will be replaced with a new equipment storage building.

Chapter 2 - Meteorological Mast and Station

Relocation and re-design of the meteorological mast. Removal of the meteorological station and replacement with an equipment compound.

Chapter 3 - Hinkley Point Substation

The retention of the existing temporary Hinkley Point Substation as a permanent feature to supply electricity to neighbouring Hinkley Point A and Hinkley Point B power stations.

Chapter 4 - Sluice Gate Storage Structures

Addition of four new storage racks to hold sluice gates and lifting beams to be used during outages (i.e. maintenance periods).

Chapter 5 - Acoustic Fish Deterrent System

Removal of the requirement to install an AFD system associated with the power station's cooling water system.

Chapter 6 - Compensatory Habitat Measures for Removal of Requirement to Fit an Acoustic Fish Deterrent System

Construction and delivery of the following compensatory habitat measures:

Enhancements to, or creation of, habitats, including:

- Creation or enhancement of approximately 340 hectares ('ha') of saltmarsh and associated habitat;
- Creation/enhancement of 5ha of seagrass bed;
- Creation/enhancement of 15ha of kelp forest;

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- Creation/enhancement of 1-2ha of oyster bed; and
- Easement works to improve fish migration, which will comprise works on three weir barriers:
 - Maisemore Weir on the River Severn and Trostrey Weir on the River Usk (which are our preferred proposals); and
 - One further weir on the River Lugg (one of Mousenatch Weir, Eyton Weir or Coxall Weir), the River Towy (Manorafon Weir) or the River Severn (Upper Lode Weir).

Chapter 7 - The Application Process and Next Steps

An explanation of the application process which will be used to consider the proposed changes.

Chapter 8 - Responding to this Consultation

An explanation on how to respond to this consultation.

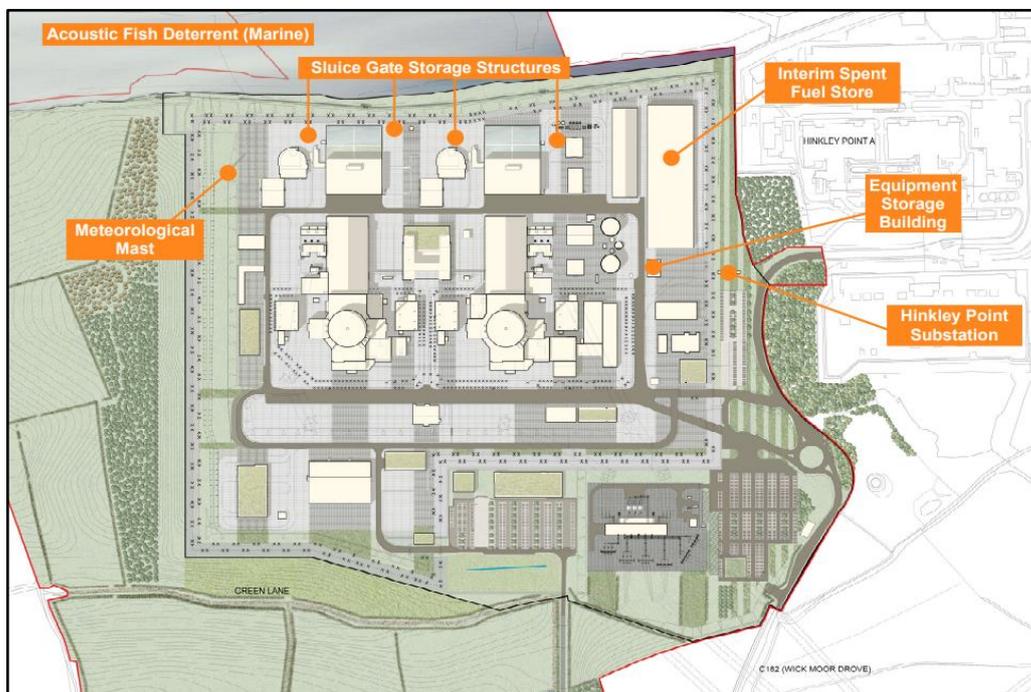


Figure 1 - Location of the onsite changes proposed at HPC described in Chapters 1-5

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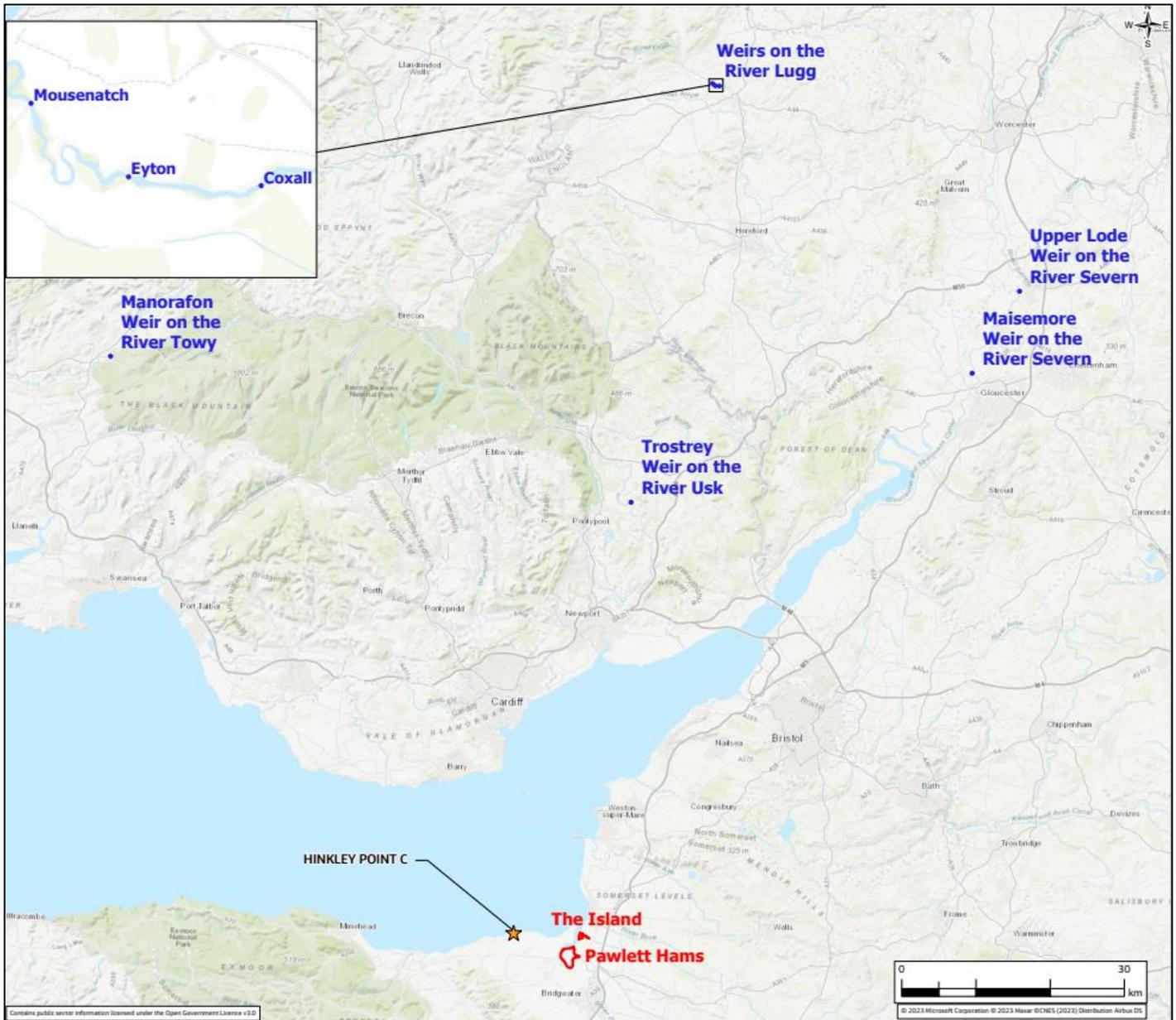


Figure 2 - Location of the offsite changes proposed by NNB as described in Chapter 6

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Purpose of the consultation

This consultation is being carried out by NNB to seek the views of members of the public and relevant stakeholders prior to submission of the Material Change Application. The consultation is being carried out in accordance with the Infrastructure Planning (Changes to, and Revocation of, Development Consent Orders) Regulations 2011.

Following consultation, we will prepare the Material Change Application, taking account of views received throughout the consultation period. We anticipate submitting the Material Change Application to the Secretary of State in early 2025.

Supporting consultation documents

The documents in Table 1 below provide more detailed technical and environmental information to support this consultation. The documents are available to view, together with this Consultation Overview Document, online and in print at the deposit location listed in Chapter 8.

Versions of some of these documents (updated where necessary to take into account responses to this consultation and any further environmental and technical work) will be submitted with the Material Change Application.

Some of these documents relate specifically to the proposal to remove the requirement to install an AFD system. This element of the overall process was consulted on previously in 2019 and some of the documents below were presented as part of that earlier consultation.

The documents in Table 1 are referred to where relevant throughout this Consultation Overview Document.

Documents 9-13 in Table 1 are chapters from the Hinkley Point C DCO application Environmental Statement which are referred to, where relevant, in other documents being consulted on, such as the Preliminary Environmental Information Report ('PEIR'). NNB is not actively seeking to consult on Documents 8-13, and they are provided for background information only. The original Hinkley Point C DCO Environmental Statement, within which these chapters can be found, can be viewed on the National Archives website [here](#). Similarly, Documents 1-2 in Table 1 were published in connection with the scoping exercise that was previously undertaken to inform the scope of the environmental impact assessment for the proposed changes, and have been provided for background information only.

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	Abbreviated title	Document title	Purpose of the document
1.	Scoping Report	Hinkley Point C Material Change Application EIA Scoping Report	A report prepared by Jacobs UK and Wood Group on behalf of NNB to support a request for a Scoping Opinion from the Planning Inspectorate.
2.	Scoping Opinion	Scoping Opinion: Proposed Hinkley Point C New Nuclear Power Station Material Change 1 Application	<p>This sets out the Planning Inspectorate's opinion on the environmental issues which are to be assessed by NNB in the Environmental Statement which will be submitted with the Material Change Application.</p> <p>The information about the proposed changes on-site within the PEIR is based on the Scoping Opinion. Both the Scoping Report and Scoping Opinion were prepared before the off-site compensatory habitats were proposed, and consequently have not been included in these reports.</p>
3.	PEIR	Preliminary Environmental Information Report Volume 1 - Introduction Volume 2 – Proposed Changes On-Site Volume 3 – Proposed Changes Off-Site Volume 4 – In-combination and Cumulative Effects	This document provides a preliminary assessment of the likely significant effects arising from the proposed changes. It updates the environmental impact assessment submitted with the original DCO application. It has been prepared in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations).
4.	PEIR Non-Technical Summary	Non-Technical Summary	A summary of the information presented in the PEIR.
5.	The Shadow HRA Evidence Report – pre- application consultation version (including shadow Appropriate Assessment and explanation of how the Material Change Application satisfies the 'no alternative solution', 'imperative reasons of overriding public interest' and 'compensatory measures' requirements)	Shadow HRA Evidence Report – pre- application consultation version	This document considers the impact of the proposed changes on designated sites protected by the Conservation of Habitats and Species Regulations 2017 (Habitats Regulations).

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	<u>Abbreviated title</u>	<u>Document title</u>	<u>Purpose of the document</u>
6.	Hinkley Point C Material Change Application Plans – On-Site Measures	Hinkley Point C Material Change Application Plans	This document provides the plans for the proposed development on-site which are proposed to be submitted for approval or information with the Material Change Application.
7.	Hinkley Point C Material Change Application Plans – Off-Site Measures	Hinkley Point C Material Change Application Plans	This document provides plans and indicative drawings for the proposed development off-site which are proposed to be submitted for approval or information with the Material Change Application.
8.	CW1 Report	Hinkley Point C Cooling Water Infrastructure Fish Protection Measures: Report to Discharge DCO Requirement CW1 (Paragraph 1) and Marine Licence Condition 5.2.31	This report provides details of the cooling water system design as approved by the Marine Management Organisation ('MMO'), particularly the mitigation measures of the fish recovery and return ('FRR') system and intake head design which have been assessed in the PEIR.
9.	Original Hinkley Point C DCO Environmental Statement Marine Ecology Chapter	Chapter 19 Environmental Statement – Volume 2 (October 2011) Hinkley Point C Development Site, Pages 1220 – 1416 of the document	This chapter is an excerpt from the Hinkley Point C DCO application Environmental Statement which presents the original assessment of effects to the marine environment.
10.	Original Hinkley Point C DCO Environmental Statement Landscape and Visual Assessment Chapter	Chapter 22 Environmental Statement – Volume 2 (October 2011) Hinkley Point C Development Site, Pages 1590 – 1787 of the document	This is a chapter from the Hinkley Point C DCO application Environmental Statement which presents the original assessment of landscape and visual impacts arising from the construction and operation of the power station.
11.	Original Hinkley Point C DCO Environmental Statement Marine Water and Sediment Quality Chapter	Chapter 18 Environmental Statement – Volume 2 (October 2011) Hinkley Point C Development Site, Pages 1119 – 1219 of the document	This is a chapter from the Hinkley Point C DCO application Environmental Statement which presents the original assessments of marine water and sediment quality arising from the construction and operation of the Hinkley Point C cooling water system and specifically the outfall and intake tunnels and fish return system.
12.	Original Hinkley Point C DCO Environmental Statement Transport Chapter	Chapter 10 Environmental Statement – Volume 2 (October 2011) Hinkley Point C Development Site, Pages 338 – 443 of the document	This is a chapter from the Hinkley Point C DCO application Environmental Statement which presents the original assessment of transport.

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	<u>Abbreviated title</u>	<u>Document title</u>	<u>Purpose of the document</u>
13.	Original Hinkley Point C DCO Environmental Statement Groundwater Chapter	Chapter 15 Environmental Statement – Volume 2 (October 2011) Hinkley Point C Development Site, Pages 850 – 938 of the document	This is a chapter from the Hinkley Point C DCO application Environmental Statement which presents the original assessment of groundwater
14.	TR479	The Fate of Impinged Sprat at HPC v1	Particle Tracking Study of Impinged Sprat from the Proposed Hinkley Point C Fish Recovery and Return
15.	TR515	HPC Water Quality effects of FRR discharges v2	This document describes the effects of discharges from the Fish Return and Recovery system on water quality
16.	WDA Permit Inquiry SoCG	Statement of Common Ground between the appellant and the Environment Agency	Statement of Common Ground between NNB and the EA in respect of the Water Discharge Activity appeal.
17.	Construction Traffic Management Plan	Construction Traffic Management Plan 18 November 2019	The Construction Traffic Management Plan was approved as part of the Hinkley Point C DCO and this latest version was agreed by the Transport Review Group and describes how materials and equipment will be delivered to the HPC Main Site
18.	Construction Workforce Travel Plan	Construction Workforce Travel Plan Version 5 2022	The Construction Workforce Travel Plan was approved as part of the Hinkley Point C DCO and this latest version was agreed by the Transport Review Group and describes how the workforce will travel to the HPC site
19.	Traffic Incident Management Plan	Traffic Incident Management Plan March 2019	The Traffic Incident Management Plan was approved as part of the Hinkley Point C DCO and this latest version was agreed by the Transport Review Group and describes how HPC traffic will be managed if there is an incident on the highway network
20.	Transport Assessment	4.19 – Annex 7 – Transport Assessment	This is the Transport Assessment from the Hinkley Point C DCO application
21.	Transport Topic Paper	Transport Topic Paper v2 2022	This topic paper describes the transport related impacts and proposed mitigation associated with the increase in the Hinkley Point C workforce which was agreed with the relevant stakeholders in May 2022
22.	Supplemental Note to HGV forecast	Supplemental Note to HGV forecast Jan 2022	This note was presented alongside the Transport Topic Paper and describes the anticipated Heavy Goods Vehicle movements associated with the Hinkley Point C site

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	Abbreviated title	Document title	Purpose of the document
23.	Transport Review Group Quarterly Report Q2 2023	Transport Review Group Quarterly Report 2023 Q2 with Appendix	This is the latest quarterly report presented to the Transport Review Group for the period between April 2023 and September 2023

Table 1 – Supporting consultation documents

A number of technical terms and abbreviations are used throughout this document. For ease of reference, a Glossary is provided in Appendix 1.

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1 INTERIM SPENT FUEL STORE AND EQUIPMENT STORAGE BUILDING

1.1 Summary of the proposed change

- 1.1.1 The Interim Spent Fuel Store ('ISFS') is one of two buildings on site designed to store spent fuel and waste generated by the operation of the two nuclear reactors. The ISFS will be located towards the north-eastern part of the site, and adjacent to Hinkley Point A which is currently in the process of being decommissioned. The current site layout plan also includes an Access Control Building to be located to the south of the ISFS.
- 1.1.2 Spent fuel is produced in nuclear power stations and it needs to be safely stored before disposal or recycling. It is produced in such small amounts that the total volume from an average person's lifetime electricity use could fit into a 330ml drinks can. All of Hinkley Point C's spent fuel will remain on site during its 60-year operation unless a geological disposal facility becomes available during that period.
- 1.1.3 After careful consideration of the available technologies, we are proposing to change the way in which spent fuel is stored in the ISFS from a wet storage method in pools to dry storage in concrete and steel canisters. Figure 6 and Figure 7 show these two storage methods in operation.
- 1.1.4 A dry fuel storage system primarily cools fuel through convection. This allows passive cooling without the need for operator intervention rather than active cooling. This removes the need for mechanical cooling systems.
- 1.1.5 Spent fuel would be stored in concrete and steel canisters rather than in pools. The canisters would be sealed, meaning no gaseous emissions can occur. For this reason, the 55m gaseous discharge stack currently consented as part of the ISFS would no longer be required for dry storage.
- 1.1.6 Dry storage technology has been used worldwide since the 1970s. Tests on spent fuel canisters after decades in dry storage have confirmed that the system continues to provide a very safe and secure storage option. The concrete and steel canisters are very robust and are designed to withstand any external hazard. They can be approached without any protective clothing as they completely shield the environment from the radiation of the spent fuel.

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- 1.1.7 Dry storage requires more space per unit of fuel stored, therefore the ISFS building dimensions currently authorised for wet storage will need to be increased in size for dry storage. The parameters of the ISFS as currently authorised are 150m (length) x 65m (width) x 25m (height). The proposed revised design would have maximum dimensions of 229m (length) x 73m (width) x 30m (height).
- 1.1.8 The ISFS designed for wet storage was proposed to be built partly below ground level. In contrast, dry storage using a canister system requires the canisters to be installed at ground level. This is due to the requirements to maintain good natural airflow, reduce the risk of flooding and to simplify movement of spent fuel into and around the storage building itself. As a result, the proposed dry storage building needs to be 5m taller than the wet storage building currently consented.
- 1.1.9 It is also proposed that the Access Control Building associated with the ISFS is replaced with a new Equipment Storage Building located further south than the original Access Control Building. The Equipment Storage Building is required to store, transport and handle equipment used when spent fuel is transferred to the ISFS. The dimensions of the consented Access Control Building are 29m (length) x 17m (width) x 5m (height). The maximum size proposed for the replacement Equipment Storage Building would be 31m (length) x 23m (width) x 18m (height).
- 1.1.10 The proposed change in size of the ISFS and the location of the proposed Equipment Storage Building (which will be required instead of the Access Control Building) can be seen in Figure 3 and Figure 4.

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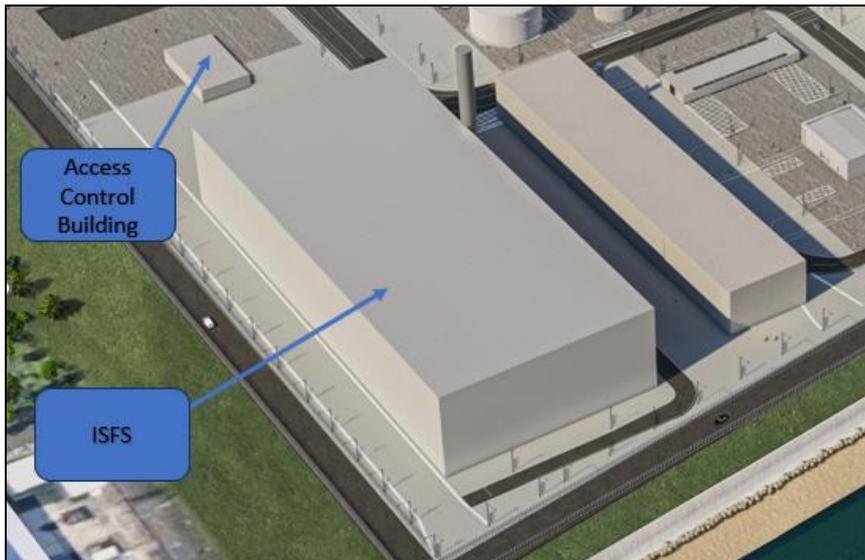


Figure 3 - Original ISFS and Access Control Building

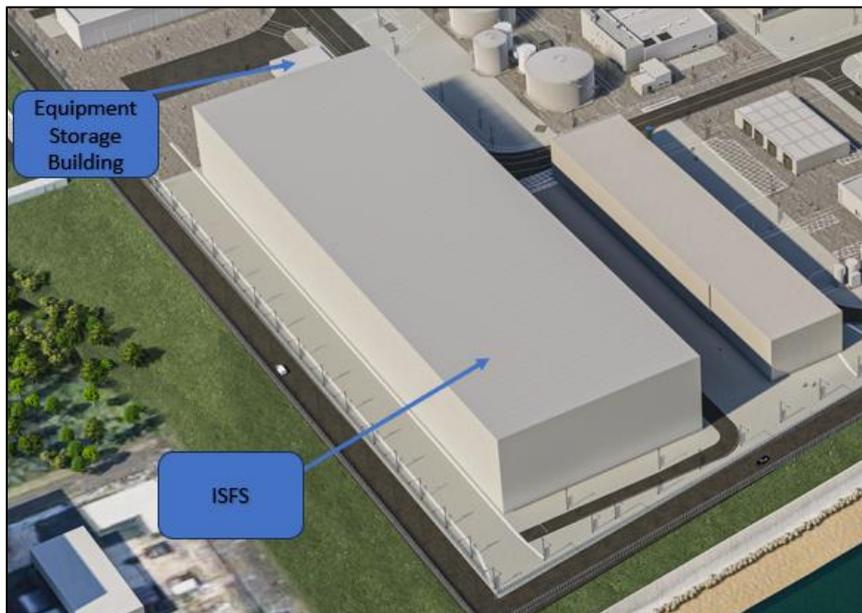


Figure 4 - Proposed ISFS and new Equipment Storage Building

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- 1.1.11 NNB proposes to seek authorisation of changes to the Plans (see Hinkley Point C Material Change Application Plans) currently authorised under the DCO to reflect these changes.
- 1.1.12 These proposed changes to the ISFS and the Access Control Building/Equipment Storage Building were initially included as part of a non-material change application made by NNB in 2017. While that application was approved, consent for these proposed changes was not granted as the Secretary of State considered that further assessment (in particular landscape and visual impact assessment) was needed in order to determine whether they could be authorised as a non-material, rather than a material change and consulted on accordingly.
- 1.1.13 The proposed changes are now being consulted on in advance of submitting the Material Change Application, and an assessment of the landscape and visual impacts of the changes has been scoped into the PEIR which is provided with this consultation.

1.2 Managing spent fuel

- 1.2.1 This section provides further information on the way spent fuel and radioactive waste is dealt with safely.
- 1.2.2 Radioactive waste and spent fuel are produced as a result of electricity generation in nuclear power stations, and also from the use of radioactive material in industry, defence, medicine and scientific research. Radioactive waste from nuclear power stations is produced in small amounts and has already been safely stored in the UK since the UK's first nuclear power station began operating in 1956, with Hinkley Point A beginning to generate electricity from 1965.
- 1.2.3 Nuclear waste products can be safely stored in a number of different ways depending on their type. In the UK, spent nuclear fuel that is removed from reactors is safely stored at power station sites in specialist facilities. The intention is to eventually move the spent fuel to a deep geological disposal facility. A plan for this is currently being developed by the UK's Nuclear Waste Services (part of the Nuclear Decommissioning Authority). It is for this reason that spent fuel stores at power station sites are referred to as 'interim' spent fuel stores. The spent fuel could, however, if necessary, be kept on site for the power station's whole lifetime and the proposed spent fuel store would provide sufficient space for this. No spent fuel or waste from other sites would be stored at Hinkley Point C.

