

HPC COMPANY DOCUMENT

HINKLEY POINT C MATERIAL CHANGE APPLICATION - PRELIMINARY ENVIRONMENTAL INFORMATION REPORT – VOLUME 2: PROPOSED CHANGES ON-SITE

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1. INTRODUCTION

1.1 Overview

1.1.1 This volume of the Preliminary Environmental Information Report ('PEIR') outlines the scope of the updated Environmental Impact Assessment ('EIA') for the proposed changes to the Hinkley Point C Project on-site. For an explanation of the proposed changes on-site and off-site to the Hinkley Point C Project, refer to **Section 1.3** in **Volume 1 Chapter 1**.

1.1.2 The proposed changes to the Hinkley Point C Project on-site are:

- Removal of the requirement to install an acoustic fish deterrent ('AFD') system (using sound to deter certain types of fish from the cooling water system ('CWS') intake heads);
- Amendment to the Interim Spent Fuel Store ('ISFS') from wet to dry storage of spent fuel and a change in building dimensions;

- Replacement of the Access Control Building associated with the ISFS with a new larger Equipment Storage Building;
- Relocation and re-design of the meteorological mast resulting in the meteorological station building no longer being required;
- Amendment to retain the existing temporary Hinkley Point Substation as a permanent feature to supply electricity to neighbouring Hinkley Point A and Hinkley Point B; and
- Four new structures (two per Unit¹ of Hinkley Point C) to house sluice gates and lifting beams to be used during outages (i.e. maintenance periods) only.

1.1.3 The proposed changes on-site are described in more detail in **Volume 1 Chapter 2**.

1.2 Content of this Volume

1.2.1 This volume explains how the Scoping Opinion has been considered (see **Chapter 2**).

¹ Each Unit of Hinkley Point C comprises one of the reactors and the buildings associated with that reactor.

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- 1.2.2 It then provides further information on the effects of the proposed changes on-site on Groundwater and Transport, in line with comments raised in the Scoping Opinion (see **Chapters 3 and 4** respectively). NNB Generation Company (HPC) Limited ('NNB') has agreed with relevant stakeholders (Environment Agency, Somerset Drainage Board and Somerset Council) that Groundwater can be scoped out of further assessment and has provided the evidence to demonstrate the absence of a likely significant effect. NNB has also consulted the Transport Review Group ('TRG') on Transport and is seeking agreement with the TRG that Transport can also be scoped out of further assessment in relation to the proposed changes on-site.
- 1.2.3 The environmental aspects scoped into the updated EIA for the proposed changes on-site (i.e. Marine Ecology and Water Quality and Landscape and Visual) have been allocated separate chapters (**Chapter 5** and **Chapter 6**). Each chapter describes the preliminary assessment of the likely significant environmental effects as a result of the project as changed by the proposed changes on-site and any mitigation being considered to avoid, prevent or reduce and, if possible, offset those effects.

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2. SCOPE OF THE UPDATED ENVIRONMENTAL IMPACT ASSESSMENT

2.1 Overview

2.1.1 This chapter outlines the scope of the updated EIA for the proposed changes to the Hinkley Point C Project on-site.

2.2 Scoping Report

2.2.1 A Scoping Report was submitted to the Planning Inspectorate on 23 March 2022².

2.2.2 The Scoping Report identified two Aspects of the environment relating to the proposed changes that should be scoped into the updated EIA:

- Marine Ecology including an assessment of piscivorous (fish-eating) birds; and
- Landscape and Visual.

2.2.3 Any site-specific cumulative effects (i.e. in-combination effects) of the above were also proposed to be scoped

into the updated EIA. These are the combined effects of different impacts acting on the same receptor or group of receptors. For example, a resident at a nearby house experiencing a change in both noise and visual impacts. Cumulative effects are usually either additive or interactive and would be associated with impacts occurring at the same time.

2.2.4 The Scoping Report also identified the requirement to establish if any new developments within the vicinity of the Hinkley Point C Project have come forward since the original Development Consent Order ('DCO') application was submitted. A preliminary assessment can be found in **Volume 4 Chapter 2** which identifies any new pathways to cumulative effects (effects of the Hinkley Point C Project and other developments in the surrounding area, i.e., inter-project effects).

2.2.5 Climate Change, Major Accidents and/or Disasters and Population and Human Health (new aspects of the environment to be considered under the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 ('2017 EIA Regulations')³) were proposed to be scoped out of further assessment. These were not assessed in the original Environmental

² NNB Generation Company Ltd (2022). Hinkley Point C Material Change Application EIA Scoping Report.

³ Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 [[Online](#)]. Accessed 23 November 2023.

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Statement ('ES') because it was prepared under the requirements of the previous EIA regulations which did not require the assessment of these Aspects.

2.3 Scoping Opinion

2.3.1 The Planning Inspectorate (on behalf of the Secretary of State) adopted the Scoping Opinion on 3 May 2022. Regulation 14(3) of the 2017 EIA Regulations states that the ES must be based on the most recent scoping opinion adopted (so far as the proposed development remains materially the same as the proposed development which was subject to that opinion).

2.3.2 To demonstrate compliance with Regulation 14(3), **Table 2-1** explains how the Scoping Opinion has been considered and this has been summarised below.

2.3.3 Taking into account the Scoping Opinion, the following Aspects have been included in this PEIR:

- Groundwater;
- Transport;
- Marine Ecology and Water Quality including an assessment of piscivorous (fish-eating) birds;
- Landscape and Visual; and
- Cumulative and In-combination effects.