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- 1.2.4 Low-level radioactive waste is disposed of promptly at specialist licensed and permitted facilities. Only higher-level radioactive waste, including spent nuclear fuel, is stored at power stations before a geological disposal facility is available.
- 1.2.5 The use of dry storage is not a new technology. Continuous dry storage of spent fuel began in the early 1960s and, by the late 1970s, several countries concluded that there were advantages to storing spent fuel under dry conditions which has led to many dry stores now being in operation across the globe. One of the first was at Wylfa nuclear power station in Anglesey, Wales, operating since 1971 (now being decommissioned). Sizewell B in Suffolk also uses dry storage technology, as will Sizewell C in due course.
- 1.2.6 Spent fuel removed from the reactor will first be cooled underwater in a reactor fuel pond elsewhere within the Hinkley Point C site for up to 10 years. The reactor fuel ponds are not designed for the full life-time quantities of spent fuel which will be produced by the power station. Therefore, following this initial period the spent fuel will be packaged into canisters and transferred to the ISFS.

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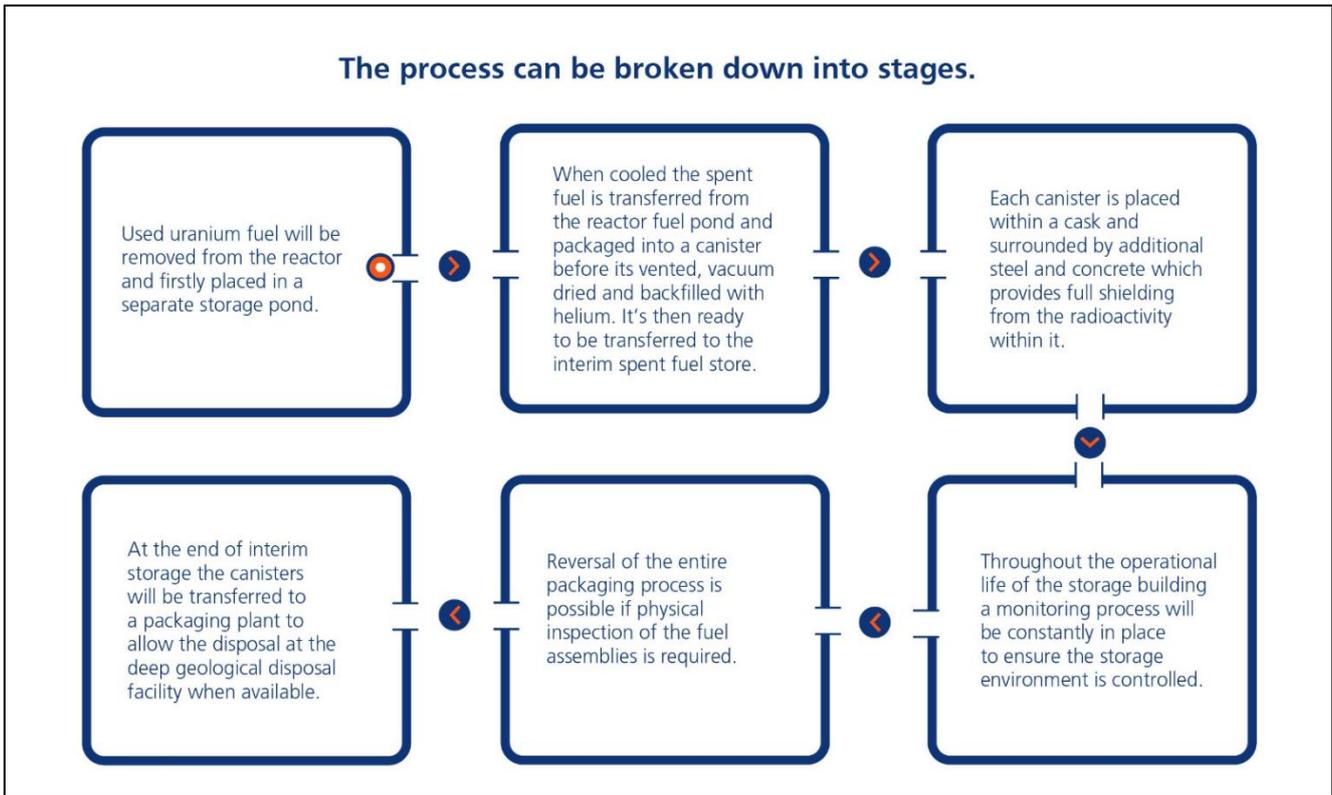


Figure 5 - Process for Managing Spent Fuel

FACT BOX

Spent fuel is produced in such small amounts that the total volume from an average person's lifetime electricity needs could fit into a 330ml drinks can

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1.3 Why change from wet to dry storage?

- 1.3.1 In 2010 a review commissioned by NNB of fuel storage methods available for the new power station was carried out. This review concluded that both 'wet' and 'dry' storage could be considered as the 'Best Available Technique' (see Section 1.4) and both would be suitable for use at Hinkley Point C.
- 1.3.2 The original decision to propose a wet store over a dry store was based upon the operational experience at the time and ease of inspection. There was no clear difference in terms of performance or safety between the two technologies. However, the factors which have now led NNB to prefer dry over wet storage are outlined below.



Figure 6 - The 'wet' ISFS at Sellafield

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Figure 7 - The 'dry' ISFS at Sizewell B power station

1.3.3 The proposed change from wet to dry storage is being driven by the advantages of the dry storage of spent fuel in comparison to wet storage, as approved within the DCO. These factors are:

- **Engineering efficiency:** A wet store requires building an aircraft protection shell over a large pool to protect the wet store of spent fuel from accident or attack. The canisters used for a dry storage method provide this same protection in a more compact and efficient way. The canisters are very robust and are designed to withstand external hazards. They can be approached without any protective clothing as they completely shield the environment from the radiation of the spent fuel.
- **Management:** Whilst both methods are equally safe, a wet storage method requires active management via circulating cooling water to ensure that the pools are providing the correct environment for the storage of fuel. In a dry storage method, the canisters are cooled by air convection, which does not require active management. Whilst both methods are capable of being operated safely, passive safety measures are preferable because passive systems do not require operator intervention or complex mechanical and electrical systems. They rely on air convection. Operators and systems introduce complexity and risk of failure through diverse means (e.g. human error etc.).

1.3.4 In the 12 years since the original review, a dry store has been operational at Sizewell B in Suffolk, which is also owned and operated by EDF. The facility provides valuable operational

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experience and offers clear advantages in having a consistent method across our power stations – increasing efficiency and allowing the sharing of best practice. Sizewell C was granted a Development Consent Order with a dry interim spent fuel store in July 2022.

1.4 BAT and ALARP

- 1.4.1 'Best Available Technique' ('BAT') is the measure by which the Environment Agency ensures that the requirements of the International Atomic Energy Agency's International Basic Safety Standards are met, to keep radiation doses to the public and environment as low as possible. It considers all relevant factors, including health and safety, operability and cost.
- 1.4.2 'As Low As Reasonably Practicable' ('ALARP') is the requirement set by the Office for Nuclear Regulation ('ONR') and the Health and Safety Executive ('HSE') to ensure risks to workers and members of the public from all risks and hazards are mitigated.
- 1.4.3 Both wet and dry storage options could demonstrate BAT and ALARP and are therefore, in principle, considered to be safe methods from the perspectives of the Environment Agency, ONR and HSE.
- 1.4.4 NNB was originally granted a Radioactive Substances Regulations ('RSR') permit by the Environment Agency which gave permission to dispose of and manage radioactive waste using the wet storage method.
- 1.4.5 In July 2022 NNB applied to vary that permit to authorise dry storage. The RSR permit sets strict limits for external radiation doses. The dry storage method meets the same strict safety standards and the RSR permit variation was granted by the Environment Agency in October 2022.

1.5 Environmental effects of the proposed change

- 1.5.1 As set out in the PEIR (Volume 2, sections 3.5, 4.7, 5.9 and 6.6), no new or materially different significant effects on the environment are anticipated as a result of the proposed change from a wet to dry ISFS and replacement of the Access Control Building with an Equipment Storage Building compared with the original Hinkley Point C DCO Environmental Statement (see Table 2).

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- 1.5.2 The proposed change to the ISFS does not alter the quantities of spent fuel produced by the operational power station. There is also no change to the radiological impact to members of the public or to the wider environment.
- 1.5.3 One of the main differences between the two storage methods is that a larger building will be required for the proposed dry storage. It will be a longer building, to provide the necessary space needed for the canisters, and 5m taller in order to facilitate the required access and maintain good airflow. The dry fuel store will not require excavation below ground, unlike the wet storage solution. A further difference is that for a wet store the design of the building is integral to the safety of the fuel whereas for dry storage the integrity of the fuel is provided by the canisters and not the building. The building merely provides a weatherproof shell – it does not provide a safety function.
- 1.5.4 However, as explained earlier, dry storage does not require installation of a 55m gaseous discharge stack. This will remove the visual impact of this feature, which would have been required for wet storage.
- 1.5.5 Users of the Coastal Path which includes two viewpoints (19 and 19a) would have open views to the ISFS which would be perceptibly larger, extending northwards by 79m from its original footprint, and 8m wider and 5m taller.
- 1.5.6 Visual receptors would experience short term adverse effects on their views, however, the ISFS would be seen against the backdrop of the much larger Reactor Buildings and within the context of the operational Hinkley Point C site.
- 1.5.7 In relation to the change of the Access Control Building to the Equipment Storage Building, despite the increased size, the building remains considerably smaller than the adjacent ISFS. As it is located to the south of the ISFS it will not be visible from the Coastal Path which is the main external viewpoint. From other viewpoints to the east, such as those at Pixie’s Mound and west of Wick, it will be visible, but in the context of the larger surrounding buildings and the proposed change is not likely to cause any new or materially different visual impact.
- 1.5.8 Table 2 summarises the anticipated effects on the environment compared to the effects assessed in the original Hinkley Point C DCO Environmental Statement, as a result of the proposed changes to the ISFS and Access Control Building (also set out in Tables 3-2, 4-2, 5-9, 6-3 & 6-4 in Volume 2 of the PEIR).

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Summary of anticipated change in effects from the original DCO Environmental Statement

Proposed Change	Groundwater	Transport	Marine Ecology and Water Quality	Landscape and Visual
Change from wet to dry ISFS.	No new or materially different likely significant effects on the groundwater environment.	Reduction in workforce numbers and Heavy Goods Vehicle traffic. No new or materially different likely significant transport effects.	Scoped out of assessment as there are no pathways which could give rise to significant effects on marine ecological receptors or water quality.	No new or materially different likely significant landscape or visual effects. In line with the Scoping Opinion this will be demonstrated by a full Landscape and Visual Impact Assessment to be presented in the Environmental Statement.
Replacement of the Access Control Building with Equipment Storage Building.	No new or materially different likely significant effects on the groundwater environment.	Negligible increase in workforce numbers and Heavy Goods Vehicle traffic. No new or materially different likely significant transport effects.	Scoped out of assessment as there are no pathways which could give rise to significant effects on marine ecological receptors or water quality.	No new or materially different likely significant landscape or visual effects. In line with the Scoping Opinion this will be demonstrated by a full Landscape and Visual Impact Assessment to be presented in the Environmental Statement.

Table 2 - Summary of anticipated change in effects as a result of the proposed changes

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Dry storage has been used for many years at sites across the world, including the UK (at both Wylfa and at Sizewell B), USA, Canada and Germany. In the United States, more than 2,400 casks have been loaded and are safely storing 100,000 spent fuel assemblies. Tests on spent fuel and cask components after years in dry storage confirm that the systems continue to provide a safe and secure environment.

2 METEOROLOGICAL MAST AND STATION

2.1 Summary of the proposed change

- 2.1.1 A meteorological mast is proposed at Hinkley Point C to host instruments to measure environmental conditions such as wind speed, wind direction and air temperature. The data from these instruments will monitor and record climatic and atmospheric conditions and would provide important information in the event of an emergency situation.
- 2.1.2 It is proposed that Hinkley Point C's meteorological mast is lowered in height and repositioned to reduce the chance of interference from surrounding buildings and infrastructure which could lead to inaccurate wind speed and temperature readings. The new proposed position is in an area closer to the perimeter fence, approximately 60m southwest of the currently authorised location.
- 2.1.3 Taking account of the proposed location and the use of more advanced technology, the change would also involve substantially reducing the height of the mast from 50m to 10m. The newly proposed location is approximately 60m south-west of its current approved location and is on a platform 20m above ordnance datum ('AOD'), as opposed to only 14m AOD. This means that the overall change in height of the mast AOD will be a reduction of 34m (from a height of 64m AOD (50m + 14m) to only 30m AOD (10m + 20m)).

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- 2.1.4 This new arrangement would not require the previously consented separate building ('the meteorological station') to house the meteorological equipment. The equipment would instead be located outside, within a compound area situated near to the mast. It is therefore proposed that the meteorological station currently authorised by the DCO is not constructed.



Figure 8 - Proposed Meteorological Mast

- 2.1.5 The currently authorised location of the mast and station and the proposed new location of the mast and compound for storage of equipment are shown on Figure 9

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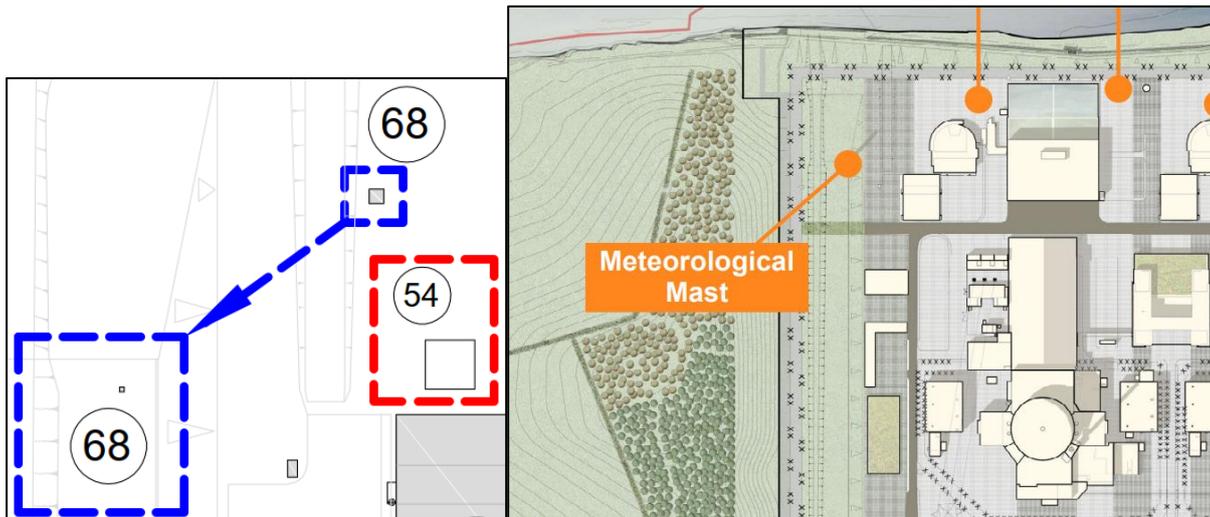


Figure 9 - Relocation of the meteorological mast and location of new associated compound (68) and removal of the meteorological station building (54)

2.1.6 NNB proposes to seek authorisation for changes to the Site Layout Plan and Parameter Plan currently authorised under the DCO to reflect these changes.

2.2 Why is the change necessary?

2.2.1 The changes will ensure that the meteorological mast will meet the current guidelines set out by the World Meteorological Organisation ('WMO'), which were published in 2018 after the DCO had been approved. A 4-year study of the prevailing weather conditions on site was carried out, which also contributed to the design change.

2.2.2 Consequently, the current authorised location is not appropriate for the following reasons:

- Asphalt within the proximity of the nearby internal road could result in inaccuracies in the measurements of temperature;
- Shadows cast by surrounding buildings could lead to inaccuracies in the measurements of temperature;

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- Nearby buildings could cause a wind barrier resulting in insufficient wind quality to accurately measure wind velocity and direction; and
- Proximity of buildings meaning Sonic Detection and Ranging ('SODAR') or Light Detection and Ranging (LIDAR) equipment to measure the wind at >70 m could not be installed. SODAR is used to measure wind speed at various heights. LIDAR is used to preview wind speed before it interacts with other measuring methods.

2.3 Environmental effects of the proposed change

- 2.3.1 As set out in the PEIR (Volume 2, sections 3.5, 4.7, 5.9 and 6.6), no new or materially different significant effects on the environment are anticipated as a result of the proposed change to the meteorological mast compared with the original Hinkley Point C DCO Environmental Statement.
- 2.3.2 In particular, from a landscape and visual impact perspective, these changes would not lead to any new or materially different environmental impacts due to the significantly reduced height of the mast and the removal of the accompanying building, even though the location of the mast has changed from that originally consented.
- 2.3.3 Table 3 summarises the anticipated change in effects on the environment compared to the effects assessed in the original Hinkley Point C DCO Environmental Statement as a result of the proposed changes to the meteorological mast (also set out in Tables 4-2, 5-9, 6-3 & 6-4 in Volume 2 of the PEIR).

Summary of anticipated change in effects from the original DCO Environmental Statement

Proposed Change	Groundwater	Transport	Marine Ecology and Water Quality	Landscape and Visual
Relocation and re-design of the meteorological mast and removal of the meteorological station building.	Scoped out of assessment as unlikely to give rise to new or additional likely significant effects beyond those reported in the original Environmental Statement.	No change in workforce numbers and a negligible reduction in Heavy Goods Vehicle traffic. No new or materially different likely significant transport effects.	Scoped out of assessment as there are no pathways to the marine environment which could give rise to significant effects on marine ecological receptors or water quality.	No new or materially different likely significant landscape or visual effects. In line with the Scoping Opinion this will be demonstrated by a full Landscape and Visual Impact Assessment to

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Summary of anticipated change in effects from the original DCO Environmental Statement

Proposed Change	Groundwater	Transport	Marine Ecology and Water Quality	Landscape and Visual
				be presented in the Environmental Statement.

Table 3 - Summary of anticipated change in effects as a result of the proposed changes

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3 HINKLEY POINT SUBSTATION

3.1 Summary of the proposed change

- 3.1.1 The Hinkley Point Substation (Substation) was constructed in 2014 as a temporary building for the construction of Hinkley Point C and supplies the construction site with electricity from the National Grid via Hinkley Point B. It is contained within a small, single storey building to the northeast of the site, adjacent to the access road to Hinkley Point A (see Figure 10).
- 3.1.2 We now propose that the building is retained during the operational phase of the power station.
- 3.1.3 It is anticipated that the plant layout within the Substation will require very minor internal modification to accommodate the change from temporary to permanent. As the building and extensive underground cabling are pre-existing infrastructure, no construction activities will be required as a result of the proposed change.

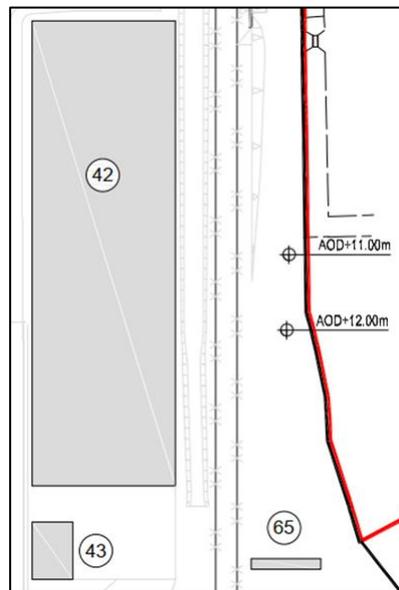


Figure 10 - Location of the Substation (65) in relation to the proposed dry storage ISFS (42) and new Equipment Storage Building (43)

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- 3.1.4 The Substation that is the subject of the proposed Material Change Application should not be confused with the National Grid Substation, also known as the Shurton Substation, which when operational will supply power from Hinkley Point C to the UK electrical transmission system.

3.2 Why is the change necessary?

- 3.2.1 The Substation was originally only required during the construction phase of Hinkley Point C, to feed-in power from National Grid via Hinkley Point B's connection. Despite the relatively short period during which it was intended to be used, the building and systems were built with a 60-year design life.
- 3.2.2 NNB has an obligation under agreements between the three Hinkley Point sites to either provide power to Hinkley Point A and Hinkley Point B (for decommissioning activities) or provide them with an alternative like for like supply, until at least 2040. To fulfil that obligation, EDF Energy and National Grid originally planned to build a new substation and 11 kV overhead line to Hinkley Point B.
- 3.2.3 However, after further consideration and discussions with Hinkley Point A and Hinkley Point B, we have concluded that instead of building a new substation, the optimal solution is to retain the existing 11 kV temporary Substation during the lifetime of the Hinkley Point C power station. This would avoid the need to design and construct a new substation and overhead line in the future to supply electricity to Hinkley Point A and Hinkley Point B, which would have required extensive construction works.
- 3.2.4 This proposed change involves switching the Substation from importing electricity, to exporting an 11 kV supply to Hinkley Point A and Hinkley Point B when Hinkley Point C begins generating electricity. Hinkley Point C therefore requires the Substation to be retained as a permanent feature during the operational life of the power station.

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Figure 11 – Photograph of the existing Electrical Substation at HPC

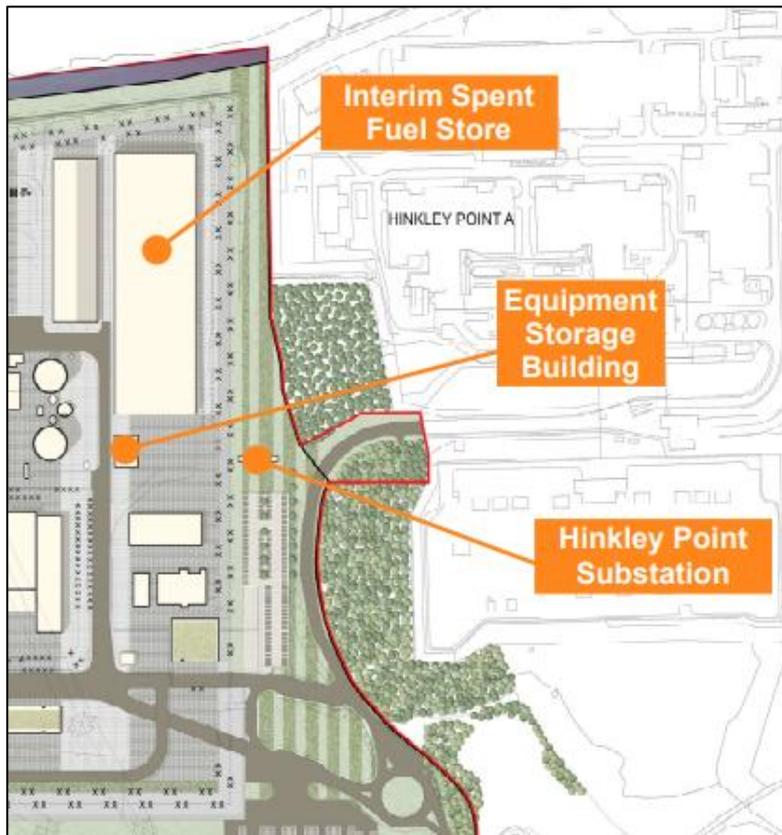


Figure 12 – Location of the Substation

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3.3 Environmental effects of the proposed change

- 3.3.1 As set out in the PEIR (Volume 2 -section 3.5, 4.7, 5.9 and 6.6), no new or materially different significant effects on the environment are anticipated as a result of the proposed change to retain the Substation compared with the original Hinkley Point C DCO submission Environmental Statement.
- 3.3.2 The building is single storey, sits adjacent to the larger ISFS and will be partially screened by landscaping and the proposed change to retain it permanently during the lifetime of Hinkley Point C will not alter this. The Scoping Opinion adopted by the Planning Inspectorate confirmed that the landscape and visual impacts from this building could be scoped out of the Environmental Statement for the Material Change Application.
- 3.3.3 Table 4 summarises the anticipated change in effects on the environment compared to the effects assessed in the original Hinkley Point C DCO Environmental Statement as a result of the proposed change to the Hinkley Point Substation (also set out in Tables 4-2, 5-9, 6-3 & 6-4 in Volume 2 of the PEIR).

Summary of anticipated change in effects from the original DCO Environmental Statement

Proposed Change	Groundwater	Transport	Marine Ecology and Water Quality	Landscape and Visual
Amendment to retain the existing temporary Hinkley Point Substation as a permanent building.	Scoped out of assessment as unlikely to give rise to new or additional likely significant effects beyond those reported in the original Environmental Statement.	Reduction in workforce numbers and Heavy Goods Vehicle traffic. No new or materially different likely significant transport effects.	Scoped out of assessment as there are no pathways which could give rise to significant effects on marine ecological receptors or water quality.	Scoped out of assessment as no additional significant landscape and visual effects are unlikely to arise due to the location and context of the wider Hinkley Point development site. In line with the Scoping Opinion this will be demonstrated by a full Landscape and Visual Impact Assessment to be presented in the Environmental Statement.

Table 4 - Summary of anticipated change in effects as a result of the proposed change

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4 SLUICE GATE STORAGE STRUCTURES

4.1 Summary of the proposed change

- 4.1.1 Located within Hinkley Point C's cooling water system, the sluice gates are used only during outages – periods of time where the reactors are shut down to carry out maintenance. The sluice gates allow maintenance to be performed on equipment that is usually submerged by holding back sea water from the rest of the system.
- 4.1.2 The storage structures are needed to provide storage for the sluice gates and their lifting beams when they are not in use.
- 4.1.3 The proposed change comprises four new structures to house the sluice gates and lifting beams. Two storage structures are required for each of Hinkley Point C's reactors and would be in the form of 'toaster style' storage racks which would be local to each reactor and fixed to a concrete base. The storage structures will be designed to hold 24 sluice gates. Figure 13 and Figure 14 show indicative images of the storage structures, and Figure 15 shows their proposed location adjacent to the sluice gates.
- 4.1.4 During outages the sluice gates will be moved by crane from the storage structures to either the Outfall Pond or Forebay buildings which are adjacent to the proposed storage structures. When the outage maintenance is complete, the Outfall Pond and Forebay will be reflooded and the sluice gates returned to the storage structures.



Figure 13 – Example of a toaster-style storage structure from Flamanville 3

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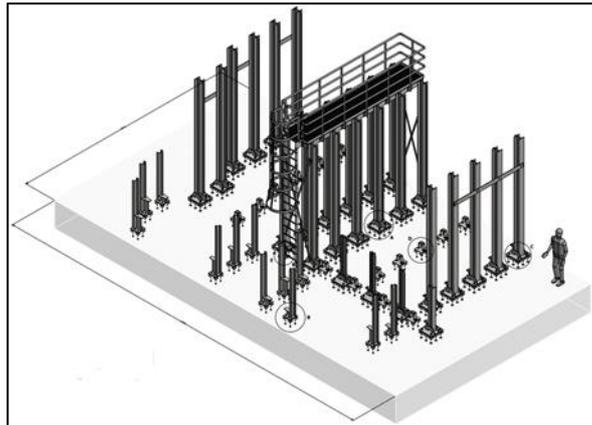


Figure 14 - Indicative design of toaster-style storage structure

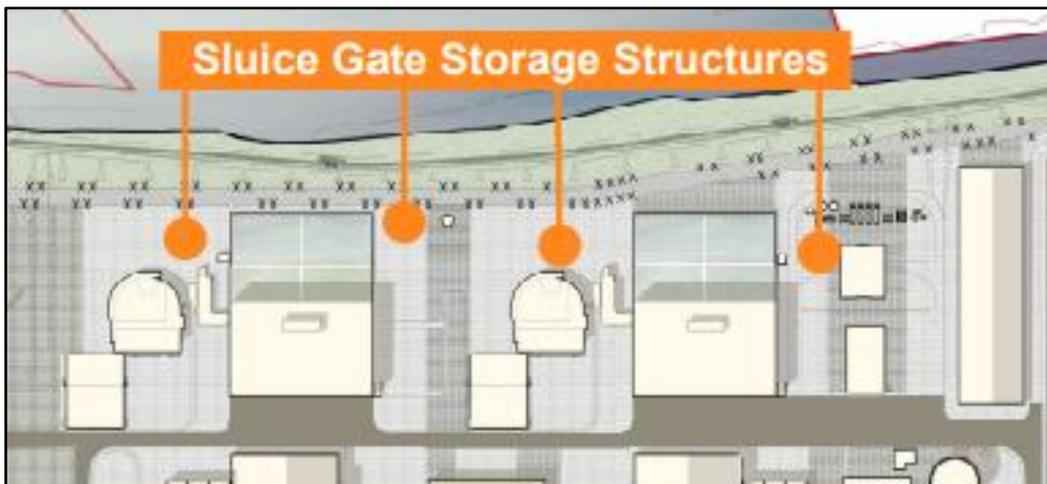


Figure 15 - Proposed location of Sluice Gate Storage Structures

4.2 Why is the change necessary?

- 4.2.1 Storage structures were not included within the original authorised Hinkley Point C design, this was because detailed design of the Outfall Pond and Forebay had not been undertaken when the DCO application was made. During the post-consent detailed design process, the need for a specific storage solution was identified adjacent to the Outfall Pond and Forebay.

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4.3 Environmental effects of the proposed change

- 4.3.1 As set out in the PEIR (Volume 2-section 3.5, 4.7, 5.9 & 6.6), no new or materially different significant effects on the environment are anticipated as a result of the addition of sluice gate storage structures compared with the original Hinkley Point C DCO Environmental Statement.
- 4.3.2 The Sluice Gate Storage Structures are very small structures in the context of the overall site at only 14m x 8m x 5m (length x width x height) and 6m x 8m x 4.5 (length x width x height). They would be largely screened by the surrounding buildings such as the Outfall Ponds, which are 45m x 47m x 11m (length x width x height) and will be seen in the context of even larger buildings such as the Turbine Halls at 46m in height. The Scoping Opinion adopted by the Planning Inspectorate confirmed that the landscape and visual impacts from these structures could be scoped out of the Environmental Statement for the Material Change Application.
- 4.3.3 Table 5 summarises the anticipated change in effects on the environment compared to the effects assessed in the original Hinkley Point C DCO Environmental Statement as a result of the addition of sluice gate storage structures (also set out in Tables 3-3, 4-2 & 5-9 in Volume 2 of the PEIR).

Summary of anticipated change in effects from the original DCO Environmental Statement

Proposed Change	Groundwater	Transport	Marine Ecology and Water Quality	Landscape and Visual
Four new structures to house sluice gates and lifting beams.	No new or materially different likely significant effects on the groundwater environment.	Negligible increase in workforce numbers and Heavy Goods Vehicle traffic. This will be offset by a corresponding decrease in other construction activity on site in order to remain within the caps set within the management plans. No new or materially different likely significant transport effects.	Scoped out of assessment as there are no pathways which could give rise to significant effects on marine ecological receptors or water quality.	Scoped out of assessment as additional landscape and visual effects are unlikely to arise due to the location and context of the wider Hinkley Point site.

Table 5 - Summary of anticipated change in effects as a result of the proposed change

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5 ACOUSTIC FISH DETERRENT SYSTEM

5.1 Summary of the proposed change

- 5.1.1 Like coal and gas-fired power stations, nuclear power stations generate electricity by creating heat, which is used to turn water into steam. The steam then turns turbines connected to electrical generators.
- 5.1.2 In the case of nuclear power stations, heat is created by the process of nuclear fission. Steam leaving the turbines needs to be cooled down and turned back into water. At Hinkley Point C, just like its predecessor (Hinkley Point B), a cooling water system will be installed which takes seawater from the Bristol Channel and uses it to condense the steam being passed through the turbines. Water intake and outfall tunnels extending approximately 3.3km and 1.9km (respectively) into the Bristol Channel will abstract and return water used in the cooling process. A full description of the cooling water system is set out in **Appendix 2**.
- 5.1.3 No fish protection measures were included in the design of Hinkley Point A or Hinkley Point B, which operated for 35 and 46 years respectively, and ceased operations in 2000 and 2022. However, three fish protection measures were incorporated into the design of the cooling water system for Hinkley Point C, as consented by the DCO. These measures are described below in Section 5.2.

5.2 Fish protection measures originally consented for Hinkley Point C

- 5.2.1 Three measures to protect fish were incorporated into the design of the cooling water system for the power station, as consented by the DCO:
- Low Velocity Side-Entry ('LVSE') water intake heads with a capped head design;
 - A Fish Recovery and Return ('FRR') system; and
 - An AFD system.

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- 5.2.2 An AFD system was intended to be the first fish protection measure that fish would encounter in the cooling water system design.
- 5.2.3 The capped head of the LVSE intake heads have been designed to reduce the vertical drawn of water thereby reducing the potential for entry into the intake tunnels of pelagic fish swimming in the water column. For those fish that do nevertheless enter the intake tunnels, the FRR system is designed to recover and return them to the Bristol Channel quickly and with as little harm as possible.
- 5.2.4 NNB will install the first two fish protection measures but is proposing to remove the DCO requirement to install the AFD system. A full description of the first two measures is set out in **Appendix 3**.
- 5.2.5 **Figure 16** illustrates the fish protection measures schematically as part of the cooling water system. Each measure is described further below.

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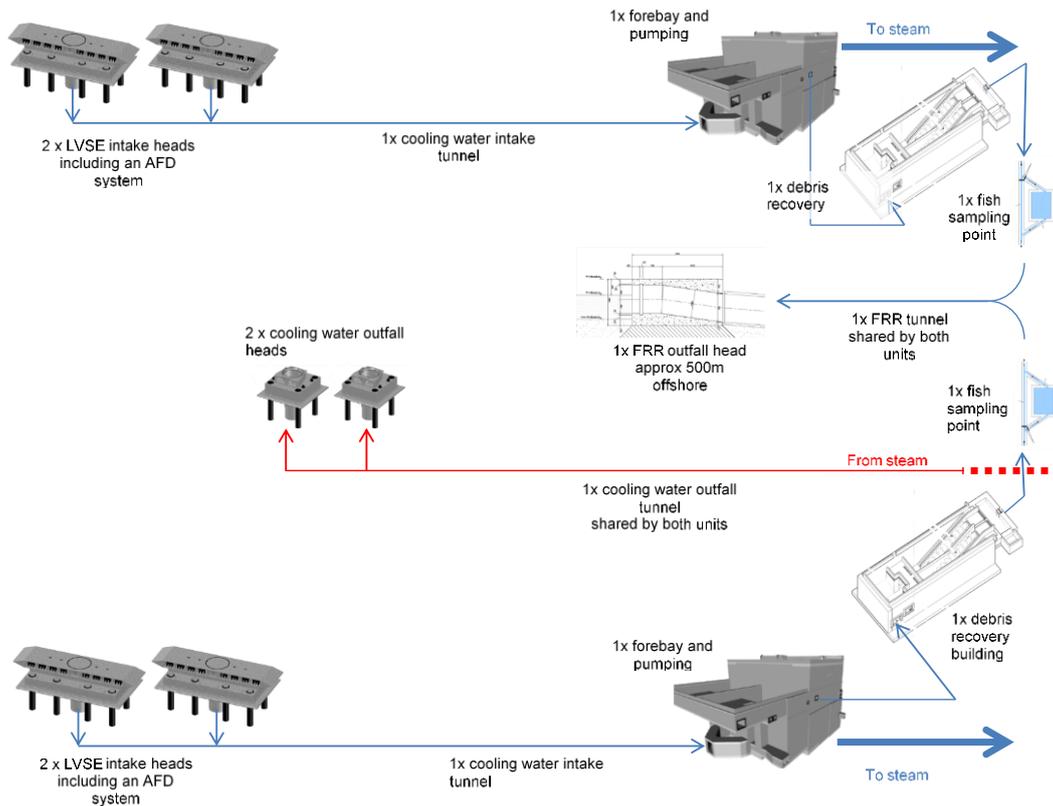


Figure 16 - Schematic of cooling water system and fish protection measures consented by the Hinkley Point C DCO

5.2.6 A number of technical terms are used throughout this section. Definitions of the main terms are included in Table 6 below.

Term	Meaning
entrainment / entrained	Entrainment is the passage of marine organisms, too small to be filtered by the drum and band screen, through the cooling water system. This primarily includes plankton, fish eggs, larvae and some juvenile stages. Adult stages of some small-bodied species may be entrained.
entrapment / entrapped	Entrapment refers to the entry of marine organisms into the intake heads regardless of the route they then take through the rest of the cooling water system. In an assessment context, entrapment is the sum of entrainment and impingement.

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Term	Meaning
impingement / impinged	The retention of fish or other marine organisms on the surface of filtration screens by the water current (typically includes juvenile and adult fish, shrimp and crabs). Impinged organisms are returned to the sea via the FRR outfall.
sound projectors	The part of an AFD system which generates sound waves which deter sound-sensitive fish.
turbidity	The cloudiness that arises as a result of high concentrations of particles being present in water. High turbidity levels reduce visibility in water.

Table 6 - Definition of terms*

*a full list of definitions is set out in Appendix 1 of this Consultation Overview Document and the PEIR document

5.3 Acoustic fish deterrent

- 5.3.1 The purpose of an AFD system is to deter those fish that are sensitive to sound from approaching the intake heads. The effectiveness of an AFD system is dependent upon the hearing ability of the fish species concerned. The hearing sensitivity of species varies significantly.
- 5.3.2 Evidence developed by the Centre for Environment, Fisheries and Aquaculture Science ('Cefas') on behalf of NNB, and the Environment Agency as the regulator, considers the potential impacts on fish from the removal of the requirement to install an AFD system (discussed further in Section 5.6). NNB has adopted the Environment Agency's approach to the calculation of potential harm. As a result, and following our 'shadow appropriate assessment' under the Habitats Regulations, we cannot conclude with certainty that there will be no risk of harm to certain designated conservation sites for which fish species are relevant features. As a result, we have prepared a 'derogation case' under the Habitats Regulations. This case demonstrates that there are no alternative solutions that would provide a better outcome for designated conservation sites and yet still meet the project objectives and that there are imperative reasons of overriding public interest ('IROPI') for this change. Furthermore, we will be providing compensatory habitat measures to ensure that the effects of Hinkley Point C will not prevent favourable conservation status being maintained within or achieved for the Severn Estuary and relevant designated sites.
- 5.3.3 Although there are examples of AFD systems being used at power stations in the UK and around the world, there are no examples of such systems being installed permanently in an

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offshore environment, or in conditions as harsh as those encountered in this part of the Bristol Channel. AFD systems are typically installed near the shoreline within sheltered Estuaries or in inland waters (rivers and lakes). AFD systems are easier to install, maintain and repair in such locations, as fewer sound projectors are required and the proximity of the intake to the shore means that the system can be installed, maintained and repaired with limited disruption being caused by weather, water clarity and tidal conditions.

5.3.4 At the time of the DCO application, AFD systems were regarded as emerging best practice. However, a design had not at that time been worked up by NNB or any other operator around the world in a location similar to Hinkley Point C. It was agreed that detailed design would be carried out by NNB following the granting of the DCO which would then be presented as part of a submission to discharge DCO Requirement CW1. NNB therefore undertook an extensive two-year programme to develop a design for an AFD system that would work during the operation of the power station, taking into account the following key considerations:

- The hearing sensitivity of fish and marine organisms present in the area;
- The isolated offshore location: The intake heads will be located in an exposed location which is subject to high wave heights and frequent winter storms. These reduce the windows of time available to construct and maintain an AFD system;
- The tidal conditions: The Bristol Channel is characterised by a very large tidal range and a short period of 'slack water', when there is no significant movement either way in the tidal stream water. The tidal range (more than 10m between high and low tide) and fast current velocities (up to 1.8 metres per second at the intake head locations) mean that the only time available to undertake maintenance safely is approximately 30 to 60 minutes per tide at slack water;
- The water in the Severn Estuary has almost no visibility because of the high levels of suspended sediment (turbidity). This presents significant risks and constraints for offshore installation, maintenance **and repair** activities, particularly for divers; and
- The nuclear safety classification of the intake heads: The sound modelling undertaken by NNB confirmed that the sound projectors for an AFD system would need to be mounted on or close to the intake heads in order to provide effective fish deterrence. However, as the cooling water system provides a function that is safety critical for the operation of the reactors, the design of the AFD system would need to meet the high design standards that are applied to all of Hinkley Point C's safety critical systems.

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- 5.3.5 Reflecting the complexity of these considerations, the optimum design identified by NNB would require a total of 288 underwater sound projectors (72 projectors per intake head), located along the sides of each intake head.
- 5.3.6 The installation of permanent structures with rails and/or lifting frames to raise the sound projectors out of the water for maintenance was considered but was concluded not to be practical. The sound projectors would therefore need to be fixed to structures and installed/recovered (for maintenance) in clusters by divers.
- 5.3.7 Figure 17 illustrates a potential design identified by Hinkley Point C (AFD system infrastructure shown in yellow).

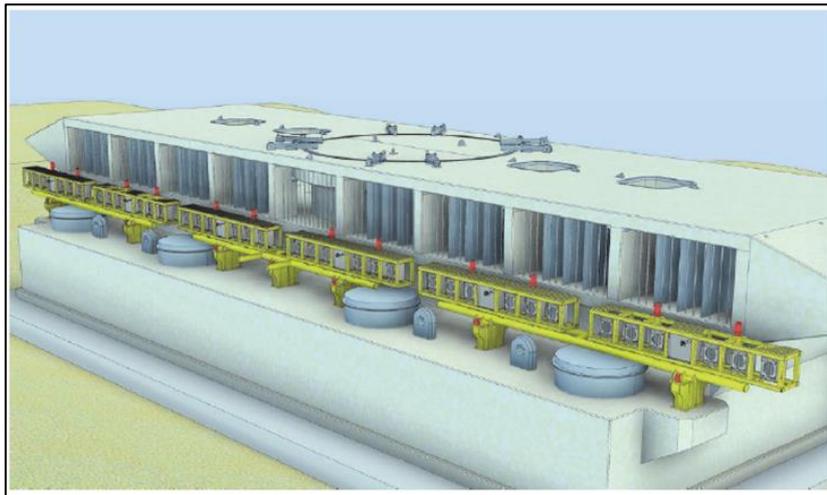


Figure 17 - Potential siting of AFD structures as part of the LVSE intake head

5.4 Why we cannot install and maintain an AFD - Safety risks

- 5.4.1 As part of the design process, consideration was given to the installation, maintenance and repair requirements for an AFD system. During the preparation of this consultation a further review has been carried out to ensure that the information is up to date.

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- 5.4.2 NNB has concluded that the use of remotely operated vehicle ('ROV') technology on its own cannot currently overcome the significant challenges associated with the installation, maintenance and repair activities an AFD system would require. It is also highly unlikely that ROVs would ever on their own be an effective solution for the installation, maintenance or repair activities an AFD system would require.
- 5.4.3 Divers would therefore also be needed for the installation, maintenance, and repair of the AFD. NNB is applying to remove the requirement to fit an AFD system from the DCO because, after lengthy and careful analysis, NNB has concluded that the involvement of divers in the installation, maintenance and repair of the AFD system presents intolerable and unjustifiable health and safety risks due to the risk to human life involved.
- 5.4.4 The challenging conditions in the Severn Estuary due to the high tidal range and zero or near zero visibility conditions combined with the complexity of the tasks to be carried out substantially increase the risk of diver entanglement, snagging, entrainment, pinning and trapping. Diver umbilicals could also become pinned or trapped, cutting air and communications to divers and putting their lives at severe risk. Divers are also vulnerable to water flow, suction or turbulence, whether natural or caused by water intakes or discharges. These operations, however, would require divers to carry out maintenance or repair work within the vicinity of intake heads which are actively drawing in water. This would be the case even if the reactors are put into shutdown mode, as water would still need to be taken into the Cooling Water System to cool the reactors. Divers would also need to operate adjacent to sound projectors designed to produce sound pressure levels of >160 db re 1µPa across the surface of the intake screens and noise at the sound frequency range of 30-600 Hz, with the capability of operating up to 2,000 Hz. To protect divers, the AFD system may have to be switched off for the duration of planned maintenance or unplanned repair work.
- 5.4.5 NNB is therefore firmly of the view that compliance with health and safety legislation, principles and guidance could not be achieved if divers were required to undertake work at the level of frequency and exposure to the high risks that such complex work would entail. This is because NNB has legal duties which require risks to be eliminated or designed out where feasible.
- 5.4.6 Maintenance of the system would take at least 72 days per year. Taking into account the tidal conditions (tidal range and short periods of slack water) and weather conditions at Hinkley Point, it is unlikely that there will be 72 days in the year suitable for maintenance activities. The isolated offshore location further reduces the windows of time available to install an AFD

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system (or other fish deterrent system), due to high wave heights and frequent winter storms. This would cause additional delays if contractors could not be deployed due to bad weather.

5.5 The reasons why ROV technology alone cannot be used for the installation, maintenance and repair tasks for an AFD system at the Hinkley Point C intake location

- 5.5.1 ROVs do not now and are unlikely in the future to have the capability to carry out the installation, maintenance and repair tasks required at Hinkley Point on their own. This means that divers would also be needed for these tasks. This is because the use of ROVs at Hinkley Point faces significant technical feasibility challenges. This includes factors such as the lack of operational visibility due to the location's high turbidity, ROV operational reliance on sonar, the need to operate in strong currents and the resulting high likelihood that an ROV's tether to the accompanying service boat would become entangled when flying in and around the AFD system and its associated framework.
- 5.5.2 In conclusion, NNB is firmly of the view that compliance with health and safety legislation, principles and guidance could not be achieved if divers were required to undertake work at the level of frequency and exposure to the high risks needed for the installation, maintenance and repair of an AFD system (or other fish deterrent system). Health and safety legislation, principles and guidance require NNB to eliminate risks to workers where feasible. The risks to employees and contractors undertaking the installation, maintenance and repair activities for an AFD system, particularly divers, would not be compatible with these requirements. These safety concerns make it appropriate to remove the requirement to install an AFD system at Hinkley Point C.

5.6 The ecological implications of not installing an AFD system

- 5.6.1 The Severn Estuary Special Area of Conservation ('SAC'), Severn Ramsar site, the River Usk SAC and the River Wye SAC are important and sensitive environments and NNB recognises its responsibility to protect them.
- 5.6.2 There are a number of important designated environmental sites located in the vicinity of Hinkley Point C that are protected by national and international legislation. These are designated for various ecological features such as fish species, certain habitat types including

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estuarine habitats, bird species and marine mammals. Accordingly, the potential direct and indirect effects of water abstraction on these designated sites, arising primarily from fish entrapment through the cooling water system but also from other aspects of the project, are important considerations and must be assessed by the competent authority when the Material Change Application is determined. This assessment is through a process known as a 'Habitats Regulations Assessment' ('HRA') under the Conservation of Habitats and Species Regulations 2017 ('Habitats Regulations'). NNB has accordingly prepared a 'Shadow HRA Evidence Report - Pre-Application Consultation Version' ('HRA Report') to inform this process.

- 5.6.3 As part of the Material Change Application and the related applications, other environmental assessments must also be undertaken and submitted pursuant to the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations), the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 and the Eels (England and Wales) Regulations 2009.
- 5.6.4 The HRA Report and the preliminary conclusions of the environmental impact assessment ('PEIR') have been published in support of this consultation. The Water Framework Directive and Eels reports will be updated prior to submission and submitted with the Material Change Application.