2.3.4 In the case of Groundwater and Transport, the Scoping Opinion states that the ES should assess these aspects or provide '*evidence demonstrating the absence of an LSE [Likely Significant Effect] and agreement with the relevant stakeholders that they agree with this approach*' (ID 3.3.6 and 3.3.11).

2.3.5 **Chapter 3** and **Chapter 4** demonstrate the absence of likely significant effects related to Groundwater and Transport respectively.

2.3.6 NNB has agreed with relevant stakeholders (Environment Agency, Somerset Drainage Board and Somerset Council) that Groundwater can be scoped out of further assessment. NNB has also consulted the TRG on Transport and is seeking agreement with the TRG that Transport can also be scoped out of further assessment in relation to the proposed changes on-site.

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Table 2-1: Consideration of the Scoping Opinion

Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
Somerset Council (formerly West Somerset Council and then Somerset West and Taunton Council)	No ID provided in Scoping Opinion	No reference provided in Scoping Opinion	ISFS	<i>'The [local planning authority ('LPA')] therefore respectfully suggests that the Secretary of State will need to consider either, 1) the visual impact of the facility now proposed, and/or 2) the possibility of alternative solutions, such as setting the facility further down into the ground thereby minimising any additional impact.'</i>	1) The visual impact of the change to the ISFS will be assessed within the landscape and visual chapter of the ES. See Volume 2 Chapter 6 . 2) See Volume 1 Chapter 2 paragraph 2.3.22 .
Stogursey Parish Council	No ID provided in Scoping Opinion	No reference provided in Scoping Opinion	ISFS	<i>'Stogursey Parish Council are of the opinion that the long term effects of the size increase should form an integral part of the scoping exercise as it could well have longer time impact on the coastal path landscape'</i>	Landscape and visual impacts of the proposed changes to the ISFS have been scoped into the EIA for the proposed material change application. The EIA will consider the impacts during the remainder of construction and during operation of Hinkley Point C. As stated in paragraph 5.7.1 of the original ES Volume 2 Hinkley Point C Development Site - Chapter 5: Decommissioning, consent from the Office for Nuclear Regulation ('ONR') under the Nuclear Reactors (EIA for Decommissioning) Regulations 1999 is required to decommission a nuclear

Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
					reactor. This would include a full EIA and submission of an ES.
Environment Agency	No ID provided in Scoping Opinion	No reference provided in Scoping Opinion	Removal of the AFD	<i>'In the recent appeal to vary the Operational Water Discharge Activity permit for Hinkley Point C we have commented extensively on the scoping/ methodology of impact studies carried out by the applicant. A large proportion of these comments also apply to the scope and methodology for information relating to the EIA process. Please see attached the Agency's closing statement to this appeal. For more detail please see appeal information can be found under reference APP/EPR/573. We look forward to working with the applicant to address our concerns.'</i>	Noted.
Planning Inspectorate	2.1.1	2.1.54 & Appendix A	Equipment Storage Building	<i>'The Scoping Report notes that as a result of changes proposed to the Interim Spent Fuel Storage (ISFS) the Access Control Building has been removed and a new Equipment Storage building would be constructed. Information on the dimensions of the building is limited to the plans in Appendix A of the Scoping Report. The ES should include the dimensions of the building and provide a justification for the location chosen.'</i>	See Volume 1 Chapter 2 paragraphs 2.3.18 and 2.3.19 for a justification of the location of the Equipment Storage Building and the dimensions of the building.
Planning Inspectorate	2.1.2	Appendix A, Drawing HINK-A1- SL-00-GA-011	Sluice gate storage	<i>'Appendix A of the Scoping Report shows four locations identified as 'Sluice gate storage'. The Scoping Report does not explain why two storage locations are required per Unit. Furthermore, there is no explanation as to why the buildings have different dimensions. The ES should clearly explain the dimensions of these components and their use.'</i>	See Volume 1 Chapter 2 paragraphs 2.6.6 and 2.6.7 for an explanation as to why two storage locations are required per Unit and why the structures have different dimensions.
Planning Inspectorate	2.1.3	Section 2 and	Meteorological Mast	<i>'The Scoping Report does not provide any information on the compound required around the meteorological mast. The ES</i>	See Volume 1 Chapter 2 paragraphs 2.4.8 to 2.4.11 for information on the

Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
		Appendix A		<i>should include parameters for the compound and its components.'</i>	compound required and the parameters for the compound.
Planning Inspectorate	2.1.4	2.1.35 – 2.1.37 2.1.58 – 2.1.60 2.1.66 – 2.1.68 2.1.74 – 2.1.76 2.1.87	Alternatives	<i>'The Scoping Report summarises the alternatives that have been considered in relation to each of the Proposed Changes. The ES should include a section on the alternatives which have been considered for each of the Proposed Changes and not just the Acoustic Fish Deterrent (AFD). Where supporting evidence has been relied on (such as the AFD Optioneering Report) this should be included in annexes to the ES. In relation to an AFD, the section on alternatives should address the potential use of Remotely Operated Vehicles (ROV) during maintenance and provide a justification as to why use of ROV is not considered to be a feasible alternative.'</i>	This PEIR includes a section on the alternatives considered for each of the proposed changes in Volume 1 Chapter 2 . The Shadow Habitats Regulations Assessment Evidence Report – Pre-Application Consultation Version (hereafter referred to as the 'HRA Report') published for consultation alongside this PEIR includes details which set out the latest supporting evidence and information regarding alternatives and the use of ROVs. The relevant elements of the AFD Optioneering Report have been considered within the HRA Report rather than provided as a standalone document.
Planning Inspectorate	2.2.1	3.1.5	Cumulative Impact	<i>'The Scoping Report notes that 'major applications within the locality' will be identified. The Inspectorate considers that the cumulative effects assessment should consider all other projects with zones of influence which overlap with the zones of influence of the Proposed Changes. Where possible, the Applicant should seek agreement with stakeholders (including the relevant local planning authorities, the Environment Agency (EA) and the Marine Management Organisation</i>	See Volume 4 Chapter 2 for a description of the cumulative effects assessment methodology. This PEIR has been published to support consultation with stakeholders and their views are sought on the list of relevant other projects to be included

Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
				<i>(MMO) on the developments that should be included in the cumulative effects assessment.'</i>	in the cumulative effects assessment in the ES.
Planning Inspectorate	2.2.2	3.1	Baseline conditions	<i>'Paragraph 3.1.1 of the Scoping Report states that the assessments in the ES will consider the current and future baseline plus the baseline identified within the original ES for the Hinkley Point C Development Site. However, the wording of the aspect chapters contradicts this statement, with Chapters 8 and 9 both appearing to refer to the baseline in the original ES rather than a baseline which reflects the existing situation (see sections 3.1 and 3.2 of this report for more detailed comments). The Inspectorate considers that the approach outlined in paragraph 3.1.1 is correct and the assessments in the ES should consider both the baselines in the original ES and the current baseline to allow an understanding of how the environment has changed as construction proceeds. The ES should clearly explain how the non-material changes and the works consented under other planning regimes have been considered in the baseline.'</i>	The assessments in the ES will consider both the baseline in the original ES and the current baseline to allow an understanding of how the environment has changed since the original DCO application was submitted and as construction proceeds. The ES will clearly explain how the non-material changes and the works consented under other planning regimes have been considered in the baseline.
Planning Inspectorate	2.2.3	7.6	Transboundary	<i>'The Inspectorate on behalf of the SoS has considered the Proposed Change and concludes that the Proposed Change is unlikely to have a significant effect either alone or cumulatively on the environment in a European Economic Area State. In reaching this conclusion the Inspectorate has identified and considered the Proposed Development's likely impacts including consideration of potential pathways and the extent, magnitude, probability, duration, frequency and reversibility of the impacts. The Inspectorate considers that the likelihood of transboundary effects resulting from the Proposed Change is so low that it does not warrant the issue of a detailed transboundary screening. However, this position will remain</i>	Noted. NNB considers that it would be appropriate for the Secretary of State to carry out a transboundary screening on a precautionary basis in order for other member states to have the opportunity comment on the project.

Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
				<i>under review and will have regard to any new or materially different information coming to light which may alter that decision. Note: The SoS' duty under Regulation 32 of the 2017 EIA Regulations continues throughout the application process. The Inspectorate's screening of transboundary issues is based on the relevant considerations specified in the Annex to its Advice Note Twelve, available on our website at http://infrastructure.planninginspectorate.gov.uk/legislationand-advice/advice-notes/</i>	
Marine Management Organisation	No ID provided in Scoping Opinion	5.5.10	Marine Policy	<i>'Due to the potential impacts to the marine environment from the removal of the AFD, the MMO considers that regard should be given to the Welsh National Marine Plan.'</i>	Noted. The Welsh National Marine Plan has been given due consideration within the assessment process, and will be discussed in detail in the ES.
Natural England	No ID provided in Scoping Opinion	Table 7-1	Marine birds	<i>'The applicant's remarks on potential impacts on fish-eating (piscivorous) birds, which may be caused by not installing an AFD, appear to scope out this aspect from the EIA. However, potential impacts on seabirds should be considered under "Marine Ecology" not "Terrestrial Ecology and Ornithology", which is confirmed in Section 8 (Page 88) of the report. We assume that the updated ES will include an analysis, as should the new HRA, which is required under Regulation 63 of the Habitats Regulations 2017 (as amended).'</i>	Potential indirect effects on piscivorous birds are considered within the interim assessment in Chapter 5 . They are also considered within the HRA Report (Sections 9.6.36 et seq (lesser black backed gull) and 9.13).
Planning Inspectorate	3.1.1	Table 8-1	Impacts on the ISFS, Meteorological Mast, Hinkley Point Substation and	<i>'The Inspectorate agrees that these matters can be scoped out of the assessment as there are unlikely to be pathways which could give rise to significant effects on marine ecological receptors.'</i>	Noted. Effects on marine ecological receptors from these elements of the proposed changes are not considered further within this assessment.