Identification of fish species for assessment purposes

- 5.6.5 The various assessments which are listed above to support the Material Change Application will be informed, in part, by fish impingement monitoring data collected from the Hinkley Point B cooling water drum screens.
- 5.6.6 Impingement monitoring at Hinkley Point B provides a powerful and locally applicable data set for establishing the baseline fish community within Bridgwater Bay. Impingement monitoring at Hinkley Point B has consisted of a 39-year, low intensity sampling programme known as the RIMP (Routine Impingement Monitoring Programme) and the CIMP (Comprehensive Impingement Monitoring Programme) which is a high-resolution sampling programme collecting samples over the course of a year.
- 5.6.7 The first CIMP (known as 'CIMP 1') was completed between February 2009 and January 2010.
- 5.6.8 In 2021 a second CIMP was undertaken ('CIMP 2') that ran between June 2021 and June 2022 and provided a final opportunity to estimate impingement at HPB prior to the station ceasing to generate electricity.

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- 5.6.9 During the original DCO application, 14 fish species were selected to be representative species of the assemblage found at Hinkley Point and assessed. The brown shrimp *Crangon crangon* was also assessed due to their abundance and importance in the food web. This number of species assessed increased to a total of 21 species for the variation of the Water Discharge Activity (WDA) Permit consultation process in 2019. Following CIMP 2, a total of 25 fish species and brown shrimp have been quantitatively assessed as representative taxa (as listed in Table 7).
- 5.6.10 Both datasets have been used in the assessment, depending on the species in question, in order that the most precautionary case is assumed.

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Species	Conservation importance			Ecological Importance	Socio-economic value
	Ramsar†	Annex II*	NERC**		
European seabass				✓	✓
Atlantic cod			✓	✓	✓
Whiting			✓	✓	
Atlantic herring			✓	✓	
Twaite shad	✓	✓	✓		
Allis shad	✓	✓	✓		
Atlantic salmon	✓	✓	✓		
Dover sole			✓	✓	✓
European plaice			✓		
Sprat				✓	
European flounder				✓	
Five-beard rockling				✓	
Sand goby				✓	
Poor cod				✓	
Common sea snail				✓	
Bib (pout)				✓	
Thin-lipped grey mullet				✓	
Conger eel				✓***	
Lesser spotted dogfish				✓***	
Blue whiting			✓		
Thornback ray					✓
European eel	✓		✓		
Sea trout	✓		✓		
Sea lamprey	✓	✓	✓		
River lamprey	✓	✓	✓		
Brown shrimp (invertebrate)				✓	

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Table 7 - Species that will be assessed in the Material Change Application and their selection criteria
(based on both CIMP datasets & the RIMP)

† Ramsar Criterion 4 species of the assemblage of migratory species.

* Species listed under Annex II of the Conservation of Habitats and Species Regulations 2017 (Habitat Regulations).

** S41 Priority Species¹ of the Natural Environment and Rural Communities (NERC) Act 2006.

*** Conger eel and lesser spotted dogfish were selected in addition on the basis of their contribution to total impinged biomass.

Effects on fish populations in the absence of an AFD

- 5.6.11 In writing its HRA Report, NNB has taken into account the results of an assessment made by the Secretary of State when determining a previous application that NNB made to the Environment Agency on 15 February 2019 to vary an environmental permit for Water Discharge Activities ('WDA') EPR/HP3228XT ('WDA Permit'). The variation sought by NNB was to remove the condition on the WDA Permit which required installation of an AFD system. The assessment considered two impact pathways, namely fish entrapment and pollution from the FRR system.
- 5.6.12 Cefas undertook a comprehensive series of assessments to determine the effects of water abstraction on fish populations in the absence of an AFD.
- 5.6.13 The assessments in 2019 updated the original impingement assessment submitted within the DCO application for Hinkley Point C in 2011, when development of the cooling water system was at an early stage. The 2011 assessment was based on the best available information at that time. Since the DCO application was submitted, there have been considerable advances in scientific understanding and knowledge of the Bristol Channel fish community. The updated evidence was presented as part of the WDA Permit consultation documents in 2019 (TR456 report). For all species assessed, the predicted losses relative to the population comparator were below 1% of the population annually.

¹ <http://publications.naturalengland.org.uk/publication/4958719460769792>

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- 5.6.14 When assessing NNB's application to vary the WDA Permit, the Environment Agency applied different methods for calculating the effects that losses of small (juvenile) fish, typically impinged at Hinkley Point, would have on spawning populations.
- 5.6.15 The Environment Agency were unable to conclude that the proposal would not adversely affect the integrity of four European / Ramsar sites. This was on the basis of effects on Annex II / Ramsar Criterion 4 migratory fish species Atlantic salmon, Allis shad, and twaite shad that are qualifying features of designated sites, and the marine species Atlantic cod, whiting, European seabass, and Atlantic herring that form part of the typical fish assemblage species that form a sub-feature of the Annex I Estuaries qualifying habitat feature of the Severn Estuary SAC (see Table 10 for more information).
- 5.6.16 A public inquiry (the WDA Permit Inquiry relating to NNB's appeal for non-determination) was held by the Planning Inspectorate in June 2021 that focused on the seven species and on the designated sites that the Environment Agency had identified as being of concern. Table 10 shows the qualifying species and designated sites that were agreed by the Environment Agency at the public inquiry.

Relevant European site

Severn Estuary Special Area of Conservation (SAC)

Severn Estuary Ramsar*

Interest feature

Annex I qualifying habitat

- Estuaries – the Estuaries feature includes a typical fish species assemblage

(More than 100 species of fish have been reported within the Severn Estuary, the Environment Agency identified Atlantic salmon, Allis shad, Twaite shad, as well as Atlantic cod, whiting, European seabass and Atlantic herring as species within the assemblage as being of concern during the WDA Permit inquiry).

Annex II qualifying species

- Twaite shad

Criterion 4 migratory fish species assemblage

- Atlantic salmon
- Allis shad
- Twaite shad

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Relevant European site

River Usk SAC

River Wye SAC

Interest feature

Annex II qualifying species

- Atlantic salmon
- Twaite shad

Annex II qualifying species

- Atlantic salmon
- Twaite shad

Present but not a primary reason for site selection

- Allis shad

** In his Decision Letter, the Secretary of State for Defra noted that: "For the reasons given at IR11.39-46, the Secretary of State agrees with the Inspector that the agreed species of relevance, Atlantic cod, European seabass, Atlantic herring and whiting, are not species to take into account when considering impacts on the Ramsar site. He notes that the Ramsar criteria (on which Ramsar sites are designated) draw a distinction between Criterion 8 (habitats), under which the Severn Estuary Ramsar site was designated, and Criterion 7 (criteria based on fish populations), which do not form part of the site's designation. The Secretary of State further agrees with the Inspector that this does not alter the position that the migratory species, Atlantic salmon, allis shad and twaite shad, are relevant features for assessment against Criterion 4 (criteria based on a wetland's role in supporting plant and/or animal species at a critical stage in their life cycles)."*

Table 8 - Species and habitats of relevance during the WDA permit inquiry

- 5.6.17 In the report to the Secretary of State following the WDA Permit Inquiry², the Inspector acknowledged that there was precaution in the Environment Agency approach but concluded that adverse effects for Atlantic cod (of up to 15.7% of the population annually) European seabass (1-2%), Whiting (1-6%), and Atlantic herring (up to 4% of landings) could not be excluded due to the predicted level of impacts and the current poor status of the populations of these species.
- 5.6.18 Reductions in these species led to the concern about predator-prey interactions and that the favorable conservation status can be maintained or restored, and the conservation objective of the estuary habitat feature be met. The Secretary of State concluded that adverse effects on the integrity of the Severn Estuary SAC could not be excluded beyond reasonable scientific doubt.
- 5.6.19 Atlantic salmon, Twaite shad and Allis shad are all qualifying Annex II species of the designated sites of relevance to Hinkley Point C (see Table 8). Both Cefas and the Environment Agency's assessments predicted annual effects well below 1% of each SAC population, except for Allis

² PINS 2021. Report to the Secretary of State for Environment, Food and Rural Affairs. APP/EPR/573. December, 2021

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shad from the River Wye where the Environment Agency assumed that a small population was present and predicted effects up to 1.6% of the population. The assessment approach applied by Cefas, as technical advisors to NNB during the WDA inquiry, indicated that annual losses would be below 0.1% of the population of each SAC's qualifying species. Such losses were not predicted to have a significant effect on the population size or long-term sustainability. Therefore, it was concluded by NNB that there were no adverse effects on integrity.

- 5.6.20 Whilst it was acknowledged that the losses of qualifying Annex II species were low, residual uncertainties in the data and the status of the population relative to the conservation objectives led the Environment Agency and Inspector to conclude that adverse effects on the integrity of the designated sites could not be excluded beyond reasonable scientific doubt³. For this reason, NNB has agreed with the Environment Agency, Natural England, Cyfoeth Naturiol Cymr/Natural Resources Wales and the Marine Management Organisation that the application for a change to the DCO to remove the requirement to fit an AFD system will be premised on the Environment Agency's approaches to assessing population effects. The assessments in the HRA Report and PEIR update the figures used in the WDA Permit Inquiry using data from CIMP1 and new data collected during CIMP2 as well as incorporating the most recent available evidence. Since January 2023, NNB has been engaging with these parties to develop our Habitat Regulations 'derogation' case for the change. Having two estimates highlights changes in impingement between the two sampling periods because of natural variability in fish populations over time.
- 5.6.21 In the absence of an AFD, impingement rates are anticipated to increase, with some species being impacted by the change more than others. The removal of the AFD is not expected to have a meaningful effect on the amount of entrained organisms and no benefit of the AFD was applied in previous assessments of entrainment. This is because many individuals susceptible to entrainment, would be too small to actively avoid the intake even if they could sense the AFD. Furthermore, responses to juvenile fish to an AFD may vary from adult fish and few studies have determined age or size effects (Putland & Mensinger, 2019).
- 5.6.22 The methods for determining losses from the Severn Estuary SAC's typical fish species assemblage and subsequent population level effects are summarised here with more detail provided in the HRA Report (Section 6). The number of fish predicted to be impinged at Hinkley Point C annually was calculated using the annual Hinkley Point B losses factored to take

³ PINS 2021. Report to the Secretary of State for Environment, Food and Rural Affairs. APP/EPR/573. December, 2021

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account of the pumping capacity at Hinkley Point C. An estimate of the total number and weight of all fish that would be lost through Hinkley Point C annually (in the absence of an AFD) is given in Table 9. This represents the estimated annual losses of fish due to impingement from the estuary typical fish species assemblage.

Dataset	Annual number of fish lost due to impingement mortality from the assemblage	Annual weight of fish lost due to impingement mortality from the assemblage (t)
CIMP1	2.59 million	45.8
CIMP2	1.83 million	18.1

Table 9 - Predicted mean numbers and weight (t) of all fish species subject to impingement mortality with LVSE capped head mitigation and FRR mitigation (without AFD) by Hinkley Point C in CIMP1 and CIMP2. Note that these are raw numbers and weights and represent losses of fish from the estuary that are predominantly juvenile stages.

- 5.6.23 Since these impingement numbers represent mostly juvenile fish, and not all juveniles would naturally survive to become adults, factors are applied to convert the juvenile numbers to the number of adult equivalents, using the Environment Agency extension to the Cefas methods. This allows a population level assessment to be established. Estimates of equivalent adults predicted to be lost due to entrainment or fish too small to be impinged are added to the assessment based on data collected in ichthyoplankton surveys.
- 5.6.24 To evaluate the effects of entrapment of equivalent adults, losses must be compared against a suitable estimate of the population (as a %). This may be the number or weight of adults (spawners) in the population. For the Annex II/Ramsar Criterion 4 species, losses were compared against estimates of the numbers of adults in the population. For these species, comparisons must be made against the population estimates of each of the sites for which the species is a designated feature. Total losses are compared to each population because it is not known which designated site the impinged fish would have come from or be returning to. Therefore, to provide the most precautionary assessment, the predicted total number of equivalent adults lost is compared against the adult population size of each site separately (Table 10).

Species / Site / Dataset	Predicted equivalent adults lost per annum	Population estimate (adult numbers)	Predicted impingement effect (% population)	Entrapment uncertainty assessment - L95%-U95% CI (% population effect)
Twaite shad Severn Estuary SAC and Ramsar site*				
CIMP1	48	86,674	0.08%	0.02% – 0.34%

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Species / Site / Dataset	Predicted equivalent adults lost per annum	Population estimate (adult numbers)	Predicted impingement effect (% population)	Entrapment uncertainty assessment - L95%-U95% CI (% population effect)
CIMP2	104	NA	NA	NA
Twaite shad River Usk SAC*				
CIMP1	48	21,674	0.22%	0.07% – 1.35%
CIMP2	104	NA	NA	NA
Twaite shad River Wye SAC*				
CIMP1	48	43,348	0.11%	0.04% – 0.67%
CIMP2	104	NA	NA	NA
Allis shad Severn Estuary Ramsar site†				
CIMP1	11	1,083	0.99%	0.29% – 6.24%
CIMP2	NA	NA	NA	NA
Allis shad River Wye SAC†				
CIMP1	11	433	2.47%	0.71% – 15.68%
CIMP2	NA	NA	NA	NA
Atlantic salmon Severn Estuary Ramsar site‡				
CIMP & RIMP	22	17,616	0.08%	<0.01% – 0.36%
Atlantic salmon River Usk SAC‡				
CIMP & RIMP	22	6,269	0.21%	<0.01% – 1.09%
Atlantic salmon River Wye SAC‡				
CIMP & RIMP	22	5,890	0.23%	<0.01% – 1.01%

Table 10 - Predicted number of equivalent adults of the WDA Permit inquiry Annex II/ Criterion 4 species that would be lost annually through impingement by Hinkley Point C (without AFD), using the Environment Agency approaches. Population effects and 95% confidence intervals accounting for uncertainty in the input parameters, are provided.

*For twaite shad in CIMP2, no estimate of the predicted impingement effect is given, due to uncertainties in the adult population size. Further information is provided in the HRA Report.

†No Allis shad were recorded in CIMP2, and therefore no assessment was possible.

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‡For Atlantic salmon, all available data from the RIMP and both CIMP1 and CIMP2 were used to provide a single assessment.

- 5.6.25 The four marine species from the assemblage are all subject to commercial fishing and for Atlantic cod, whiting and European seabass, annual international assessments are undertaken to estimate the stock status. The geographical areas largely adopted by the Planning Inspector following discussion at the public inquiry are used in the updated assessments. The updated predicted impingement effects (%) for each species in CIMP1 and CIMP2 is given in Table 11.
- 5.6.26 For Atlantic herring, this species does not have a full analytical stock assessment, and losses were compared against the reported commercial landings. The resulting assessment of the % effect is more precautionary because landings only reflect a small part of the adult stock.
- 5.6.27 Additional detail on the assessment process is given in the HRA (Section 6).

Species / Dataset	Predicted equivalent number of adults lost per annum	Predicted equivalent weight (t) of adults lost per annum	Re-scaled population estimate (t)	Predicted entrapment effect (% re-scaled population)	Uncertainty assessment - L95%-U95% CI (% re-scaled population effect)
Atlantic cod					
CIMP1	37,994	180.05	1,195	10.03%	3.12% – 23.56%
CIMP2	3,347	8.50	278	2.09%	0.76% – 4.37%
Atlantic herring					
CIMP1 (landings)	31,797	2.07	157	2.99%	2.37% – 3.90%
CIMP2 (landings)	92,438	7.78	23	48.36%	29.74% – 80.66%
CIMP1 (PELTIC biomass)	31,797	2.07	1,723	0.12%	0.01% – 0.51%
CIMP2 (PELTIC biomass)	92,438	7.78	2,198	0.18%	0.02% – 0.69%
Whiting					
CIMP1	1,008,748	300.61	2,917	13.23%	7.05% – 21.29%
CIMP2	143,522	22.68	1,840	1.61%	0.70% – 3.09%
European seabass					
CIMP1	8,823	9.92	650	1.70%	0.85% – 2.78%

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Species / Dataset	Predicted equivalent number of adults lost per annum	Predicted equivalent weight (t) of adults lost per annum	Re-scaled population estimate (t)	Predicted entrapment effect (% re-scaled population)	Uncertainty assessment - L95%-U95% CI (% re-scaled population effect)
CIMP2	2,753	3.29	368	1.18%	0.51% – 2.39%

Table 11 - Predicted number of equivalent adults and equivalent adult weight (t) that would be lost annually through entrapment by Hinkley Point C (without AFD), for the WDA Permit Inquiry marine assemblage species using the Environment Agency approaches. The re-scaled population estimate (spawner biomass, t), and the predicted entrapment effect (as a percentage of the spawning biomass) is also given. The Lower (L95%) and Upper (U95%) Confidence Intervals ('CI'), account for variability in the input parameters used to predict the numbers of entrapped fish.

FACT BOX	In 2022 UK fishing vessels landed 640,000 tonnes of sea fish
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5.7 Environmental effects of the proposed change

- 5.7.1 As set out in the PEIR (Volume 2 -sections 3.5, 4.7, 5.9 and 6.6), the removal of the requirement to install an AFD was scoped out of the assessment for groundwater and landscape and visual as there are no possible effects due to the location of the AFD on the intake structures. The removal of the requirement to install an AFD was scoped into the Transport and Marine Ecology and Water Quality assessments.
- 5.7.2 **Table 12** summarises the anticipated change in effects on the environment compared to the effects assessed in the original Hinkley Point C DCO Environmental Statement as a result of the removal of the requirement to install an AFD (also set out in Tables 4-2, 5-9 and 5-12 and in Volume 2 of the PEIR).

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Summary of anticipated change in effects from the original DCO Environmental Statement

Proposed Change	Groundwater	Transport	Marine Ecology and Water Quality	Landscape and Visual
Removal of the requirement to install an AFD	Scoped out of assessment as no pathways which could give rise to significant effects on groundwater receptors due to the removal of the requirement to install the AFD.	Reduction in workforce numbers and Heavy Goods Vehicle traffic. No new or materially different likely significant transport effects.	Based on an entrapment assessment following the EA's methodology, significant effects on some fish species populations would be anticipated. It is not anticipated to result in significant effects on seabirds or marine mammals. Release of dead / decaying fish from the cooling water system may result in changes to marine water quality, however these are not predicted to be significant.	Scoped out of assessment as unlikely to give rise to significant landscape and visual effects due to the location of the AFD at the intake structures.

Table 12 - Summary of anticipated change in effects as a result of the proposed change

5.7.3 The HRA Report provided with this consultation should also be referred to for an explanation of the evidence and approach to assessment of the effect on protected sites of operating Hinkley Point C without an AFD system.

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6 THE HABITATS REGULATIONS 'DEROGATION' CASE FOR THE PROPOSED CHANGE

6.1 Introduction of derogation case

- 6.1.1 Under the Habitat Regulations, it is open to the Secretary of State to vary the DCO to remove the requirement to fit an AFD system even if s/he considers that there is a risk of an adverse effect on the integrity of any designated conservation site. In order to come to such a decision, NNB would need to demonstrate to the Secretary of State's satisfaction that there is no alternative solution to the proposed change, that there are 'imperative reasons of overriding public interest' ('IROPI') for the proposed change, and that any necessary compensatory measures will be taken to ensure that the overall coherence of the national site network (of designated sites) is protected. Under the Habitats Regulations, such a case is known as a 'derogation case'. The three elements of this case are outlined below but are set out in more detail in the HRA Report.

6.2 No alternative solution

- 6.2.1 Stage 3 of the HRA Report presents NNB's 'assessment of alternative solutions' for the Project and identifies the Project's 'genuine and critical' objectives, supported by relevant national and local policies. Only alternatives that meet or deliver the Project's needs and objectives, and which would also be less damaging to the European sites and not have an adverse effect on the integrity of the relevant European sites, are considered as potentially feasible alternative solutions to the Project in the context of the Habitats Regulations.

The need for the Project

- 6.2.2 NNB is applying to remove the requirement to fit an AFD system from the 2013 DCO because, after lengthy and careful analysis, NNB has concluded that there are significant technical feasibility problems associated with the design, installation, maintenance and repair of an AFD system in challenging tidal conditions of the Severn Estuary. This presents two key risks with the development as currently authorised:

6.2.2.1 First, there would be indefinite delays whilst an AFD system was developed and installed. This is because there was (and remains) no engineering precedent anywhere in the

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world for fitting an AFD system to open water intake heads, such as those at Hinkley Point C, in waters with a comparable tidal range and currents. Despite extensive work by NNB and its specialist advisors, the engineering difficulties proved so challenging that NNB made the decision in November 2017 not to proceed with the AFD system. If the Project is not approved and an AFD system is required, Hinkley Point C would not be able to commence operations in mid-2027, as planned. It would instead be necessary to delay the commencement of operations, potentially indefinitely, until an appropriate system had been designed, developed and tested. Approval of the Project allows that delay to be avoided and will ensure that HPC is able to contribute to meeting the urgent national need for a reliable and secure supply of new nuclear power.

6.2.2.2 Secondly, an important element of the technical feasibility problems associated with an AFD system is that the works in connection with it would need to rely heavily on ROVs. The independent expert advice that NNB has received is that existing ROVs fall significantly short of being able to undertake the work associated with the installation, maintenance and repair of an AFD system. This means it is highly unlikely that ROVs would ever, on their own, be an effective solution for the complex tasks which the installation, maintenance or repair activities an AFD system would require. The reasons why ROV technology alone cannot be used are discussed in Stage 3 of the HRA Report.

6.2.3 In the absence of suitable ROV technology to undertake the necessary tasks at the level of accuracy and reliability required for the installation, maintenance and repair of an AFD system, NNB would need to rely heavily on the use of human divers to undertake these activities. Doing this would expose divers to significant periods, on a regular basis, to intolerable health and safety risks which could lead to their deaths. NNB is firmly of the view that compliance with health and safety legislation, principles and guidance could not be achieved if divers were required to undertake work at the level of frequently and exposure to the high risks that such complex work would entail. These intolerable health and safety risks are discussed in Stage 3 of the HRA Report.

Genuine and critical objectives of the Project

- 6.2.4 The following genuine and critical objectives of the Project have been identified, each of which is discussed in detail in Stage 3 of the HRA Report:
- Objective 1 – the need for low carbon energy from new nuclear power at Hinkley Point C to provide a secure and reliable energy supply for the UK;

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- Objective 2 – the urgent need for low carbon energy production;
- Objective 3 – the need for the Project to be technically feasible (technical considerations include whether a solution is technically capable of being designed, installed, maintained and repaired);
- Objective 4 – the need for the Project to be carried out in compliance with health and safety legislation;
- Objective 5 – the need to minimise fish entrapment; and
- Objective 6 – the need for design feasibility (design considerations include operational functionality; compliance with nuclear safety requirements and any site specific constraints).

Consideration of alternative solutions

- 6.2.5 Stage 3 of the HRA Report presents NNB’s ‘assessment of alternative solutions’ for the Project and concludes that there are no ‘alternative solutions’ in the context of the Habitats Regulations (Sections 10 and 11 of the HRA Report).

6.3 Imperative Reasons of Over-riding Public Interest

- 6.3.1 Stage 4 of the HRA Report presents NNB’s Imperative Reasons of Overriding Public Interest (‘IROPI’) case for the Project, in accordance with the requirements of the Habitats Regulations.
- 6.3.2 The assessment draws on the IROPI case established by the Government for the identification of Hinkley Point C as a potentially suitable site for new nuclear power generation in the National Policy Statement for Nuclear Power Generation (‘NPS EN-6’). The IROPI assessment undertaken is of the Project rather than Hinkley Point C, however, the IROPI case from NPS EN-6 in favour of Hinkley Point C is of direct relevance in making the IROPI assessment for the Project.
- 6.3.3 In addition, in the recent decision to grant a DCO for the development of new nuclear power at Sizewell C, the Government concluded that Sizewell C would provide a public benefit which is essential and urgent.
- 6.3.4 The reasons to approve the Project are demonstrably imperative, overriding and in the public interest:

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6.3.4.1 Imperative

- The public interest in allowing plans or projects to proceed are imperative when they are “required”, “indispensable” or “essential”. The imperative public interest, importance and urgency of delivery of the Project is evidenced in Stage 4 of the HRA Report by reference to established Government policy regarding:
 - The increasing demand in the UK for electricity;
 - The decreasing supply of electricity in the UK as coal-fired power stations close and existing nuclear power stations reach the end of their operational life;
 - The need for new electricity and new nuclear power;
 - The UK Government’s policy of decarbonisation; and
 - Energy security.

6.3.4.2 Overriding

- In order for the imperative public interest benefits from the delivery of the Project to meet the ‘overriding’ legal test, the national, regional and / or local benefits associated with the Project must be evidenced to demonstrate that they outweigh the harm (or risk of harm) to the integrity of the European / Ramsar sites identified in the appropriate assessment of the HRA Report. In light of the nationally important and long term imperative public interest benefits associated with the Project, it is clear that these benefits decisively outweigh and override the predicted risk of adverse effect on the integrity of the European / Ramsar sites from Hinkley Point C. Accordingly, the requirement that the Project has imperative reasons of *overriding* public interest is clearly met.

6.3.4.3 Public Interest

- For the delivery of the Project to be ‘in the public interest’, there must be clear public (as opposed to private) interest associated with the delivery at a national, regional or local level, which should also be long term. There are clear urgent (imperative) and significant public interest reasons for approving the Project and avoiding an indefinite delay to the commissioning and operational phases of Hinkley Point C. These public interest benefits include the national social and economic benefits associated with removing delays to the operation of Hinkley Point C together with the health and safety benefits of not designing into Hinkley Point C intolerable health and safety risks for human divers. The operation of Hinkley Point C will also support human health and public safety through the provision of

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baseload electricity for 60 years. The carbon avoidance associated with Hinkley Point C will also prevent or mitigate the severe impacts of climate change on the environment and biodiversity.

6.4 Compensatory Habitat Measures

Legal Context

6.4.1 Regulation 68 of the Habitats Regulations requires that where:

"(a) a plan or project is agreed to, notwithstanding a negative assessment of the implications for a European site or a European offshore marine site, or (b) a decision, or a consent, permission or other authorisation, is affirmed on review, notwithstanding such an assessment, the appropriate authority must secure that any necessary compensatory measures are taken to ensure that the overall coherence of the National Site Network (NSN) is protected."

6.4.2 There are a number of sources of domestic guidance in relation to this requirement, such as the Defra and Welsh Government advice at Gov.uk "[Habitats Regulations Assessments: protecting a European site](#)".

6.4.3 In practice, this requirement means that if the Secretary of State (as competent authority) is minded to grant consent for the Material Change Application notwithstanding the risk of an adverse effect on the integrity of any designated European or Ramsar conservation site, s/he may only do so if appropriate compensatory measures are secured.

6.4.4 NNB accepts the findings of the Secretary of State from the WDA Permit inquiry⁴ that, on a precautionary basis, an adverse effect on integrity of the following sites cannot be ruled out beyond reasonable scientific doubt in relation to the following "qualifying features":

Relevant European site	Qualifying feature
Severn Estuary/Mor Hafren SAC	Twaite shad

⁴ The inquiry was held as part of the appeal brought by NNB against the Environment Agency's failure to determine an application in respect of removal of the condition to fit an AFD in the WDA Permit.

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Relevant European site	Qualifying feature
Risk Usk/Afon Wsyg SAC	Estuaries qualifying habitat feature (via its typical fish species assemblage) Cod Twaite shad Atlantic salmon
River Wye/Afon Gwy SAC	Allis shad Atlantic salmon Twaite shad
Severn Estuary/Mor Hafren Ramsar Site	Criterion 4: migratory fish species assemblage

Table 13 - Qualifying Features of the SACs

- 6.4.5 The qualifying features of concern set out above are therefore the Twaite shad, Allis shad and Atlantic salmon migratory species (also known as "Annex II migratory species"); the migratory fish species assemblage of the Ramsar site; and the Estuaries qualifying habitat of the Severn Estuary SAC site (which includes a "typical fish species assemblage").

6.5 Ensuring that the overall coherence of the National Site Network (NSN) is protected

- 6.5.1 The term "*overall coherence of the National Site Network (NSN)*" found in Regulation 68 is not defined in the legislation. However National Resources Wales and Natural England have provided guidance to NNB on the compensatory habitat requirement which includes the following:

"...Whilst the term 'overall coherence of the National Site Network' is not defined by Regulation 68 of the Habitats Regulations, we consider that overall coherence of the network is its ability to sustain the most important areas for, and the full range and variation of, habitats and species of European importance in the UK making a significant ongoing contribution to their favourable conservation status (FCS). Network coherence is therefore dependent upon conservation objectives being met in individual European sites. However, the assessment of what is required to maintain overall coherence when developing compensatory measures in a particular case depends upon a number of site-specific factors including:

- The conservation objectives of the site in question that is affected; and
- The affected site's contribution to FCS of its habitats and species, including:

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- The number and status of protected habitats and / or species in the affected site; and
- The role the affected site plays in ensuring the biogeographical distribution of protected habitats and species.

We advise that compensatory measures are targeted at the designated habitats or species of the site which would be adversely affected by the project and are informed by the site's conservation objectives, the nature and the extent of the adverse effects, and the contribution of the site to the FCS of the affected habitats and / or species. To achieve their statutory purpose of maintaining overall network coherence, we advise that compensatory measures seek to offset effects to designated habitats or species within the affected site. Where this is not possible, compensatory measures may be located outside of the affected site, provided they maintain network coherence ..."

- 6.5.2 In order to discharge the compensatory measures requirement, the Secretary of State will need to make an evaluative judgment of the appropriateness and proportionality of NNB's proposed compensatory package to meet regulation 68 taking into account the matters referred to in this guidance.
- 6.5.3 In making that judgment it will need to be recognised that the "overall coherence" test is a broad test. As explained by the Advocate General (adviser to the Court) in a Court of Justice of the European Union case (C-521/12), the compensatory measures should offset or counterbalance the risk of harm *"through different, positive effects with a view to, at the very least, avoiding a net negative effect (and, if possible, achieving a net positive effect) within a wider framework of some description"*.
- 6.5.4 The compensatory measures test does not require the risk of an adverse effect on the integrity of the four individual European / Ramsar sites identified in this case to be fully / precisely negated or removed by NNB's compensatory measures. More specifically NNB's compensatory measures are not required to negate the precise nature of the risk to site integrity presented by the project or to replace through numerical equivalence every fish that will be impinged by Hinkley Point C.
- 6.5.5 Indeed, in some circumstances, such as in the marine environment as applies in NNB's case, to achieve "like for like replacement" or "equivalence" is not technically / scientifically possible. In this case it is not technically / scientifically possible or reasonably practicable to design or deliver compensatory measures to deliver "like-for-like" replacement of the exact numbers of

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each fish species and life history stage subject to impingement. Targeted measures to deliver specific species or address their proportional losses is not feasible.

- 6.5.6 The above factors, amongst others, have informed NNB's approach to developing an appropriate package of compensatory habitat measures in this case.

6.6 Compensatory measures in light of the risk of adverse effect on the Severn Estuary SAC through impingement of fish of the Estuaries habitat's typical fish species assemblage

- 6.6.1 Applying the principles explained in section 6.2, NNB's approach to compensation in relation to the risk of harm to the Estuaries qualifying habitat of the Severn Estuary SAC (from impingement of fish of the typical fish species assemblage) is to deliver benefits for the Estuaries qualifying habitat feature as a whole. These measures will certainly provide a significant benefit to the typical fish species assemblage of the Estuaries qualifying habitat (although will not "replace" the precise numbers and species of fish impinged since this is not the requirement). These measures will also benefit other aspects of the Estuaries qualifying habitat feature such as the wildfowl species assemblage and the vascular plant species assemblage of the Estuaries habitat feature.
- 6.6.2 This is appropriate in this case because, as explained above, compensatory measures are not required to replace the precise numbers and species of fish impinged and also because the qualifying feature of the Severn Estuaries SAC acknowledged to be at risk from the removal of the AFD requirement is the Estuaries habitat. Accordingly, the Estuaries qualifying habitat feature is in this respect the focus of the compensatory measures approach.
- 6.6.3 Four types of compensatory measures are proposed to benefit the Estuaries qualifying habitat (including its typical fish species assemblage). A description of each is set out below. There will also be benefits to the typical fish species assemblage of the Estuaries feature from the barrier removal works which are described below,

Saltmarsh and associated habitats

- 6.6.4 NNB is committed to deliver the creation and enhancement of approximately 340ha of saltmarsh and associated habitats. Creation of saltmarshes and associated habitats, including

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Atlantic salt meadows at higher tidal elevations, will enhance the biodiversity of the vascular plant species assemblage in the area. This will include an increase in species of particular nature conservation importance, including nationally rare and scarce salt-meadow/salt-marsh transition species, such as sea lavender (*Limonium vulgare*), glasswort (*Salicornia*), marsh mallow (*Althaea officinalis*), dotted sedge (*Carex punctata*), and marsh pea (*Lathyrus palustris*). Saltmarshes provide a resource for wading birds and waterfowl, support a high number of invertebrates and provide nursery areas for fish. Saltmarsh also provides socio-economic and ecosystem service benefits in terms of foraging (e.g. samphire), carbon sinks and dissipating storm/tidal wave energy.

- 6.6.5 An increase in the area/size of the saltmarsh habitat (a qualifying habitat of the Severn Estuary SAC in its own right and also forming part of the Estuaries qualifying habitat of the Severn Estuary SAC) will improve its natural functioning and make it more resilient to erosion, storm damage and succession. Saltmarshes in Estuaries are particularly at higher risk of increased erosion due to riverine flood events in the future due to climate change.
- 6.6.6 Saltmarshes are documented as important nursery and foraging grounds at high tide supporting juvenile fish species. Studies from across Europe show varying levels of utilisation of saltmarshes by different species²⁵. At least thirty of the species identified in Hinkley Point B impingement sampling are found in northern European saltmarsh habitats with species of mullet and goby as well as European seabass (*Dicentrarchus labrax*), sprat (*Sprattus sprattus*), sand smelt (*Atherina presbyter*), flounder (*Platichthys flesus*), European eel (*Anguilla Anguilla*) and herring (*Clupea harengus*) commonly utilising saltmarsh habitats.
- 6.6.7 Salt marshes are also used as feeding grounds for waterfowl (wildfowl and waders), grazing the saltmarsh plants directly or preying on the invertebrate fauna. Estimates of the amount of plant material consumed by waterfowl in saltmarsh and seagrass beds range from 1 - 50 %²⁶. For example, the brent goose (*Branta bernicla*) grazes *Puccinellia maritima* and *Aster tripolium* in high marsh at end of winter, while white fronted geese feed on *Agrostis stolonifera* and *Puccinellia maritima*. The shelduck *Tadorna tadorna* feeds extensively on *Hydrobia ulvae*.
- 6.6.8 At low tide, waders including red shank (*Tringa tetanus*), curlew (*Numenius arquata*) godwits (*Limosa limosa*) and (*Limosa lapponica*) use the exposed mud feeding on infaunal and epifaunal communities. Saltmarsh also supports gulls and birds of prey. The Severn Estuary Ramsar site has a nationally-important breeding population of lesser black-backed gull.

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- 6.6.9 There are two sites that NNB is proposing for delivery of this saltmarsh and associated habitats:

Pawlett Hams



Figure 18 - Plan of Pawlett Hams

- 6.6.10 Pawlett Hams is located on the right (east) bank of the River Parrett opposite the village of Combwich, approximately 3.4 km from the estuary mouth at Stert Point. The site comprises permanent, semi-improved grassland; some of which is arable land, and is intersected by a range of drainage ditches (rhynes), which act as a drainage system in winter and as stock barriers and drinking water supplies in the summer. There are no residential dwellings within the proposed site boundary. A 400 kV National Grid line crosses the site and is proposed to be retained. The site is currently bounded by the King Charles III England Coast Path which would need to be diverted inland. Pawlett Hams has been identified by NNB as a suitable site for saltmarsh and associated habitats because of its low-lying topography, existing network of waterways and drainage and because the site is identified within the Environment Agency's

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Shoreline Management Plan as a location which is expected to be inundated as a result of climate change.

Description of proposed works

- 6.6.11 The proposed compensation measure would create around 313ha of saltmarsh and associated intertidal habitat via breaching of the soft landscape flood defences and the excavation of new creeks that will allow tidal waters to flood the low-lying areas of the site. The works will be very similar to the wetland scheme developed by the Environment Agency and managed by the Wildlife and Wetlands Trust at Steart Marshes on the opposite bank of the River Parrett.

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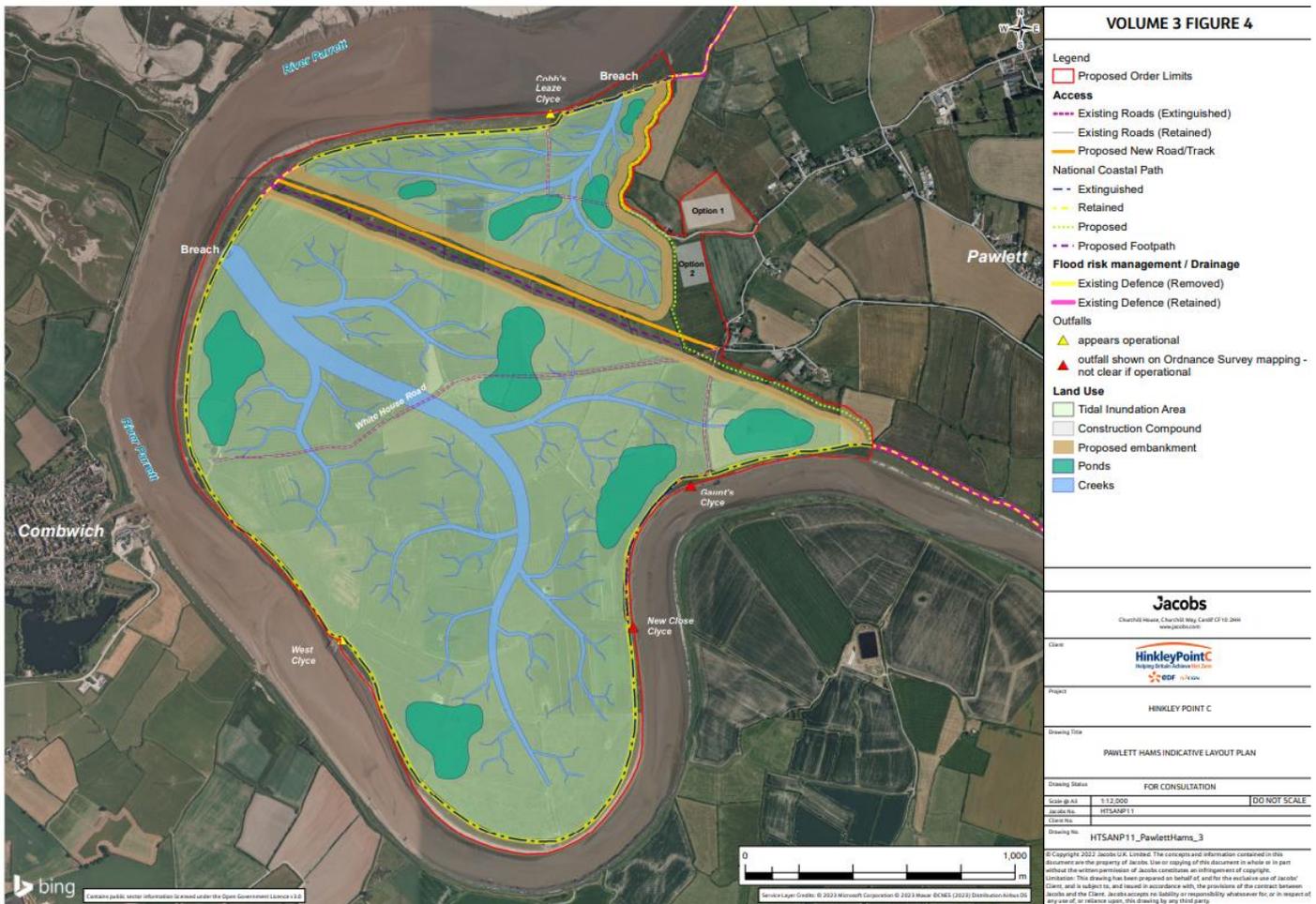


Figure 19 - Plan of Pawlett Hams

6.6.12 These habitats would be created in two compartments either side of the National Grid pylons. There will be a creek system connecting each intertidal compartment to the wider estuary through a single breach and a number of shallow pools to create additional shallow mudflat areas are also proposed. The breach, creeks and shallow pools could be subject to significant change at the detailed design stage. The total area of habitat that can be created within the scheme is less than the total footprint of the compartments since various works such as embankments and access corridors are needed.

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- 6.6.13 As the purpose of the compensation measure is ecological, it is not intended to create dedicated recreational routes through the saltmarsh and associated habitats and the King Charles III Coast Path will be realigned inland around the two compartments (as it is at Steart Marshes).

Environmental Considerations

- 6.6.14 The following is a list of environmental designations and features which are either within the proposed site or nearby. In each case we will assess the effects on the designation/feature (if any) and ensure that any effects are avoided, minimised and where necessary offset effects on existing habitats:
- Severn Estuary SPA/Ramsar within site.
 - Severn Estuary SAC bordering western boundary of site.
 - Bridgwater Bay Site of Special Scientific Interest (SSSI) within site.
 - Pawlett Hams Wetland Site which is an area of habitat restoration within the proposed site that was secured via a Section 106 agreement between Wyvern Waste Service Ltd and Somerset County Council in 2003 as habitat mitigation for the nearby Walpole landfill. It is understood to be managed as a raised water level area to promote ecological diversity and includes an area managed for lapwing.
 - Grade 3 agricultural land, used for grazing.
 - Coastal and floodplain grazing marsh (Priority habitat, designated under the UK Biodiversity Action Plan "priority habitat") throughout site and areas of coastal saltmarsh and mudflat (priority habitats) border the western boundary of the site.
 - The River Parrett is navigable from Stert Point (downstream extent to north of site) to Thorney Mills Bridge Lock (south of site) and commercial vessels use the river adjacent to site.
 - Site lies within National Character Area ("NCA") profile 142: Somerset Levels and Moors.
 - Combwich Area of High Archaeological Potential partially lies within the western side of the site and numerous non-designated heritage assets on the Somerset Historic Environment Record database are located within the site, although are considered to be between medium and low value.
 - Several Grade II Listed Buildings in Combwich on west bank (left) of River Parrett, approximately 300 m west of site.

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- King Charles III England Coast Path National Trail (BW27/12) borders the western edge of site (adjacent to the River Parrett) (which would need to be diverted inland at this site).

The Island



Figure 20 - The Island

- 6.6.15 The Island is located on the right (east) bank of the River Parrett opposite the opening to the Steart Marshes managed realignment, approximately 1.2 km from the estuary mouth at Stert Point. The site comprises saltmarsh habitat intersected by drains and is bounded by the King Charles III England Coast Path, which would remain in situ at this site. The Island has been identified by NNB as a suitable site for saltmarsh enhancement because of its low-lying topography and existing network of waterways and drainage.

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Description of proposed works

- 6.6.16 The proposed saltmarsh enhancement of approximately 27ha of land at The Island is in close proximity to the existing Steart Marshes wetland site, the Somerset Wetlands NNR, and the proposed compensation site at Pawlett Hams. Developing this location will provide good ecological connectivity between Steart Marshes wetland site, the proposed managed re-alignment at Pawlett Hams, and the Somerset Wetlands NNR, further contributing to the overall coherence of the national network of protected sites.
- 6.6.17 Enhancement of existing saltmarsh and associated habitats through the lowering of the existing high-level marsh to create a range of habitats more amenable to fish usage including tidal creek, mudflat and lower-level saltmarsh. The indicative proposals at The Island include the excavation of a new creek system leading into the marsh with proposed extensions to the existing creek and three shallow pools at the heads of the creeks to create additional shallow mudflat areas.

Environmental Considerations

- 6.6.18 The following is a list of environmental designations and features which are either within the proposed site or nearby. In each case we will assess the effects on the designation/feature (if any) and ensure that any effects are avoided or reduced.
- Severn Estuary SPA/Ramsar within site.
 - Severn Estuary SAC within site.
 - Grade 3 agricultural land.
 - Bridgwater Bay SSSI within site.
 - Somerset Wetlands National Nature Reserve bordering parts of site.
 - Coastal saltmarsh (priority habitat) throughout site.
 - The Somerset Historic Environment Record database (online) records several non-designated assets within the site which is considered to be of high archaeological potential. Such assets are considered of medium to low value. Site lies within National Character Area profile 142: Somerset Levels and Moors; a flat landscape.
 - King Charles III England Coast Path National Trail (BW 35/12) borders the eastern (landside) edge of the site (adjacent to River Parrett).

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- The River Parrett is navigable from Stert Point (downstream extent to north of site) to Thorney Mills Bridge Lock (south of site) and commercial vessels use the river adjacent to site.

Seagrass

- 6.6.19 NNB proposes to commit to the creation of 5ha of seagrass. Seagrass beds are currently present within the Severn Estuary⁵. They are not a qualifying feature for the Severn Estuary SAC in their own right, though they form part of the typical vascular plant species assemblage and the "*hard substrate habitats (including eel grass beds)*" of the Estuaries qualifying habitat feature of the Severn Estuary SAC.
- 6.6.20 Seagrasses are a key component of shallow coastal ecosystems, providing a range of ecosystem functions such as: sediment stabilisation and coastal protection, carbon cycling and sequestration, improved water quality and nutrient cycling, provision of habitat and support of diverse ecological communities. Seagrass beds are recognised as important nursery habitats, where juvenile and larval fish can shelter from predation and take advantage of the feeding opportunities presented. Therefore, successful creation / enhancement of seagrass beds could have numerous direct and indirect beneficial impacts for the typical fish species assemblage of the Estuaries qualifying habitat feature of the Severn Estuary SAC as well as for other Annex I qualifying habitats and Annex II qualifying species that are listed as primary reasons / qualifying features for the selection of the Severn Estuary SAC and other relevant European sites.
- 6.6.21 Natural seagrass beds have significant carbon sequestering capabilities and are estimated to store between 4.2 and 8.4 Pg carbon in the top metre of seagrass soils (of the total earth area covered by seagrass beds estimated to be between 300,000 and 600,000 km²)⁶. This beneficial effect is also seen for restored seagrass beds. The restored bed in Oyster Bay, Western Australia, had carbon stocks and carbon accumulation rates similar to those of

⁵ Natural England (N/A) ArcGIS Map Viewer. Available online at: <https://www.arcgis.com/apps/mapviewer/index.html?layers=e009f2adbc9b4028a34842b133c6636b> [Accessed: 04 October 2023]

⁶ Fourqurean, J. W., Duarte, C. M., Kennedy, H., Marba, N., Holmer, M., Mateo, M. A., et al. (2012). Seagrass ecosystems as a globally significant carbon stock. *Nat. Geosci.* 5, 505-509. doi: 10.1038/ngeo1477

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natural beds, with an estimated 15,000 tons of carbon being sequestered after a 10-year restoration project^{7,8}.

- 6.6.22 Seagrasses can remove microbiological contamination from the water, producing bioactive secondary metabolites with antibacterial and antifungal properties. This can reduce exposure to bacterial pathogens for fish, humans, and invertebrates by up to 50 % compared to sites with no seagrass⁹.