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Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
			Sluice Gate Storage structures		
Marine Management Organisation	No ID provided in Scoping Opinion	No reference provided in Scoping Opinion	Table 8.1 (scope)	<i>'The MMO suggest marine water quality should be scoped in, as per comment on Table 7.1 of the EIA Scoping Report.'</i>	Noted; see the response to comment 3.3.14.
Planning Inspectorate	3.1.2	5.5.10 & Table 9-2	Marine planning policy	<i>'As the ES is intended to consider effects on the fish populations within the Severn Estuary, it should also take the requirements of the Welsh National Marine Plan into account.'</i>	Noted. The Welsh National Marine Plan has been reviewed and taken into account within this interim assessment as appropriate, with particular reference to: <ul style="list-style-type: none"> - ECON General Policy - ENV General Policy - SCI General Policy - Sector policies related to energy and fisheries. These policies will also be considered within the ES.
Marine Management Organisation	No ID provided in Scoping Opinion	No reference provided in Scoping Opinion	Table 9.1 (legislation for marine ecology)	<i>'The MMO would like to highlight that the Marine and Coastal Access Act (2009) is also relevant to the consideration of potential effects on Marine Conservation Zones (MCZ).'</i>	Noted. MCZs have been considered within this interim assessment as appropriate. In addition, they will be the focus of a targeted MCZ Screening Assessment, to be provided with any future Marine Licence application submitted in association with the

Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
					proposed change to the CWS of Hinkley Point C.
Marine Management Organisation	No ID provided in Scoping Opinion	No reference provided in Scoping Opinion	Table 9.1 (legislation for marine ecology)	<i>'The MMO recommend the Water Framework Regulations should be included within this table.'</i>	Noted. WFD water bodies have been considered as receptors within this interim assessment as appropriate. In addition, they will be the focus of a WFD Assessment, to be provided with any future Marine Licence application submitted in association with the proposed change to the CWS of Hinkley Point C.
Marine Management Organisation	No ID provided in Scoping Opinion	No reference provided in Scoping Opinion	Table 9.1 (legislation for marine ecology)	<i>'The table should refer to the 'Marine Strategy' rather than the 'Marine Strategy Framework Directive'.'</i>	Noted. This has been corrected in this interim assessment and will be captured in the ES.
Marine Management Organisation	No ID provided in Scoping Opinion	No reference provided in Scoping Opinion	Table 9.2 (planning policy for marine ecology)	<i>'The MMO suggest that the Welsh National Marine Plan is also included here, for the reason noted in paragraph 2.1 of this response.'</i>	Noted; see the response to comment 3.1.2.
Planning Inspectorate	3.1.3	9.3.1	Guidance to be relied on	<i>'It is noted that the assessment of effects on marine ecology will be based on the 2018 guidance from the Chartered Institute of Ecology and Environmental Management (CIEEM). The Scoping Report states that the CIEEM guidance notes the importance of professional judgement. Where professional judgement is used in the assessments, the ES must clearly</i>	Noted. The assessment methodology is presented in Chapter 5 Sections 5.6 to 5.8 . Throughout the assessment, where professional judgement is applied, this is

Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
				<i>explain the criteria and/or reasoning which supports that professional judgement.'</i>	highlighted, along with appropriate justification for any decisions made.
Planning Inspectorate	3.1.4	9.4.4	Study area for marine mammals	<i>'The Scoping Report states that the study area currently mirrors that for fish populations but may be extended if a potential effect pathway is identified. The ES must either address any potential effects on the harbour porpoise population of the Bristol Channel (including effects on the Bristol Channel Approaches Special Area of Conservation (SAC)) or explain why such effects would not arise. The study areas for fish, bird and marine mammals should be agreed with the relevant stakeholders wherever possible.'</i>	<p>Potential indirect effects on marine mammal populations have been considered within the interim assessment and will continue to be so as the assessment progresses.</p> <p>Specific consideration of the Bristol Channel Approaches SAC is provided within the HRA Report (Section 9.14) for consultation, published alongside this PEIR; however, designated sites are also included as a receptor within this interim assessment.</p> <p>To date, there has been no specific engagement with stakeholders regarding the study areas presented within this interim assessment, and also proposed for inclusion within the ES.</p>
Planning Inspectorate	3.1.5	9.5.12-9.5.14	Current and future baseline	<i>'The Scoping Report states that no additional baseline surveys are proposed and instead the data supporting the previous ES and subsequent studies will be relied on, despite the statements in paragraph 9.5.13 that long-term monitoring has shown shifts in the fish assemblage in the vicinity of Hinkley Point. The reports in Appendix B of the Scoping Report appear to largely rely on the data collected during the Comprehensive Impingement Monitoring Programme (CIMP) in 2009/10. The Inspectorate is concerned that this data is now at least 12</i>	Further fish impingement studies have been completed, at Hinkley Point B, including the additional RIMP and CIMP data, outlined above. These data have now been analysed, shared with the relevant stakeholders, and its results factored into this interim assessment and in the HRA Report.

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Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
				<i>years old and questions whether it still reflects the situation at Hinkley Point. The ES should either contain an updated baseline or, where possible, demonstrate agreement with relevant stakeholders (particularly the Marine Management Organisation (MMO), the Environment Agency (EA) and Natural England (NE)) that the baseline data used in the Appendix B reports is appropriate for the assessment. The updated baseline should also include any new designated sites, (including Marine Conservation Zones) within the zone of influence of the Proposed Development.'</i>	The EIA will also consider potential pathways of effect to any new designated sites in the vicinity of the works, including MCZs, based on appropriate Zones of Influence ('Zol').
Planning Inspectorate	3.1.6	Table 9-3	Likely significant effects ('LSE')	<i>'The potential for LSE from fish impingement is only flagged in relation to effects on water quality and not on the fish population itself. The ES should present an assessment of the effects on relevant fish populations.'</i>	This interim assessment includes a detailed review of the evidence base to inform the assessment, including the most recent impingement data collected at Hinkley Point B, which has been used to inform an assessment of potential effects on fish populations, and associated, indirect effects on predator species. The interim assessment is set out in Chapter 5 . This will be built-on and developed within the ES.
Planning Inspectorate	3.1.7	9.8	Assessment methodology	<i>'The Scoping Report does not state this explicitly, but it appears that the assessments in the ES will rely on the various studies contained in Appendix B. The Inspectorate notes that these studies were completed between 2018 – 2020. The ES should include a justification as why the methodologies used in these assessments are still considered to be appropriate. The ES should demonstrate that the methods used to undertake the assessment have been agreed with the relevant</i>	Additional impingement surveys have been undertaken, the results of which form the basis of this interim assessment report. The final reporting of the ongoing data analysis includes a full description and justification of the methodology used, which will be presented in the ES. An overview of

Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
				<i>stakeholders where possible. In the event that such agreement is not forthcoming, the ES should include separate assessments using the Applicant's preferred method as well as that recommended by stakeholders.'</i>	this methodology is presented within Chapter 5 Section 5.8.
Marine Management Organisation	No ID provided in Scoping Opinion	No reference provided in Scoping Opinion	Assessment methodology	<i>'The section provides no information on how the marine water quality assessment will be carried out. The MMO recommend that previous detailed assessments that have been carried out for the project, that the evidence available from the assessment may be suitable to inform the EIA.'</i>	Noted; see the response to comment 3.3.14.
Somerset Council (formerly West Somerset Council and then Somerset West and Taunton Council)	No ID provided in Scoping Opinion	No reference provided in Scoping Opinion	Marine ecology	<i>'In terms of specifics, it is recommended that the likely significant effects associated with Marine Ecology should also pick up the potential for fish fatalities as a result of not having the AFD system in place. The LPA is concerned about the possibility for any fish affected by this proposed change to be killed or injured by the water-cooling operation and possibly washed up onto shore, having an impact on our marine and shoreline environment and the tourism sector at Minehead, Watchet and the other smaller seaside/riverside locations. On this basis, the LPA would be pleased to hear how EDF Energy intend to manage this issue to avoid this scenario and ensure that they would be able to respond immediately, if there were to be any such occurrences. I think it would be appropriate to address this matter in any formal submission, otherwise it would be an issue that the Council would have to raise as part of its official response to the formally submitted application for the Material Change. This is an issue that has been raised by the LPA with the Applicant before.'</i>	Potential effects of the release of dead fish have been considered within this interim assessment, drawing primarily on the findings of TR515: <i>Water quality effects of the fish recovery and return system</i> (Cefas, 2020), but updated with the findings of CIMP2. Within the ES, the fate of dead fish will include review of new impingement data, updating the findings of TR515 described above.

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Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
North Somerset Council	No ID provided in Scoping Opinion	No reference provided in Scoping Opinion	Marine ecology	<i>'The North Somerset Council Ecology team believe that the removal of the AFD will be detrimental to the European Protected site and therefore recommend that a marine specialist is consulted and that suitable mitigation is provided that will offset the detrimental impact prior to the determination of this application.'</i>	Full consideration of potential effects on European and Ramsar designated sites is provided within the HRA Report, published alongside this PEIR. However, designated sites have also been considered as receptors within this interim assessment.
Natural England	No ID provided in Scoping Opinion	No reference provided in Scoping Opinion	Marine ecology	<i>'It is important that if new evidence or new analyses of existing data that may inform our understanding of potential impacts on marine fish, marine mammals and seabirds arising from not installing an AFD have become available since the public inquiry, then such information should be included in the updated Marine Ecology chapter of the ES and the new HRA to be prepared to inform this application. It would be helpful that if any information presented in the ES and HRA submitted to the Environmental Permit public inquiry in June 2021 has been revised subsequently in the new documentation submitted to inform the application for a material change to the DCO, it is flagged clearly to aid consultees in reviewing the material. If no changes have been made subsequent to the June 2021 public inquiry, then this should be stated.'</i>	Noted. Additional impingement surveys have been undertaken at the Hinkley Point B site as described above; analysis and interpretation of these data is captured within this PEIR. Additional information and analysis will be presented within the ES; where applicable, this will be highlighted as such.
Marine Management Organisation	No ID provided in Scoping Opinion	No reference provided in Scoping Opinion	Marine ecology	<i>'This section provides little detail on the proposed assessment methodology for marine ecology receptors. The MMO recommend that evidence available from the detailed assessment for the Water Discharge Activity permit application may be suitable to inform the EIA.'</i>	Additional information on the methodology for impact assessment has been included within this interim assessment and will be captured in the ES. Throughout the assessment process, where appropriate, information and assessments from the WDA Permit

Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
					application have been reviewed and incorporated for consistency.
Marine Management Organisation	No ID provided in Scoping Opinion	No reference provided in Scoping Opinion	11.1.6 (summary and next steps – reference to an updated HRA)	<i>'The MMO would expect the Environmental Statement to be supported by various additional assessments, including an MCZ assessment, Habitats Regulation Assessment, Waste Framework Directive Assessment, Marine Plan Assessments (for both the English Southwest Marine Plan and Welsh National Marine Plan), as well as a Water Framework Regulations Assessment (PINS Advice Note 18) and a Marine Strategy Assessment.'</i>	A separate HRA Report has been prepared and published for consultation alongside the PEIR. The findings of the HRA process are considered within the PEIR, and will be included in the ES. Consideration of MCZs and WFD waterbodies is also presented within the PEIR. Full assessments for these sites will be provided alongside the ES. These detailed assessments will also accompany any subsequent Marine Licence application / variation associated with the proposed changes.
Planning Inspectorate	3.1.8	No reference provided in Scoping Opinion	Confidential Annexes	<i>'Public bodies have a responsibility to avoid releasing environmental information that could bring about harm to sensitive or vulnerable ecological features. Specific survey and assessment data relating to the presence and locations of species such as badgers, rare birds and plants that could be subject to disturbance, damage, persecution, or commercial exploitation resulting from publication of the information, should be provided in the ES as a confidential annex. All other assessment information should be included in an ES chapter, as normal, with a placeholder explaining that a confidential</i>	Noted. There is currently no confidential information associated with the impact assessment for the proposed changes.

Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
				<i>annex has been submitted to the Inspectorate and may be made available subject to request.'</i>	
Planning Inspectorate	3.2.1	10.5.3	Effects from the AFD, Hinkley Point Substation, and sluice gates storage	<i>'The Inspectorate notes that the Hinkley Point C substation is to become a permanent building and the sluice gates are new structures. However, the Inspectorate agrees that these matters can be scoped out from the landscape and visual impact assessment in the ES as additional significant landscape and visual effects are unlikely to arise due to their location and context of the wider Hinkley Point development site.'</i>	It is acknowledged that the Planning Inspectorate agrees that effects from the Hinkley Point Substation and sluice gates storage can be scoped out of the landscape and visual assessment.
Planning Inspectorate	3.2.2	10.5.5	Effects on the Vale of Taunton and Quantock Fringes National Character Area ('NCA')	<i>'The Inspectorate agrees that this matter can be scoped out due to the scale of the Proposed Change in the context of the wider Hinkley Point development site and its relationship to the NCA.'</i>	It is acknowledged that the Planning Inspectorate agrees that effects on the Vale of Taunton and Quantock Fringes NCA can be scoped out of the landscape and visual assessment.
Planning Inspectorate	3.2.3	10.5.8	Effects on the Wall Common and Coast Local Landscape Character Area ('LLCA')	<i>'The Inspectorate agrees that, considering the Proposed Changes and the location as shown on ES Figures 22.6 and 22.7, Wall Common and Coast LLCA is located at distance from the Proposed Changes and therefore the Proposed Changes are unlikely to give rise to likely significant effects at this location.'</i>	It is acknowledged that the Planning Inspectorate agrees that effects on the Wall Common and Coast LLCA can be scoped out of the landscape and visual assessment.
Planning Inspectorate	3.2.4	10.5.9	Effects on the Blue Anchor to St. Audries Bay Local	<i>'The Inspectorate agrees that, considering the scale of the Proposed Changes and the distance to the LSCAs as shown on ES Figure 22.6, additional LSE are unlikely to arise. This matter can be scoped out of further assessment.'</i>	It is acknowledged that the Planning Inspectorate agrees that effects on the Blue Anchor to St. Audries Bay LSCA, Burnhamon-Sea to Brean Down LSCA

Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
			Seascape Character Area ('LSCA'), Burnhamon-Sea to Brean Down LSCA and Brean Down LSCA		and Brean Down LSCA can be scoped out of the landscape and visual assessment.
Planning Inspectorate	3.2.5	10.5.11	Effects on LLCA in the Sedgemoor district other than the Quantock Hills LLCA	<i>'The Scoping Report seeks to scope this matter out on the grounds that the distance from the Proposed Changes and the scale of change would not lead to LSE on the other LLCA. The Inspectorate agrees that the changes are unlikely to give rise to LSE on the LLCA and therefore this matter can be scoped out of further assessment.'</i>	It is acknowledged that the Planning Inspectorate agrees that effects on LLCA in the Sedgemoor district other than the Quantock Hills LLCA can be scoped out of the landscape and visual assessment.
Planning Inspectorate	3.2.6	Table 10-3 & 10.5.24	Effects on Areas of Outstanding Scenic Interest	<i>'The Scoping Report states that an assessment of effects on these areas is not necessary as [Natural England] no longer define these areas. The Inspectorate notes that none of the responses from consultees have raised concerns about this approach and agrees that this matter can be scoped out of further assessment.'</i>	It is acknowledged that the Planning Inspectorate agrees that effects on Areas of Outstanding Scenic Interest can be scoped out of the landscape and visual assessment.
Planning Inspectorate	3.2.7	10.5.13	Effects on Fairfield Historic Park and Garden and Nether Stowey Conservation Area resulting	<i>'The Scoping Report seeks to scope this matter out on the grounds that there are unlikely to be views to the ISFS from either receptor. On the basis of the Site layout plan in Appendix A, the Inspectorate agrees that LSE are unlikely to arise and this matter can be scoped out of further assessment.'</i>	It is acknowledged that the Planning Inspectorate agrees that effects on Fairfield Historic Park and Garden and Nether Stowey Conservation Area resulting from the proposed changes can be scoped out of the landscape and visual assessment.

Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
			from the Proposed Changes		
Planning Inspectorate	3.2.8	10.5.17 & Table 10-5	Effects on principal viewpoints ('VP') 1 – 10 and Fairfield Historic Park and Garden VP7 resulting from the Proposed Changes	<p><i>'The Scoping Report states that while the meteorological mast would be visible from these viewpoints, the change in location would not alter the character of the view. The ISFS may be visible during construction but would be screened during operation by the Nuclear Island and the Conventional Island structures. The Inspectorate has reviewed the photomontages submitted with the original ES and the revised Site layout plan in Appendix A of the Scoping Report and is content that these viewpoints can be scoped out of further assessment, apart from VP7.</i></p> <p><i>In relation to VP7, while Table 10-5 states that this viewpoint would be scoped out, para 10.5.13 of the Scoping Report states that the effects on the setting of Stogursey Conservation Area have been scoped in and will be considered under VP7. On this basis, the Inspectorate does not consider that this viewpoint can be scoped out from further assessment. Accordingly, the ES should include an assessment of the effects on this viewpoint or evidence demonstrating the absence of an LSE and agreement with the relevant stakeholders, where possible.'</i></p>	<p>Location VP7 refers to Fairfield House which is over 1 km outside of the Stogursey Conservation Area and has been incorrectly identified in the scoping report to assess the effects on Stogursey Conservation Area</p> <p>However, VP18 is included in this PEIR and considers the impacts on the residential area of Stogursey, Burgage Road and Lime Street (including the Conservation Area).</p> <p>It is not considered that Fairfield House requires further assessment as the Planning Inspectorate has set out in the Scoping Opinion (ID 3.2.7).</p>
Planning Inspectorate	3.2.9	10.5.21	Views at dusk	<p><i>'The Scoping Report states that the views at dusk recorded for the original ES would not be included in the assessment of the Proposed Changes as the lighting design for the development will not be amended. The Inspectorate agrees that this matter can be scoped out of further assessment.'</i></p>	<p>It is acknowledged that the Planning Inspectorate agrees that views at dusk can be scoped out of the landscape and visual assessment.</p>

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Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
Planning Inspectorate	3.2.10	Table 10-5	Principal VPs 12,15,17, 21 – 25, 27, 29 – 42 Secondary viewpoints S1 – S6 Nether Stowey Conservation Area VP24	<i>'The Scoping Report states that the assessment in the original ES for effects during construction and years 1 and 15 of operation concluded that residual effects would be of minor significance and that the scale of the Proposed Changes would not result in effects of greater significance. The secondary viewpoints are also considered to be too far from the Proposed Changes for the scale of change to affect the significance of the previously assessed effects. The Inspectorate has reviewed the figures submitted with the original ES and the revised Site layout plan in Appendix A of the Scoping Report and is content that these viewpoints can be scoped out of further assessment. However, the assessment should also include a viewpoint which represents the views from the National Coastal Footpath (the Applicant's attention is drawn to the comments from Somerset West and Taunton Council and Stogursey Parish Council in Appendix 2 of this report).'</i>	An additional viewpoint (representative viewpoint VP19a) has been identified along the West Somerset Coastal Path which represents the views from the National Coastal Footpath. This viewpoint is closer to the Hinkley Point C site and provides views to the ISFS. This will be included in the ES.
Planning Inspectorate	3.2.11	10.4.2	Study area	<i>'Paragraph 10.4.2 of the Scoping Report states that an 8km study area will be used for the landscape and visual impact assessment however paragraph 10.4.4 states that a new zone of theoretical visibility will be determined for the ISFS as part of the Preliminary Environmental Information Report. It is not clear from the wording of the Scoping Report whether the study area is 8km or will be determined through this later assessment. The ES should clearly identify the final study area and provide justification for this, including agreement with relevant stakeholders where possible.'</i>	The study area extends over a distance of 8 km from the ISFS and includes the Quantock Hills Area of Outstanding Natural Beauty ('AONB') (refer to Figure 6.1 and Figure 6.2 in PEIR Figures – Volume 2).
Planning Inspectorate	3.2.12	10.5.22	Current baseline	<i>'The Inspectorate notes that the baseline to be used in the assessment will be the baseline in the original ES to allow a 'like for like' comparison. However, the Scoping Report also</i>	The consented non-material changes will be reviewed and considered as part of the current baseline for the

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Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
				<i>states that the changes resulting from the four previous non-material change applications will be taken into consideration when assessing new impacts from the ISFS; paragraph 3.1.2 of the Scoping Report states that the four non-material changes will form part of the current baseline. These two positions appear to contradict each other. It is not clear from the Scoping Report if the non-material changes would be included in an updated baseline or would be treated as cumulative changes alongside the Proposed Changes. The ES must provide a clear definition of the baseline and an explanation as to how the nonmaterial changes have been accounted for. Effects from the changes to the meteorological mast should also be accounted for, in addition to the changes to the ISFS.'</i>	<p>landscape and visual assessment. The baseline assessed in the original ES will be considered as part of the original baseline.</p> <p>The proposed changes to the ISFS (including Equipment Storage Building) and meteorological mast have been included in the preliminary landscape and visual assessment.</p>
Planning Inspectorate	3.2.13	10.8	Proposed assessment methodology	<i>'The assessment of effects should be supported by revised photomontages which reflect the effects of the Proposed Changes.'</i>	<p>Since submission of the Scoping Report and receipt of the Scoping Opinion, it has been identified that it is not possible to access the data used to produce the original DCO photomontages. It was assumed that these data were available for the production of revised photomontages to enable the comparison of the original photomontages against the current baseline and the proposed changes.</p> <p>Supported by an appraisal by a qualified landscape architect, it is considered to be proportionate to undertake Type 1 visualisations to</p>

Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
					<p>support the proposed material change application and landscape and visual impact assessment ('LVIA'), subject to agreement with the relevant stakeholders.</p> <p>Given the nature of the proposed changes, three viewpoint locations previously developed as Verified Visualisation Images within the original DCO application have been selected for developing into Type 1 visualisations for the proposed material change application to provide a suitable reflection of the proposed changes.</p> <p>The Type 1 visualisations have been produced for:</p> <ul style="list-style-type: none"> • VP13 – Public Right of Way ('ProW') No. WL 23/57, West of Wick (see Figure 6.3 in PEIR Figures – Volume 2); • VP19 – Stolford, West Somerset Coastal Path, ProW No. WL 23/95 (see Figure 6.4 in PEIR Figures – Volume 2); and • VP28 – Quantock Hills AONB, ProW No. BW 10/9 (see Figure 6.5 in PEIR Figures – Volume 2).