Kelp Forest

- 6.6.23 NNB commits to deliver 15ha of kelp forest. Kelp are ecosystem engineers, creating complex three-dimensional habitats that support diverse and productive communities^{10, 11}, modifying local abiotic processes such as light¹², sedimentation¹³ and water flow¹⁴. Therefore, successful creation and / or enhancement of kelp forests could have numerous direct and indirect benefits for the Annex I habitats and Annex II species that are listed as qualifying features of the Severn Estuary SAC, the River Wye SAC, the River Usk SAC and the Severn Estuary Ramsar site.

⁷ Potouroglou, M., Grimsditch, G., Weatherdon, L. and Lutz, S., (2020). Out of the Blue: the Value of Seagrasses to the Environment and People. United Nations Environment Programme.

⁸ Reynolds, Laura & Waycott, Michelle & McGlathery, Karen & Orth, Robert. (2016). Ecosystem services returned through seagrass restoration: Restoration of ecosystem services. *Restoration Ecology*. 24. 10.1111/rec.12360.

⁹ Lamb, J.B., van de Water, J.A.J.M, Bourne, D.G., Altier, C., Hein, M.Y., Fiorenza, E.A. et al. (2017). Seagrass ecosystems reduce exposure to bacterial pathogens of humans, fishes, and invertebrates. *Science* 355(6326), 731-733. <https://doi.org/10.1126/science.aal1956>

¹⁰ Steneck RS, Johnson CR (2014). Kelp forests: dynamic patterns, processes, and feedbacks. In: Bertness MD, Bruno JF, Silliman BR, Stachowicz JJ, editors. *Marine Community Ecology and Conservation*. Massachusetts: Sinauer Associates, Inc.

¹¹ Teagle H, Hawkins SJ, Moore PJ, Smale DA (2017). The role of kelp species as biogenic habitat formers in coastal ecosystems. *Journal of Experimental Marine Biology and Ecology*;492:81-98.

¹² Wernberg T, Kendrick GA, Toohey BD (2005). Modification of the physical environment by an *Ecklonia radiata* (Laminariales) canopy and implications for associated foliose algae. *Aquatic Ecology*.;39:419-30.

¹³ Eckman JE, Duggins DO, Sewell AT (1989). Ecology of understory kelp environments. I. Effects of kelp on flow and particle transport near the bottom. *Journal of Experimental Marine Biology and Ecology*.;129:173-87.

¹⁴ Rosman, J. H., J. R. Koseff, S. G. Monismith, and J. Grover. (2007). A field investigation into the effects of a kelp forest (*Macrocystis pyrifera*) on coastal hydrodynamics and transport. *J. Geophys. Res.* 112:C02016

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- 6.6.24 Kelp forests attenuate wave energy and velocity, reducing wave size by up to 60 %¹⁵. This can serve as a buffer against storm surges¹⁶, providing an indirect benefit with respect to coastal defence.
- 6.6.25 Kelp plays a vital role in the maintenance of fish stocks and ecosystem structure, and therefore indirectly help to sustain regional fisheries and the coastal communities they support. Kelp dominated habitats also offer a range of recreational activities, such as diving and angling¹⁷.
- 6.6.26 Discussions are ongoing with the relevant bodies, with regard to location, scale and approach to implementation.

Oyster Beds

- 6.6.27 NNB commits to delivering 1-2ha of oyster beds. Native oysters (*Ostrea edulis*) live on the seabed in shallow coastal waters and Estuaries, forming dense reefs where conditions are favourable. Historically, native oyster reefs were widely distributed around UK coasts, however distribution is now limited, with 95 % being lost¹⁸.
- 6.6.28 Native oysters are a keystone species, providing numerous ecosystem services, including reef formation, erosion control, improvement of water quality (through cycling and purification), raw material supply and food provision¹⁹.
- 6.6.29 Native oyster reefs are formed when aggregations of living oysters and dead shells form an extensive biogenic habitat on the sea floor. Native oysters can then form 'reef' structures, which provide habitat and refuge for a diversity of organisms, such as juvenile fish and invertebrates.

¹⁵ Mork, M., (1996). The effect of kelp in wave damping. *Sarsia*, 80(4), pp.323-327.

¹⁶ L ovas, S. M. and A. Torum. (2001). Effect of the kelp *Laminaria hyperborea* upon sand dune erosion and water particle velocities. *Coast. Eng.* 44: 37-63.

¹⁷ Beaumont, N. J., M. C. Austen, S. C. Mangi, and M. Townsend.(2008). Economic valuation for the conservation of marine biodiversity. *Mar. Pollut. Bull.* 56:386-396

¹⁸ Coen, L.D., Brumbaugh, R.D., Bushek, D., Grizzle, R., Luckenbach, M.W., Posey, M.H., Powers, S.P. and Tolley, S.G., (2007). Ecosystem services related to oyster restoration. *Marine Ecology Progress Series*, 341, pp.303-307.

¹⁹ ECSA (2016). Restoring Meadow, Marsh and Reef (ReMeMaRe). Available online at: <https://ecsa.international/reach/restoring-meadow-marsh-and-reef-rememare>. [Accessed: 04 October 2023]

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- 6.6.30 Therefore, successful creation or enhancement of native oyster reefs could have numerous direct and indirect beneficial impacts for the Estuaries qualifying habitat feature of the Severn Estuary SAC as well as for the Annex II qualifying species of the Severn Estuary SAC, the River Usk SAC and the River Wye SAC and the Criterion 4 migratory fish assemblage of the Severn Estuary Ramsar site.

6.7 Compensatory measures in light of the risk of adverse effect on the integrity of the Severn Estuary SAC and Ramsar site, River Usk SAC and River Wye SAC through impingement of Annex II fish species and fish species of the Criterion 4 migratory species assemblage

- 6.7.1 The legal principles set out above are equally applicable when assessing the appropriateness and acceptability of the compensation measures relating to the Annex II fish species and the Criterion 4 migratory fish species assemblage. The difference in the application of those principles to these receptors lies in the focus of the compensatory measures, in that these must be directed at the relevant Annex II species themselves (Twaite shad, Allis shad and Atlantic salmon) and the Criterion 4 migratory species assemblage, because these are the relevant qualifying features.
- 6.7.2 NNB's compensatory measures will comprise measures targeted at benefiting these receptors.
- 6.7.3 The key measures proposed by NNB for these receptors are the removal or easement of fish barriers in rivers to improve fish reproductive success and survival (although the habitat creation / enhancement measures above will also benefit these receptors to some extent). Migratory fish such as salmon and shad transit through the lower reaches of the Severn Estuary en route to their spawning grounds in the upper reaches of the Severn, the Wye, the Usk and other tributary rivers where they reproduce. Human development has resulted in the introduction of structures such as weirs and sluices to these rivers. Those structures hamper the migratory fish's journey by creating artificial barriers in the river which, if they cannot be overcome, prevent fish from reaching their spawning ground and reproducing or delay passage, reducing spawning opportunities and potentially increasing the risk of mortality. Equally, barriers can disrupt the downstream migration of emigrating juveniles back to the marine environment. Providing passages around such structures or, where possible and

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practicable, removing or creating a break in the structure, can significantly ease the journey to the spawning ground and is an effective compensation measure.

6.7.4 At the present time, NNB is still assessing which weirs to carry out works to in order to provide appropriate compensation. Table 16 sets out the options being considered at each of the locations to provide an improvement to fish passage.

Option	Description	Benefits	Constraints
Bypass channel – New	Implementation of a naturalised bypass channel. Likely to include riffles, pools and other geomorphological features to enhance fish passage	<ul style="list-style-type: none"> • Multispecies passage • Creation of new river habitat 	<ul style="list-style-type: none"> • Potential impact on surrounding ecology / environment • Spoil generation • More dependent on existing topography
Technical pass	Some form to technical pass- e.g. Larinier pass (including potential incorporation of elver passes)	<ul style="list-style-type: none"> • Multispecies passage • Entrance co-located with weir • No spoil 	<ul style="list-style-type: none"> • No planned work on existing structures • Loss of conveyance capacity/control depending on design • May require additional engineering intervention depending on condition of weir

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			<ul style="list-style-type: none"> Limited associated benefits such as river habitat creation
Full / Partial weir removal	Removal of weir structure and associated bank works	<ul style="list-style-type: none"> Multispecies passage Improved river channel Limited spoil compared to new channel 	<ul style="list-style-type: none"> Bridge structure interaction Requirement for offtake feature Loss of conveyance capacity/control depending on design May require additional assets to mitigate flood risk impact

Maisemore Weir (River Severn)

6.7.5 Maisemore Weir is located on the River Severn in Gloucestershire, approximately 2 miles northwest of Gloucester City Centre. It was constructed in the 1870s, and is a large, shallow, broad crested weir. It is located at the approximate upper tidal limit of the River Severn but is drowned out during spring tides. Following consultation with the EA it is understood that the majority of shad migrating upstream in the River Severn do so via Maisemore Weir, however the weir is only passable at certain tide states or when river flows are high. Accordingly, Maisemore has been identified as a suitable weir by NNB in consultation with the Statutory Nature Conservation Bodies as it causes a barrier resulting in delays to upstream migration.

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- 6.7.6 Access to the weir is from the northern bank through private land, accessed via a reasonably short section of private road from Maisemore village. The village can be accessed via the A417. The M50 is approximately 10 miles away and the M5 is approximately 7 miles away.
- 6.7.7 It is understood that the weir here serves a function in retaining water levels into the eastern River Severn bifurcation approximately 350m upstream of the weir. Any works here would need to consider this requirement as this channel feeds into Gloucester Docks and account would also need to be taken of the sluice gate to the north of the weir.

Environmental Considerations

- 6.7.8 The following is a list of environmental designations and features which are either within the proposed site or nearby. In each case we will assess the effects on the designation/feature (if any) and ensure that any effects are avoided or reduced.
- Although there are no ecological designated sites within 2km, there are two SACs designated for bats within 30km, the Wye Valley and Forest of Dean Bat Sites, approximately 16km west.
 - The weir is located entirely within the Severn main river and within Flood Zones 2 and 3. There are a number of other waterbodies within 500m of the weir, and working areas may directly/indirectly impact these.
 - There are two Public Rights of Way ('ProW') within 200m, of which one is immediately adjacent (Maisemore footpath 12) to the north of the weir.
 - There are Grade II and II* listed buildings located within 400m of the site.

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Figure 21 - Maisemore Weir on the River Severn

Trostrey Weir (River Usk)

- 6.7.9 Trostrey Weir is located on the River Usk, some 3.8 km north west of Usk, directly below the B4598, and is the site of an existing gauging station. As such any work here would need to consider the ongoing gauging requirements of Natural Resources Wales. There is a newer gauging site upstream and it may be possible to transfer gauging operations to this site and enable work at Trostrey. The site is bound by steep topography to the north and lower-level farmland to the south which would enable access. The weir is located within an engineered channel with a sheet piled bank to the south.
- 6.7.10 Weir removal could be achieved by breaking out the crest and leaving the apron and headwalls or the complete removal of the entire structure. The former would require the import of river gravels and other bed materials to improve fish passage whilst the latter would require additional bank improvement works and erosion protection to reinstate a natural channel. A technical pass is possible on the southern end of the existing weir and a naturalised channel could also be achieved here. This option may include making use of the existing braided channel to the south subject to levels and flows being suitable.

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Environmental Considerations

- 6.7.11 The following is a list of environmental designations and features which are either within the proposed site or nearby. In each case we will assess the effects on the designation/feature (if any) and ensure that any effects are avoided or reduced.
- Ancient and broadleaved woodland is located on both riverbanks adjacent to the weir.
 - The weir is situated within the River Usk SAC and River Usk (Upper Usk) SSSI.
 - There are also three SACs designated for bats within 30km.
 - Usk Bat Sites SAC, approximately 16km northwest.
 - Wye Valley and Forest of Dean Bat SAC, approximately 17km northeast.
 - Wye Valley Woodlands SAC, approximately 17km east.
 - There are two Listed Buildings within 300m of the weir. The Listed Buildings are: Churchyard cross in Trostrey churchyard, Grade II, approximately 235m north of the weir and church of Saint David, Grade II*, approximately 250m north of the weir.
 - There is one scheduled monument within 300m of the weir: St. David's Churchyard Cross, Trostrey approximately 235m north of the weir.
 - The weir is located entirely within the Usk main river and within Flood Zone C2 and is at High risk of flooding from rivers.
 - There are numerous PRoW within 200m, the closest of which is a footpath (360 88/1) located on the northeast bank of the River Usk adjacent to the weir.

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Figure 22 - Trostrey Weir on River Usk

Upper Lode Weir (River Severn)

- 6.7.12 Upper Lode Weir is located on the River Severn approximately half a mile East of Tewksbury in Gloucestershire. The weir was completed in 1858 and is a large broad crested weir. It is upstream of the tidal limit, so is unaffected by tides. It is adjacent to the Upper Lode Lock, and the confluence of the River Avon. It serves an important function of controlling water levels into the marinas on the eastern side of Tewkesbury.
- 6.7.13 Access to the weir is restricted due to its location between the Severn Ham (an island formed by the River Severn and River Avon), and the Island holding the lock keeper's cottage. The Severn Ham is a designated SSSI as is the old route of the Severn on the northern side of the lock. There is a private access road to the lock, connecting to the A438 approximately half a mile away, with the M50 approximately 4 miles away.

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Environmental considerations

- 6.7.14 The following is a list of environmental designations and features which are either within the proposed site or nearby. In each case we will assess the effects on the designation/feature (if any) and ensure that any effects are avoided or reduced.
- The parcel of land adjacent to eastern end of the weir is almost entirely designated as Severn Ham, Tewkesbury SSSI. This land is also registered common land.
 - North of the weir is the Old Severn, which is also designated as Old River Severn, Upper Lode SSSI.
 - Although there are no other ecological designated sites within 2km, there is one SAC (Wye Valley and Forest of Dean Bat Sites) designated for bats within 30km.
 - The Island holding the lock keeper's cottage at the western end of the weir is designated deciduous woodland priority habitat. There are also several Ancient and Veteran trees to the western side of the River Severn.
 - The weir is located entirely within the Severn main river and within Flood Zone 3.
 - There are a number of other waterbodies within 500m of the weir, and working areas may directly/indirectly impact these.
 - There are numerous PRow within 200m, of which one is immediately adjacent and may need to be temporarily closed or diverted during construction.
 - The Historic Environment Record noted some Romano-British pottery within the 250m study area as well as Bushley Lock Keepers House, WWII earthworks and Upper Lode Weir. An archaeological watching brief was undertaken by Cotswold Archaeological Trust in May 1995 in connection with construction work for a new fish pass at Upper Lode Weir. The investigation noticed no archaeological stratigraphy due to the wholesale removal of any archaeological potential during the construction works on the weir.

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Figure 23 - Upper Lode Weir on River Severn

Manorafon Weir (River Towy)

Site Description

- 6.7.15 Manorafon Weir features two rock weirs, located on the River Towy in Carmarthenshire, approximately 5.5 km to the west of the town of Llandeilo and NNB is considering the more southerly of the weirs. Works on the River Towy would provide a potential option to improve fish passage in the wider area. This site currently operates as a water extraction site and a gauging station. These requirements would need to be considered going forward. The site is located in an open area of farmland with relatively shallow-sloped topography on both banks.

Environmental Considerations

- 6.7.16 The following is a list of environmental designations and features which are either within the proposed sites or nearby. In each case we will assess the effects on the designation/feature (if any) and ensure that any effects are avoided or reduced.
- The weir is located within the River Towy SAC and SSSI. There are no other ecologically designated sites located within 2km or within 30km designated for bats.
 - The weir is located entirely within the Towy and within a high risk flood zone, and is known to flood.

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- There are a number of other waterbodies within 500m of the weir, and working areas may directly/indirectly impact these.
- There is one listed building approximately 465m south of the weir. There are no other known heritage assets within the vicinity.



Figure 24 - Manorafon Weir on River Towy

Mousenatch Weir, Eyton Weir and Coxall Weir (River Lugg)

Site Description

- 6.7.17 These weirs are located in close proximity to each other, between 2 and 3.5km northwest of Leominster. NNB understands that they were built in the 1970s as part of the Leominster Flood Defence Scheme and are Environment Agency assets. The Environment Agency is currently considering the functional removal of Mousenatch, Eyton and Coxall.
- 6.7.18 In discussions with the Statutory Nature Conservation Bodies in January 2023, it was originally suggested that NNB should consider carrying out work to weirs on the Rivers Severn, Usk and Wye. Whilst suitable weirs were identified for the Severn and Usk as set out above, neither

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Natural Resources Wales nor the Environment Agency could recommend a suitable weir on the River Wye. The River Lugg however is a tributary of the River Wye which is why works on one of the weirs is being consulted on.

- 6.7.19 Environment Agency modelling has shown that the weirs offer no flood defence benefit but require ongoing maintenance and are a public safety risk. The functional removal of the block stone weirs would help ameliorate these unintended environmental consequences created by removing barriers to fish migration and allowing the river to once again function naturally. They also impact on the quality of two SSSIs, notably the River Lugg SSSI and the Lugg Meanders SSSI, as they interrupt the natural sediment regime of this reach of the river.
- 6.7.20 The compensation measures proposed here would be the functional removal of one of Mousenatch, Eyton and Coxall weirs. Accordingly, the constraints and benefits of other measures have not been assessed.

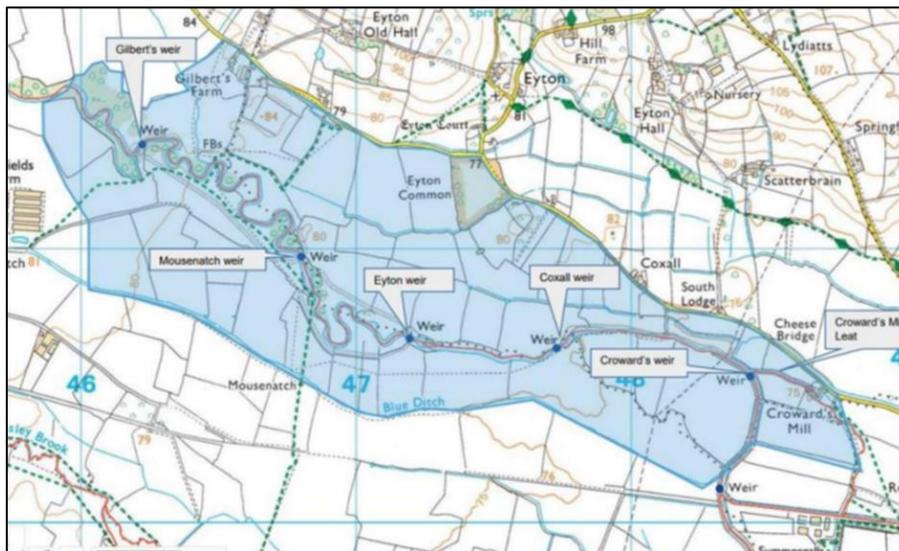


Figure 25 - Location of the Mousenatch Weir, Eyton Weir and Coxall Weir on the River Lugg. (please note that Crowards Weir is not part of this consultation, it is a discounted option) © Environment Agency

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Figure 26 - Mousenatch Weir © Environment Agency

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Figure 27 - Eyton Weir © Environment Agency

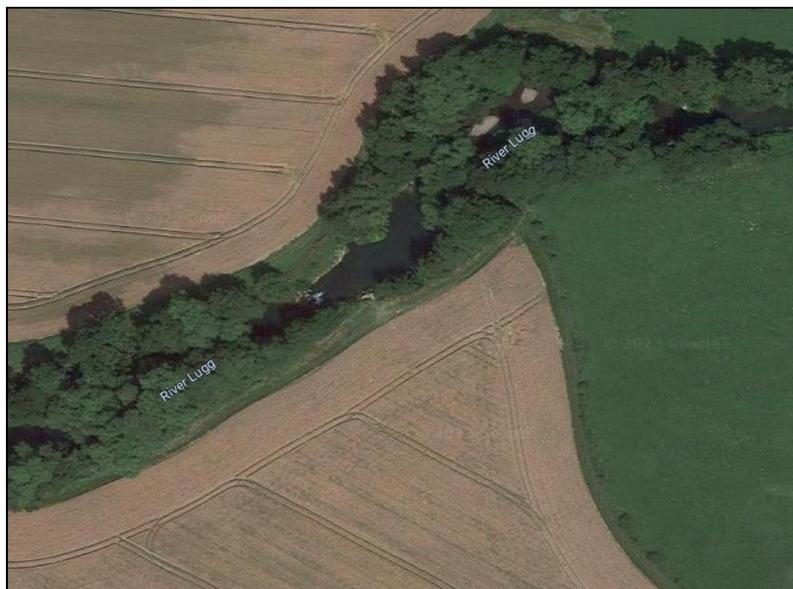


Figure 28 - Coxall Weir © Environment Agency

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Environmental Considerations

The following is a list of environmental designations and features which are either within the proposed sites or nearby. In each case we will assess the effects on the designation/feature (if any) and ensure that any effects are avoided or reduced. Given the proximity of the weirs we have not repeated duplicate information.

- All of the weirs are situated within the River Lugg SSSI.
- Eyton Common Local Wildlife Site (LoWS) is located approximately between 425 and 575m north of Mousenatch, Eyton and Coxall weirs.
- There are no other ecological designated sites within 2km or within 30km for bats.
- Mousenatch and Coxall weirs have areas of deciduous woodland priority habitat adjacent or extending over the weirs.
- All of the weirs are located entirely within the Lugg main river and within Flood Zone 3. There are some other waterbodies within 500m of the weir, and working areas may directly/indirectly impact these. One PRoW (KINGSLAND KL6 Footpath) is located in close proximity to the weirs.

6.8 Adaptive Monitoring and Management Plan (AMMP)

- 6.8.1 The draft DCO Amendment Order which NNB will submit with its Material Change Application will include provisions which commit NNB to the delivery of a package of compensation measures in accordance with a framework approach (an Adaptive Monitoring and Management Plan - ('AMMP')). The AMMP will:
- quantify the impingement rates relative to predictions;
 - provide evidence for the successful implementation of compensation measures; and
 - set out a framework for additional monitoring and potential adaptive management should measures fail to achieve objectives.
- 6.8.2 A key principle that will drive the development of the AMMP is that fish population numbers are influenced by many factors, the provision of suitable habitat being only one such factor. Therefore, the AMMP will need to be carefully designed in order to monitor and respond to

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the performance of the specific compensation measures, rather than reflecting trends or influences of other environmental factors.

- 6.8.3 As the final compensation measures have not yet been formally agreed or designed, it is not possible to provide more specific details of the content of the AMMP at this stage.
- 6.8.4 NNB will engage with the relevant Statutory Nature Conservation Bodies and regulators to establish an AMMP Advisory Group ('AMMPAG'). The purpose of this group will be to provide oversight and advice on the development and implementation of the AMMP.
- 6.8.5 The proposed compensation measures will be actively managed in accordance with the AMMP throughout the period when Hinkley Point C will abstract water via the cooling water system ('CWS'). On the basis that this is expected to be for at least 60 years, the different features making up the compensation measures will be fully established and will be permanent, self-sustaining features. NNB will, in conjunction with partners, consider what, if any, further management is needed at the end of the operational life of the power station.

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7 THE APPLICATION PROCESS AND NEXT STEPS

7.1 Introduction

- 7.1.1 This chapter provides a summary of the process NNB will follow in order to seek consent for a material change to the DCO and how this consultation fits into that process.
- 7.1.2 We also explain why we are treating this change as a material change.

7.2 Previous non-material change applications

- 7.2.1 NNB has in the past sought and obtained consent for a number of design changes to the power station and has made 4 separate applications. All of those changes were classed as non-material under the Planning Act 2008 regime. As such, pre-application consultation was not required and amendment orders were granted by the Secretary of State in 2015, 2017, 2018 and 2021 after comments from interested parties were taken into account.

7.3 Why does NNB consider the non-installation of an AFD system should be treated as an application for a material change?

- 7.3.1 As explained in Chapter 5, NNB has adopted the Environment Agency's approach to assessment arising from the WDA Permit appeal inquiry. Using this approach, our assessment, as reported in the PEIR and the HRA Evidence Report provided as part of this consultation, indicates that the proposed change to remove the requirement to install an AFD could result in a significant effect on the environment and protected habitats. NNB remains fully committed to installing both the LVSE intake heads and the FRR system as part of the operational power station and will be legally bound to develop, implement and maintain the compensatory measures.
- 7.3.2 Nevertheless, the Secretary of State for the Department for Energy and Climate Change ('DECC'), in granting the DCO for Hinkley Point C, took into account the installation of an AFD system as a mitigation measure in reaching his decision that there would not be an unacceptable effect on the environment or protected habitats. NNB therefore considers it

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appropriate to treat this change as a material change within the meaning of the Planning Act 2008 regime. The effect of this is to ensure that the application is subject to a higher degree of scrutiny than for a non-material change, including a potential examination in public.

- 7.3.3 NNB is also mindful that the Environment Agency and other key stakeholders are keenly interested in any proposal not to install an AFD system. As explained in Chapter 5, the duty to install an AFD system was also set out in Hinkley Point C's WDA Permit which has since been varied to remove this requirement.
- 7.3.4 Finally, NNB intends to include provisions for compulsory acquisition powers for the compensation sites which are to be secured by the proposed Material Change Application. Use of compulsory acquisition powers is one of the 4 criteria set out in Government guidance which suggests that an application to change a Development Consent Order will be material²⁰.

7.4 Do the other elements of the application constitute a material change?

- 7.4.1 In relation to the proposed change to the ISFS, an identical proposal was submitted in 2017 as part of a non-material change application to the Secretary of State. Within the decision letter for that application, the Secretary of State noted that given the information and assessment provided it was not possible to determine the materiality of the proposal. NNB has therefore carried out additional assessments, the initial results of which are provided as part of this consultation. Those assessments show that the change to the ISFS will not have significant new or materially different environmental effects. Nevertheless, NNB considers it expedient to include the request for the ISFS change as part of the Material Change Application which it intends to make in relation to the AFD system.
- 7.4.2 Similarly, our assessments indicate that the other changes described within this consultation would not in themselves constitute material changes but are included to avoid the need to submit a separate and parallel non-material change application and the potential for overlapping consultations that could confuse interested parties.

²⁰ [Planning Act 2008: Guidance on Changes to Development Consent Orders \(2015\)](#)

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7.5 Procedure for a material change

- 7.5.1 The Planning Act 2008 (Section 153 and Schedule 6) provides the legal framework for making a material change to a DCO. The procedure is governed by the Infrastructure Planning (Changes to, and Revocation of, Development Consent Orders) Regulations 2011. The process is managed by the Planning Inspectorate but applications for material changes are decided by the Secretary of State.
- 7.5.2 **Figure 29** sets out the key stages, and further guidance on making changes to DCOs is provided at: <https://www.gov.uk/government/publications/changes-to-development-consent-orders>.
- 7.5.3 In particular, there is a duty on NNB to consult with stakeholders and statutory consultees and the general public, and to take into account any representations made before finalising and submitting the Material Change Application.
- 7.5.4 When the Material Change Application is submitted, it must be accompanied by a consultation report which sets out the ways in which feedback from the consultation has been taken into account. This consultation is therefore an important part of the process and we welcome your views. Please refer to Chapter 8 for information on how to respond.

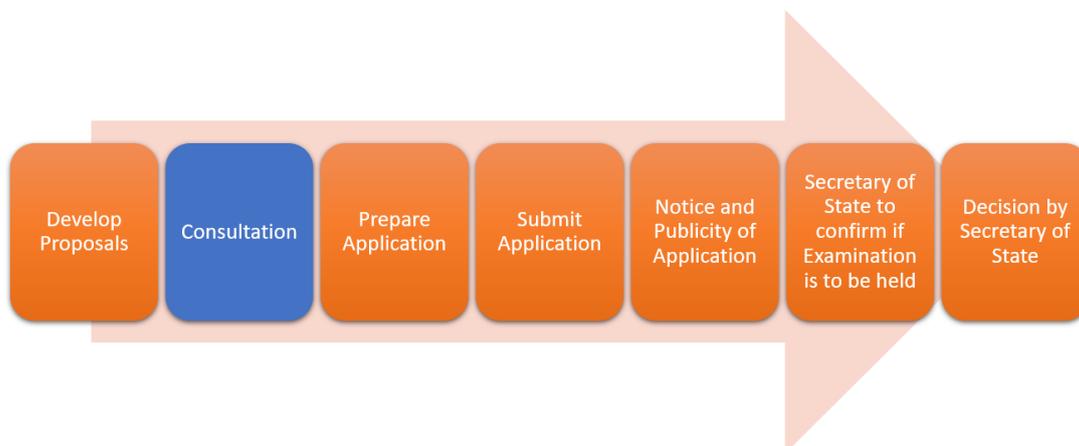


Figure 29 - Key stages of the material change process

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- 7.5.5 Once the Material Change Application has been made to the Planning Inspectorate, there will be a minimum 28-day period for representations to be made to the Secretary of State. The Secretary of State will consider the application and all representations received and decide whether they consider it necessary or appropriate to hold an examination.
- 7.5.6 If the Secretary of State takes the decision not to hold an examination, they will consider all representations received and take them into account in reaching their decision, in the same way as for a non-material change application. The Secretary of State is expected to make a decision within two months of notifying all parties that an examination will not be held.
- 7.5.7 If the Secretary of State decides that an application should be subject to an examination, one or more inspectors will be appointed from the Planning Inspectorate to review all representations and identify the main issues. A preliminary meeting will be held with parties who have expressed an interest in taking part in the examination. The examination of an application for a material change should be completed within four months of the preliminary meeting. The Planning Inspectorate must make a written report and recommendation to the Secretary of State within two months of the end of the examination and the Secretary of State must then make a decision two months after that.
- 7.5.8 If consent is granted, this will be brought into effect by the making of an Order which amends the existing Hinkley Point C DCO, removing the requirement to install an AFD system and making changes to the relevant plans to amend the other buildings and structures that form part of the application.

7.6 Proposed Consenting Approach

- 7.6.1 If the proposed development is on the main Hinkley Point C site, consent will be through the Material Change Application.
- 7.6.2 If the proposed development is not on the main site but on land in England (i.e. Pawlett Hams, The Island, Maisemore Weir, Upper Lode Weir and River Lugg weirs) it is Associated Development, and consent will be through the Material Change Application.
- 7.6.3 If the proposed development is not on the main site but on land in Wales (i.e. Trostrey and Manorafon Weirs), consent will be through an application to the relevant local planning authority under the Town and Country Planning Act 1990 (as the Planning Act 2008 does not include Associated Development in Wales).

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- 7.6.4 If the proposed development is in the Severn Estuary/wider Bristol Channel (i.e. sea grass, oyster bed and kelp forest), consent will be via a Marine Licence from the Marine Management Organisation.

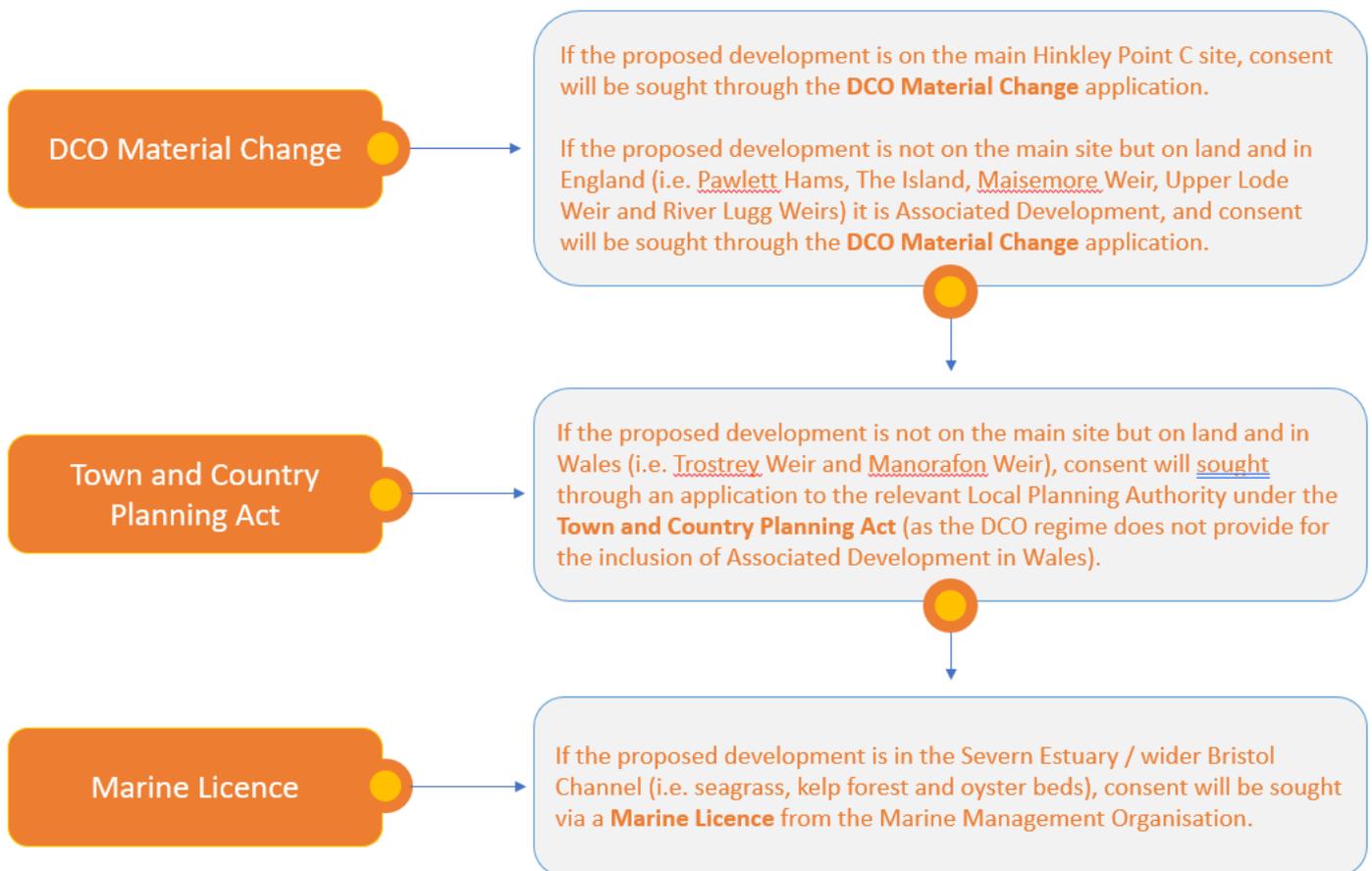


Figure 30 - Proposed Consenting Approach

7.7 Marine licence variation application

- 7.7.1 The fish protection measures currently required by the Hinkley Point C DCO are also duplicated in NNB's Marine Licence (L/2013/00178). An application will be required for the

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removal of the requirement to fit an AFD system under the marine licence. NNB intends to submit its application for a variation to the marine licence at a similar time to the Material Change Application. The MMO will carry out a separate consultation on the marine licence variation and has indicated that it will issue any decision after the decision of the Secretary of State for DESNZ on the Material Change Application.

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8 RESPONDING TO THIS CONSULTATION

8.1 Engaging in this consultation

- 8.1.1 The consultation will start on 9th January 2024 and finish at 23:59 on 29th February 2024.
- 8.1.2 We want to hear your thoughts on our proposals and welcome your feedback. In particular, we would like your views on the following questions:
- Do you have any comments on the removal of the requirement to install an Acoustic Fish Deterrent system?

In our application we outline a number of compensation measures, which are designed to collectively offset any potential impacts by enhancing the structure and function of the estuary habitat. In respect of our proposals for saltmarsh and associated habitats, we would like your views on:

- Whether, in your view, the sites identified at Pawlett Hams and 'The Island' are likely to achieve our objectives.
- Whether there are any local issues or environmental impacts arising from our proposals that you would like to make us aware of. If so, please let us know whether our proposals could be altered to reduce or eliminate those issues or impacts.
- Whether the proposed compulsory acquisition of land at Pawlett Hams, Maisemore Weir, Upper Lode Weir and the River Lugg Weirs has any impacts on you or your business.

In respect of our marine options (Seagrass, Kelp and Oyster Beds) we would like your views on:

- Whether you are aware of any areas of the Severn Estuary (or beyond) that would be suitable locations for these kinds of measures.
- Whether the list of potential benefits and impacts that we have set out in our documentation is correct and whether there are any other factors we should consider.

In respect of our river barrier (weir) options we would like your views on:

- Whether any of the options (presented in Section 6.7 above) are preferable and why?

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- Whether there are any other river sites not set out in the documentation where we could remove barriers or ease passage for migratory fish and achieve our objectives?
- Whether there are any local issues or environmental impacts arising from our proposals that you would like to make us aware of? If so, please let us know whether our proposals could be altered to reduce or eliminate those issues or impacts.

In respect of our proposals on-site at Hinkley Point C:

- Do you have any comments on the change from a 'wet' Interim Spent Fuel Store to a 'dry' Interim Spent Fuel Store, including the resulting change to the building's dimensions?
- In relation to the proposed changes to the Interim Spent Fuel Store, do you have any comments on the replacement of the proposed Access Control Building with a new Equipment Storage Building?
- Do you have any comments on the relocation and redesign of the Meteorological Mast, and removal of the Meteorological Station and replacement with an equipment compound co-located with the mast?
- Do you have any comments on the introduction of the Sluice Gate Storage Structures?
- Do you have any comments on the retention of the existing temporary substation as a permanent feature in order to supply electricity to neighbouring Hinkley Point A and Hinkley Point B power stations during their decommissioning processes?

Further Questions:

- Do you consider yourself to be affected by the proposals either positively or negatively, in any way?
- We outline potential environmental effects, our evidence base, the methodology and proposed approach to further and more detailed assessment in the Preliminary Environmental Information Report and the Shadow HRA Evidence Report – pre-application consultation version. Do you wish to make any comments on what is set out?
- Are there any additional measures or opportunities which you would like incorporated into our proposals that could further minimise the impact of the scheme or enhance the beneficial effects on the environment or local community?
- Do you have any further comments or suggestions regarding the information presented in this consultation?

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- 8.1.3 Copies of the consultation documents listed in Table 1 in the Introduction to this document, and three short films providing more information on the proposed method of dry storage within the ISFS and more information on the AFD, and compensation measures, are available on our website: <https://www.edfenergy.com/hpc-dco>
- 8.1.4 Visitors to our website can also navigate a virtual exhibition room, download supporting documents, ask questions and submit a response to the consultation should you wish to do so.
- 8.1.5 Hard copies of the consultation documents listed in Table 1 in the Introduction to this document will also be available at our visitor centre in Cannington Court in the centre of Cannington Village (Church Street, Cannington, Bridgwater TA5 2HA). The documents will be available to view between 9:30am and 5pm, Monday to Thursday (except Bank Holidays) and 9:30am to 4pm on Fridays throughout the consultation period.
- 8.1.6 Hard copies can also be requested by emailing edfenergy@hpcenquiries.com. A £50 fee for printing and posting may be required.
- 8.1.7 If you require the consultation documents in a different format for accessibility reasons, please call 0333 009 7070 or email edfenergy@hpcenquiries.com.
- 8.1.8 If you have any questions on the proposal, whether they relate to the consultation itself or the supporting documents, you can contact NNB by phone on 0333 009 7070, email edfenergy@hpcenquiries.com or post Freepost SEC NEWGATE UK LOCAL HPC Consultation 2024

8.2 In-person consultation events

- 8.2.1 We will be holding several in-person events with members of the NNB team at the following locations and times:

Location	Address	Date	Start	Finish
Stogursey Victory Hall	15 Town Close, Stogursey, Bridgwater TA5 1RN	Thursday 11 January 2024	15:00	19:00
Cannington Court	Church Street, Cannington, Bridgwater TA5 2HA	Thursday 18 January 2024	12:00	17:00

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Wembdon Village Hall	Homberg Way, Wembdon, Bridgwater, TA6 7BY	Monday 22 January 2024	11:00	15:00
Pawlett Village Hall	Monmouth Farm Close, Pawlett, Bridgwater, Somerset, TA6 4RY	Tuesday 30 January 2024	16:00	20:00

- 8.2.2 Due to the amount of information, we would encourage those who have access to the internet to visit the virtual room on our website and preview the materials before attending in person.

8.3 Virtual consultation events

- 8.3.1 We will also be holding virtual consultation events via our website at <https://www.edfenergy.com/hpc-dco> at the following dates and times:

Date	Time
Tuesday 16 January 2024	12:00-14:00
Wednesday 24 January 2024	18:00-20:00
Thursday 1 February 2024	10:00 – 12:00

8.4 Giving Feedback

- 8.4.1 If you wish to comment on our proposals an online Feedback Form is available on our website at <https://www.edfenergy.com/hpc-dco>. Alternatively, you can give feedback in one of the following ways:
- Email your comments to: edfenergy@hpcenquiries.com
 - Post your written responses to: Freepost SEC Newgate UK Local HPC Consultation 2024
 - Call our Freephone number during normal office hours: 0333 009 7070
- 8.4.2 The deadline for formal statutory consultation responses to be received by NNB is 23:59 on 29 February 2024.

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- 8.4.3 Representations received will be logged by NNB and considered in the preparation of the final Material Change Application. A summary of consultation responses received will be referenced in the consultation report to be submitted with the Material Change Application. Please be aware that your responses may be made public as the Secretary of State may request copies of all original representations received.

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Appendix 1 Glossary

AFD	Acoustic Fish Deterrent
ALARP	As Low As Reasonably Practicable
AMMP	Adaptive Monitoring and Management Plan
AMMPAG	Adaptive Monitoring and Management Plan advisory Group
AOD	Above Ordnance Datum
BAT	Best Available Techniques
DESNZ	Department for Energy Security and Net Zero
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CI	Confidence Interval
CIMP	Comprehensive Impingement Monitoring Programme
Compensation	Compensatory measures that are taken to ensure the overall coherence of the National Site Network is protected.
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
Derogation	Where an applicant demonstrates to the Secretary of State's satisfaction that there are no alternative solutions to the proposed change, that there are 'imperative reasons of over-riding public interest' (IROPI) for the proposed change, and that any necessary compensatory measures will be taken to ensure that the overall coherence of the national site network (of designated sites) is protected
EA	Environment Agency
EIA	Environmental Impact Assessment
entrainment / entrained	Entrainment is the passage of marine organisms, too small to be filtered by the drum and band screen, through the cooling water system. This primarily includes plankton, fish eggs, larvae and some juvenile stages. Adult stages of some small-bodied species may be entrained.
entrapment / entrapped	Entrapment refers to the entry of marine organisms into the intake heads regardless of the route they then take through the rest of the cooling water system. In an assessment context, entrapment is the sum of entrainment and impingement.
Epifaunal	Aquatic animals that live on the surface of the sea
EPR	European Pressurised Reactor
European site	'European Sites' is as defined in regulation 8 of the Habitats Regulations, and includes Special Areas of Conservation ('SACs') and Sites of Community Importance ('SCIs') designated under the Habitats Directive, and Special

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	Protection Areas ('SPAs') designated under the Wild Birds Directive, which together create a Europe-wide 'Natura 2000' network of designated sites.
FCS	Favourable Conservation Status
FRR	Fish Recovery and Return
Habitats Regulations	The Conservation of Habitats and Species Regulations 2017
HDPE	High Density Polyethylene
Hinkley Point A	Hinkley Point A nuclear power station
Hinkley Point B	Hinkley Point B nuclear power station
Hinkley Point C	Hinkley Point C nuclear power station
Hinkley Point C DCO	The Hinkley Point C (Nuclear Station Generating Order) 2013 as amended
HRA	Habitats Regulations Assessment
HSE	Health and Safety Executive
Ichthyoplankton	The eggs and larvae of fish
impingement	The retention of fish or other marine organisms on the surface of filtration screens by the water current (typically includes juvenile-adult fish, shrimp and crabs)
Infaunal	Organisms that live in the sediment of the sea floor
IROPI	Imperative Reasons of Overriding Public Interest
ISFS	Interim Spent Fuel Store
Keystone Species	An organism that helps to define its entire ecosystem
LAT	Lowest astronomical tide
LVSE	Low velocity side entry
Marine Licence	Marine Licence L/2013/00178 (variation issue L/2013/178/4) in relation to Hinkley Point C
Material Change Application	The material change application proposed by NNB which is being consulted on
MMO	Marine Management Organisation
NNB	NNB Generation Company (HPC) Limited
NPS	National Policy Statement
NSN	Natura 2000. National Site Network
ONR	Office for Nuclear Regulation
pelagic fish	Species of fish that live in the water column (not near the surface or sea bed) and offshore, typically in the open ocean / sea (not near the shore)
PEIR	Preliminary Environmental Information Report

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Ramsar site	A wetland site designation to be of international importance under the Ramsar Convention
RIMP	Routine Impingement Monitoring Programme
ROV	Remotely Operated Vehicle
SAC	Special Area of Conservation
Secretary of State	The Secretary of State for the Department of Energy Security and Net Zero
sound projectors	Sound projectors associated with an AFD system, which are responsible for generating the sound waves which deter fish
SODAR	Sonic Detection and Ranging
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
Turbid/ turbidity	The cloudiness that arises as a result of high concentrations of particles being present in water. High turbidity levels reduce visibility in water
WDA	Water Discharge Activity
WDA Permit	The permit granted by the Environment Agency on 13 March 2013 EPR/HP/3228XT
WFD	Water Framework Directive

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Appendix 2 The Cooling Water System at Hinkley Point C

- 2.1 An AFD system is currently one of the three fish protection measures associated with the cooling water system for Hinkley Point C. To understand the purpose of those measures, it is important to understand the nature of the cooling water system as a whole.
- 2.2 This Appendix explains how electricity is generated by nuclear power stations and why cooling, using water drawn from the Bristol Channel, is an essential part of the design of Hinkley Point C.
- 2.3 The key elements of the cooling water system are described.

How is electricity generated from nuclear power?

- 2.4 Like coal and gas-fired power stations, nuclear power stations generate electricity by creating heat, which is used to turn water into steam. The steam then turns turbines connected to electrical generators. In the case of nuclear power stations heat is created by the process of nuclear fission.
- 2.5 Hinkley Point C will be powered by two nuclear reactors of a type known as UK EPR™. Water will be used in three separate and self-contained circuits within the power station. The 'cooling water system' described in this consultation, of which an AFD system would currently form part, refers only to the third circuit described below. Seawater is not used in the other two circuits.
- 2.6 At the centre of each reactor is a thick-walled steel pressure vessel within which a controlled fission reaction takes place. This reaction is capable of producing 4,500MW of thermal power, which is used to heat a primary circuit of pressurised water to around 330°C (shown in red and labelled as the 'primary system' on Figure A2-1). Water in this primary circuit is circulated through four heat exchangers, known as steam generators, where water in a separate secondary system is converted to steam (shown in blue/green and labelled as the 'secondary system' on Figure A2-2A2-1).
- 2.7 The secondary circuit steam is used to power a single large turbine per reactor, rotating at around 1,500 revolutions per minute. This is housed in a turbine hall and is connected directly to a three-phase electrical generator capable of producing around 1,780MW of electrical power, of which around 1,670MW is exported to supply the UK's energy demand.

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- 2.8 Steam leaving the turbine must be turned back into water to be circulated again through the secondary system. This is done by circulating the steam through a condenser (shown in brown on Figure A2-1), where cooling occurs. This cooling is achieved using seawater abstracted from the Bristol Channel, which travels around a third independent water system (the cooling water system) connected to the condenser. The cooling water system infrastructure is explained in the next section.
- 2.9 The steam condensate (water) is returned to the steam generators via high pressure feedwater pumps, and the cycle begins again.

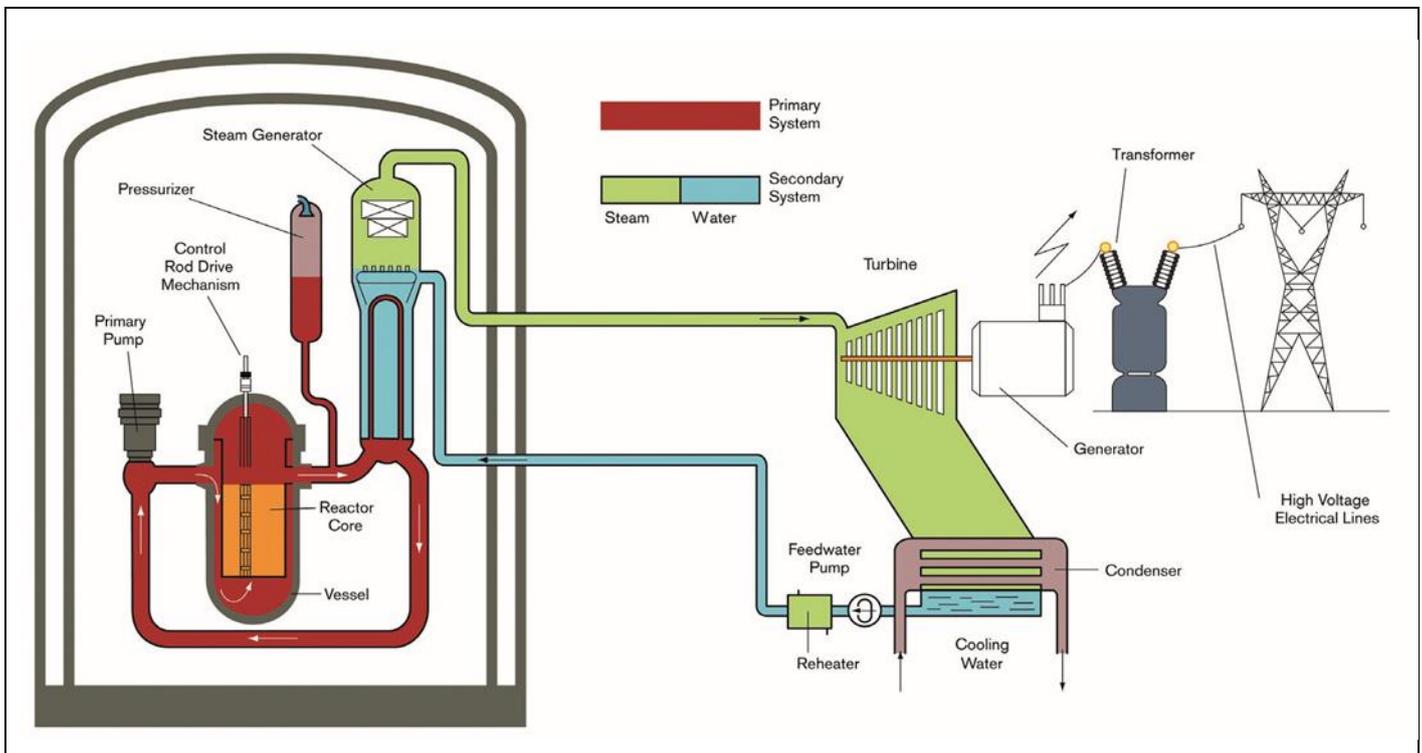


Figure A2-1 - Schematic illustration of nuclear generation

The offshore cooling water infrastructure and related facilities

- 2.10 The power station will be cooled using water drawn from the Bristol Channel. Each of the two reactor units will have its own intake tunnel through which seawater will be abstracted from the Bristol Channel and used to cool the steam condensers and other heat exchangers in the power

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station as part of the electricity generation process. Once the seawater has served its cooling purpose, it will be returned to the Bristol Channel via a single outfall tunnel, shared by both reactor units.

- 2.11 The large volume of water required for cooling (approximately 132m³ per second) means that the intake and outfall tunnels must have large internal diameters: approximately 6m and 7m respectively.
- 2.12 The intake and outfall tunnels extend approximately 3.3km and 1.9km, respectively, into the Bristol Channel. Tunnels of this length are required in order to minimise the impact of water intake and discharge on the sensitive coastal marine environment.
- 2.13 Two intake heads have been installed at the seaward end of each intake tunnel. These are large rectangular structures (35.5m long, 10m wide and 2.8m deep) through which the abstracted seawater must pass before reaching the intake tunnels. As explained in Chapter 5, these intake heads have been designed to maximise fish protection. Two outfall heads have been put in place at the seaward end of the single outfall tunnel.
- 2.14 The cooling water system also encompasses a forebay and pumping station for each intake tunnel, located onshore.
- 2.15 The forebay is a large, 29m deep structure that allows the hydraulic energy from the seawater exiting the intake tunnel to dissipate before it enters the pumping station. In the pumping station, the seawater passes through a fine (5mm) mesh filter to remove debris and marine life before being pumped around the steam condensers and other heat exchangers in the cooling water system and then discharged back into the Bristol Channel. Marine life (mainly fish, crabs and shrimp) is removed from the filters by special structures ('buckets') and returned via gutters and a dedicated fish recovery and return (FRR) tunnel rather than via the outfall tunnel. The role of the intake heads and FRR tunnel are explained further in Chapter 5.
- 2.16 Figure A2-2 shows the location of the intake and outfall tunnels, the FRR tunnel and the intake and outfall heads for Hinkley Point C as approved by the Hinkley Point C DCO.

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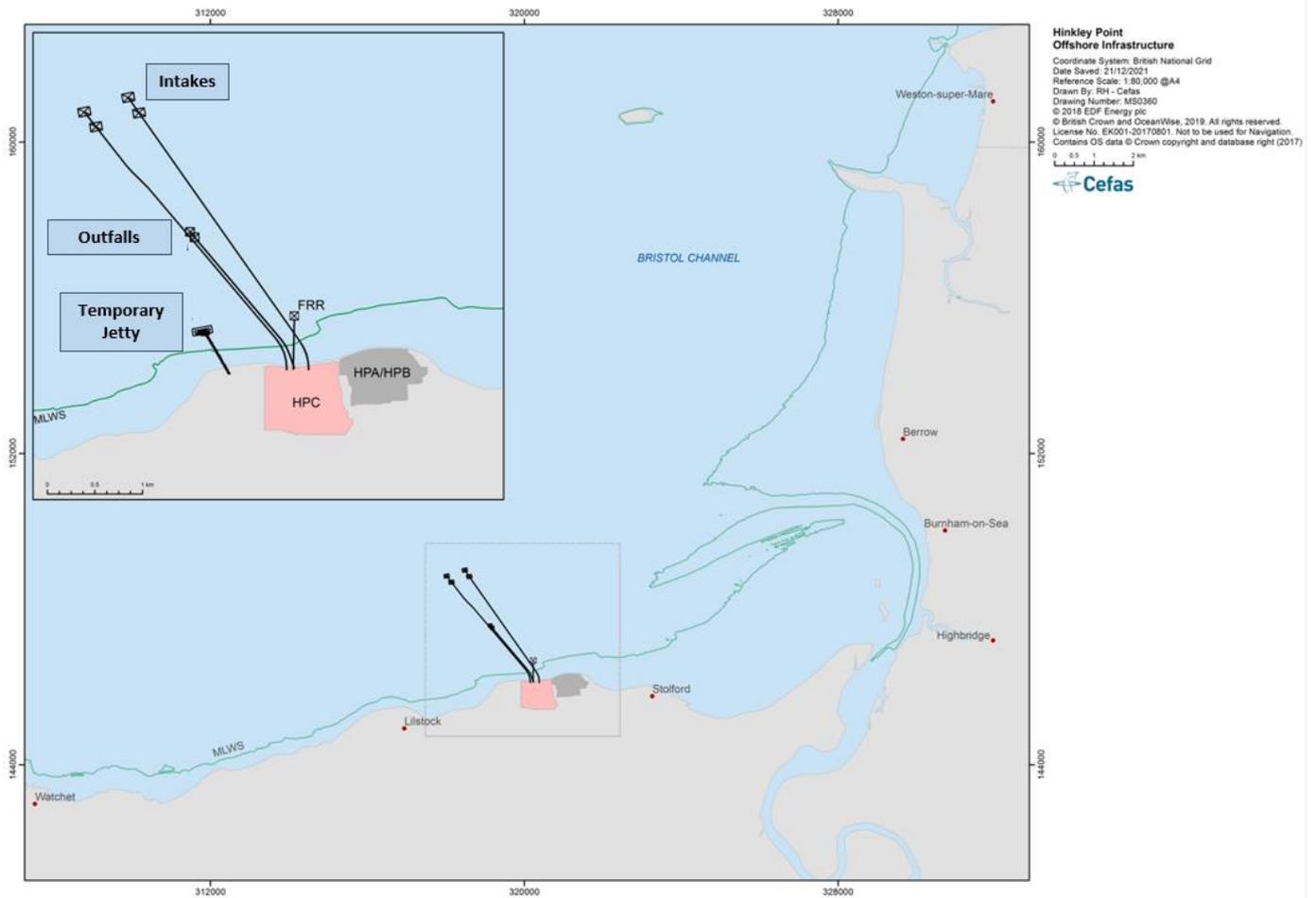


Figure A2-2 - Location of intake and outfall infrastructure

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Appendix 3 Details of LVSE heads and the FRR System

3.1 LVSE intake heads

- 3.1.1 The seawater abstracted from the Bristol Channel will pass through the LVSE intake heads into the intake tunnels. Two intake heads have been installed for each intake tunnel (see Figure 16 for an illustration of the design). The intake heads were installed during the summer of 2022. The siting of the LVSE intake and outfall heads is as shown on Figure A3-1 below. The location of the LVSE intake heads has been selected to ensure there will be a continuous and reliable supply of seawater to the cooling water system. This is necessary to ensure the safe and efficient operation of the power station, while also helping to minimise the amount of fish and other organisms entrapped in the cooling water system.

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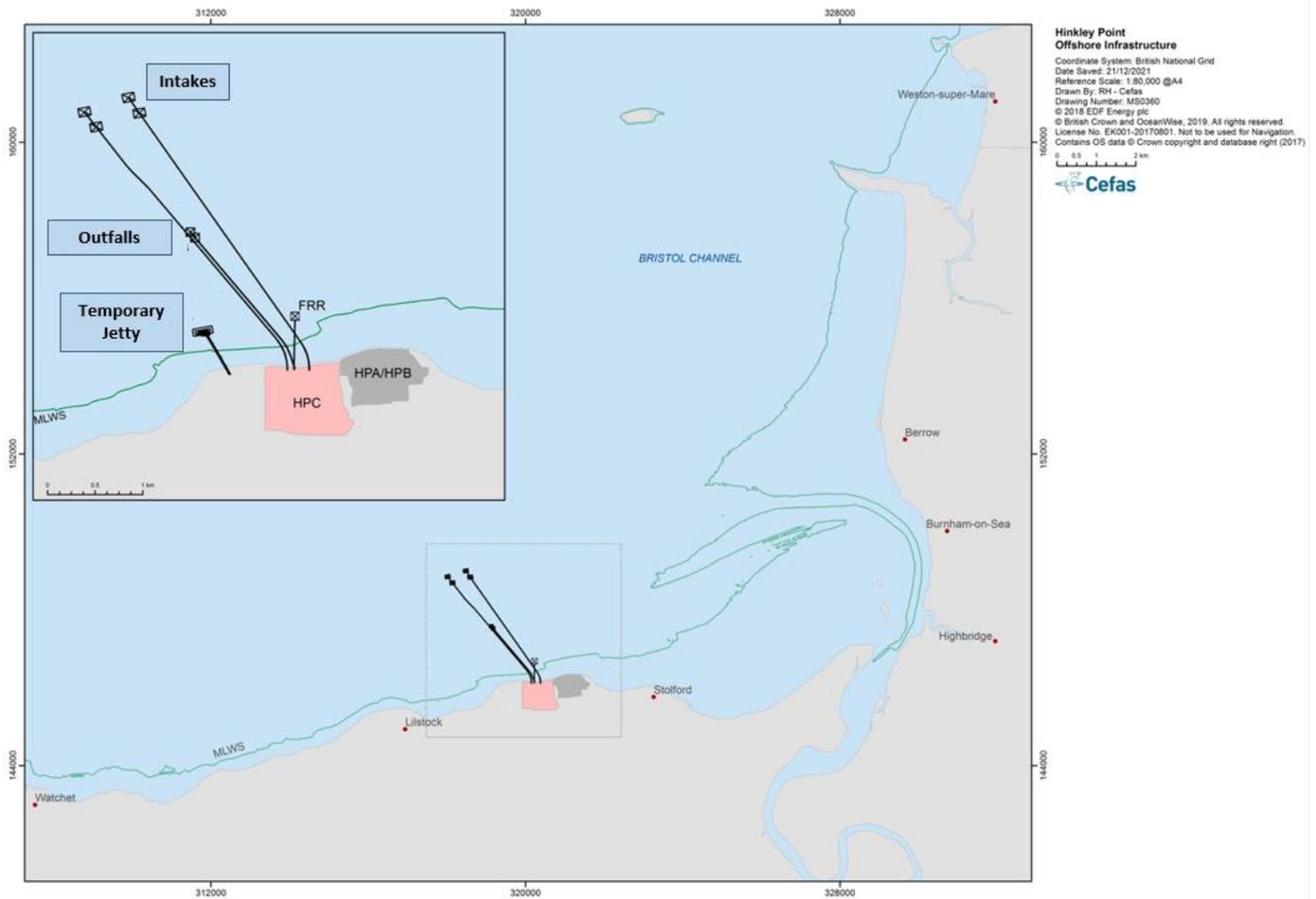


Figure A3-1 - Plan of Hinkley Point C's Offshore Infrastructure, including the location of water intakes and FRR system

3.1.2 The LVSE intake heads have been designed to take into account the principles of best practice for fish protection in the Environment Agency's reports (2005 and 2010)²¹. These measures are

²¹ Science Report SC030231: "Screening for intakes and outfalls. A best practice guide." EA (2005); [Microsoft Word - W6_103 TR amended_1.doc \(publishing.service.gov.uk\)](#)

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summarised in Table A3-1. Further information on the design of the LVSE intake heads is provided in the approved CW1 Report (see Table 1 above).

Environment Agency Criteria

Location

Intake heads should be located in an open area of seabed that is free from obstructions so that the abstraction does not affect the natural current flow at the intake significantly.

Intake heads should not be located in intertidal or saltmarsh areas, or any other areas where fish might congregate, as this increases the risk of drawing in juvenile fish.

Intake heads should not be located in narrow estuaries where migratory fish may migrate.

Intake heads should not be located in fish spawning or nursery areas, including those of both national and local importance.

Design

Intake heads should not create a surface vortex that might endanger craft or swimmers.

Intake heads in deep water are preferable because the bulk of fish drawn in are commonly species that favour the mid-to-upper water column.

Intake heads should avoid abstracting water vertically because fish are less able to escape vertical currents. The problem can be overcome by fitting a velocity cap.

Intake heads should have entrances protected by bars to prevent entry by humans, as well as marine mammals.

Intake heads should have sufficiently low intake velocities for fish to be able to avoid being drawn in.

Hinkley Point C Design Information

Hinkley Point C's intake heads are located approximately 3.3km offshore from the south coast of the Bristol Channel. Abstraction will not affect the natural current flow at the intake.

Hinkley Point C's intake heads are located approximately 3km from the shore and not near any intertidal or saltmarsh areas.

Hinkley Point C's intake heads are located approximately 3km offshore from the south coast of the Bristol Channel in part of the estuary which is approximately 20km wide. The intakes are positioned several kilometres south of the main channel of the estuary. They are therefore well away from areas with the highest current velocities that are predominantly used by fishes making directed up- or down-estuary migrations.

Hinkley Point C's intake heads are not located near any high intensity or protected fish spawning/nursery grounds

Hinkley Point C's intake heads are located offshore where there are no swimmers and in deep water so that vortices will not be created.

Hinkley Point C's intake heads are located in water approximately 5 metres deep at low tide and 15 metres deep at high tide, which is deeper than the mid-to-upper water column.

Hinkley Point C's intake heads are of a Low-Velocity, Side-Entry (LVSE) design. Water is only abstracted in a horizontal plane through the sides of the intake heads.

Hinkley Point C's intake heads have vertical bars spaced at 0.3 metres to prevent entry.

Hinkley Point C's intake heads are a low-velocity design and will abstract at sufficiently slow velocity to allow fish to swim away if they can detect the intake and choose to do so.

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Environment Agency Criteria

Intake head entrances should be perpendicular to the main tidal stream so that tidal current velocity is not added to intake velocity.

The sill of the intake should be high enough above the seabed level to prevent sediment and debris being drawn from the seabed into the intake. This also reduces the risk of drawing in epibenthic fish.

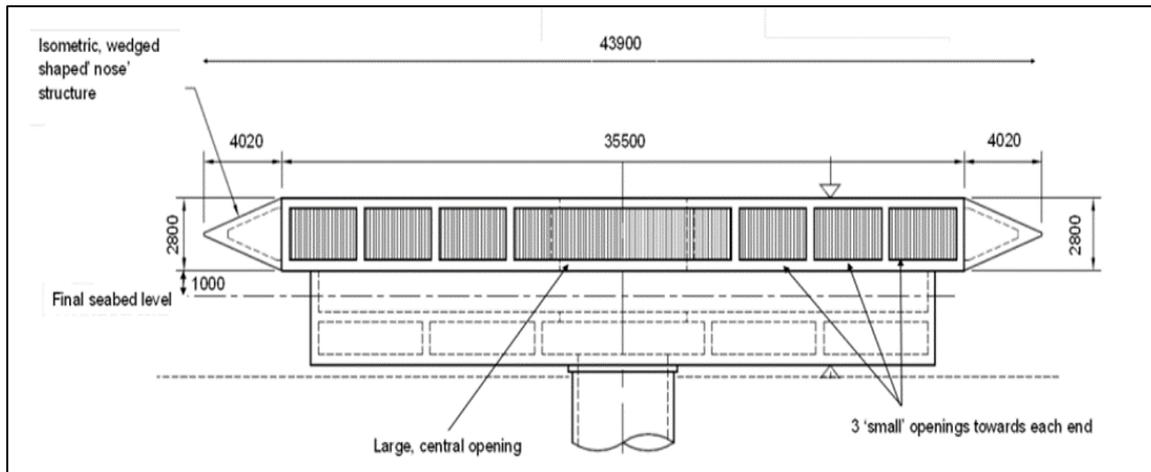
Hinkley Point C Design Information

Hinkley Point C's intake heads are placed perpendicular to the main tidal current and only abstract water along the two long edges. Tidal flow will serve to carry fish past the intake openings not into them.

The intake surface (apertures) are 2 metres high with centres approximately 2.5 metres above the seabed, with the base of the aperture being approximately 1.5 metres above the seabed. This will prevent sediment and debris, as well as reducing epibenthic fish and crustaceans (e.g. crabs) that inhabit the seafloor, from entering the intake.

Table A3-1 - Fish protection measures incorporated into the LVSE intakes

3.1.3 The design of the LVSE intake heads is illustrated in .Figure A3-2 and a photograph of a LVSE intake head is shown in Figure A3-3.



.Figure A3-2 - LVSE Intake head design (measurements in mm)

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Figure A3-3 -Hinkley Point C's LVSE intake heads are specially designed to reduce the speed at which water is fed into the cooling system

3.2 Fish recovery and return system

3.2.1 The FRR system comprises a series of measures forming part of the cooling water system. Debris and organisms which pass through the initial widely spaced bars on the LVSE intake heads will be removed before the water enters the power station cooling water system. This occurs using fine mesh (5mm) drum screens, which protect the main cooling water supply to the steam condensers, and band screens (also 5mm) which protect the rest of the cooling water system. Each drum and band screen is fitted with buckets to recover fish and discharge them into a common gutter system for return to the sea. Anything smaller, which passes through the 5mm mesh, is entrained and passes through the power station cooling water system without causing blockages.

3.2.2 The FRR system is designed to reduce damage to fish and to optimise survival rates of fish and crustaceans. FRR systems have been reported to achieve high survival rates (80%) for robust species such as European eel and lamprey and epibenthic species like Dover sole. Moderate survival rates of approximately 50% may be anticipated for demersal species like cod and whiting at Hinkley Point C. However, for delicate pelagic species such as herring, sprat and shad, survival rates are low (<10%).

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- 3.2.3 The design takes into account the recommendations for fish protection published by the Environment Agency (Environment Agency 2005 and Environment Agency 2010)²² and ecological and engineering studies carried out following the granting of the Hinkley Point C DCO. The FRR system proposed, and the way in which it meets these purposes and requirements, is set out in Table A3-2. Further information on the design of the FRR system is provided in the CW1 Report (see Table 1 above).
- 3.2.4 NNB remains fully committed to installing the FRR system, currently scheduled for 2025, and its installation will not be affected by the proposed Material Change Application.

Environment Agency Criteria

Location

The design of the fish buckets should be optimised for fish handling and be able to handle large sinuous fish (eels, lampreys).

The fine filtration (band and drum) screens should rotate continuously at a speed of at least 1.5 metres per minute so that fish are not impinged against the screen for long periods before removal.

Screen meshes should be smooth and fish-friendly, constructed from woven stainless steel or plastic mesh. Mesh size should be 6mm or less.

Low-pressure backwash sprays should be used to remove fish from the screens. Higher pressure jets may be used at a later point in the cycle to wash off debris.

FRR gutters should be:

- (a) smooth, with any joints properly grouted and finished so there are no snags
- (b) at least 0.3 metres in diameter and the main return channel should be at least 0.5 metres in diameter
- (c) covered to prevent bird predation and algal growth.

A continuous wash-water supply should be provided to ensure sufficient depth of water in the FRR gutters to keep fish immersed and moving through the FRR system.

Hinkley Point C Design Information

The FRR system will have buckets that are designed to retain all fish including eels and lamprey and to allow unhindered exit into the fish collection gutters.

The band and drum screens will rotate continuously. The drum screens will rotate at a speed of least 2.5 metres per minute and the band screens will rotate at 0.5 metres per minute to prevent excessive wear and tear on these safety critical screens.

The screen meshes for the band and drum screens will be woven stainless steel with a mesh size 5mm x 5mm.

The filtration screens will have backwash sprays in increasing order of pressure. The first spray will be at 1 bar to wash the fish gently from the screens. Persistent debris will be washed off afterwards by high pressure (3.5 and 6.5 bar) sprays.

The FRR gutters will be:

- (a) lined with High Density Poly Ethylene (HDPE) plastic to ensure they are smooth with smooth joints
- (b) adhering to these dimensions
- (c) covered.

The FRR system collects wash-water in the buckets with the fish, which will be supplemented with additional water to ensure that fish are washed along the gutters safely and efficiently.

²² Science Report SC030231: "Screening for intakes and outfalls. A best practice guide." EA (2005):

[Microsoft Word - W6_103 TR amended_1.doc \(publishing.service.gov.uk\)](#)

Science Report SC070015/SR3: "Cooling water options for the new generation of nuclear power stations in the UK" EA (2010):

[Microsoft Word - SC070015 Cooling REPORT_24th June 2010 For publication.doc \(publishing.service.gov.uk\)](#)

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Environment Agency Criteria

A dedicated FRR tunnel should be provided to return fish to the source water body, instead of the main cooling water outfall. This is to prevent fish being exposed to high temperatures and any associated chemical discharges.

The FRR tunnel should discharge fish at a point where they are unlikely to be returned to the intake point and should enter the water below the lowest astronomical tide (LAT) mark so that fish can be returned to sea at all states of the tide.

Hinkley Point C Design Information

The FRR system has one dedicated tunnel to return fish to the Bristol Channel. The two separate intake tunnels both return fish to the Bristol Channel using this dedicated FRR tunnel.

The FRR tunnel outfall will be approximately 550 metres offshore and approximately 2.5km away from the intake heads. The outfall is below the LAT.

Table A3-2 - Fish protection measures incorporated into Hinkley Point C's FRR system

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If you have any questions on the proposal, whether they relate to the consultation itself or the supporting documents, you can contact NNB by phone on **0333 009 7070**, email edfenergy@hpcenquiries.com or post Freepost:
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