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Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
					Please refer to Appendix A for further information on the methodology proposed.
Sedgemoor District Council	No ID provided in Scoping Opinion	No reference provided in Scoping Opinion	Landscape and Visual	<i>'...the applicant proposes to undertake a Landscape and Visual Impact Assessment. The inclusion of this assessment is welcomed because it is not clear what impacts the proposed change to the [ISFS] may have, particularly in terms of visual impact or light pollution, these are areas of particular local concern.'</i>	<p>The ES will include a LVIA of the impacts of the proposed changes to the ISFS. The Scoping Report states that the views at dusk recorded for the original ES would not be included in the assessment of the proposed changes as the lighting design for the Hinkley Point C Project will not be amended. The Planning Inspectorate agreed that this matter could be scoped out of further assessment (Scoping Opinion ID 3.2.9) as the lighting design for the Hinkley Point C Project will not be amended.</p> <p>Furthermore, operational impacts are controlled through the DCO via a number of Requirements, which oblige NNB to submit a detailed plan or strategy that complies with the principles set out in the original ES, or to comply with a specified limit. This includes Requirement MS29 Operational Lighting Strategy, the detailed design of which will be submitted to and approved by Somerset Council.</p>

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Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
Somerset Council (formerly Somerset West and Taunton Council)	No ID provided in Scoping Opinion	No reference provided in Scoping Opinion	Landscape and Visual	<i>'...it is crucial that the Applicant provides detailed and appropriate evidence and examination on the potential for impact to visual amenity from the Coastal footpath area which will lie adjacent to the proposed new ISFS...'</i>	The ES will include a LVIA of the impacts of the changes to the ISFS. A new viewpoint location (representative viewpoint VP19a) will be included along the West Somerset Coastal Path (refer to Figure 6.1 and Figure 6.2 in PEIR Figures – Volume 2 for the location of this viewpoint).
Planning Inspectorate	3.3.1	Table 7-1 & Section 7.2 (original ES Chapter 7)	Spent fuel and radioactive waste management	<i>'The Scoping Report states that there is no change to the volume of spent fuel held by the ISFS and notes the removal of the vent stack reduces the risk of any potential emissions. On this basis it is considered that additional LSE are unlikely and this matter can be scoped out of further assessment.'</i>	It is acknowledged that the Planning Inspectorate agrees that spent fuel and radioactive waste management can be scoped out of further assessment.
Planning Inspectorate	3.3.2	Table 7-1 (original ES Chapter 8)	Conventional waste management	<i>'The Inspectorate agrees that the changes in conventional waste arisings from changes in the design of the ISFS, retention of the substation and installation of the new sluice gate structures are, on balance, unlikely to lead to additional LSE beyond the worst-case scenario assessed in the original ES. The Scoping Report states that targets set in the original ES of 90% of waste being reused would also be adhered to for the material change. On this basis, this aspect can be scoped out of further assessment in the ES.'</i>	It is acknowledged that the Planning Inspectorate agrees that conventional waste management can be scoped out of further assessment.
Planning Inspectorate	3.3.3	Table 7-1 (original ES	Socio-economics:	<i>'The Inspectorate agrees that the scale of the Proposed Changes as set out in the Scoping Report are unlikely to give rise to significant effects over and above those assessed in the</i>	It is acknowledged that the Planning Inspectorate agrees that the following aspects associated with socio-

Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
		Chapter 9)	Construction employment; labour market and supply chain; accommodation supply; owner occupied housing; private rented sector; tourist sector; latent sector; population dynamics; public services; and operational employment, supply chain and multiplier.	<i>original ES. This aspect can be scoped out of further assessment in the ES.'</i>	economics can be scoped out of further assessment: construction employment; labour market and supply chain; accommodation supply; owner occupied housing; private rented sector; tourist sector; latent sector; population dynamics; public services; and operational employment, supply chain and multiplier.
Planning Inspectorate	3.3.4	Table 7-1 (original ES Chapter 9)	Socio-economics: Agricultural land use impacts	<i>'The Inspectorate agrees that no additional agricultural land is required to facilitate the Proposed Changes and therefore this matter can be scoped out of further assessment.'</i>	It is acknowledged that the Planning Inspectorate agrees that socio-economics (agricultural land use impacts) can be scoped out of further assessment.
Planning Inspectorate	3.3.5	Table 7-1 (original ES Chapter 9)	Socio-economics: Specific locational impacts	<i>'The Inspectorate agrees that the Proposed Changes are unlikely to give rise to new or additional significant effects on individual businesses. It is noted that any new or different significant effects identified by the ES would trigger an assessment of effects on business receptors which would be</i>	It is acknowledged that the Planning Inspectorate agrees that socio-economics (specific locational impacts) can be scoped out of further assessment unless any new or

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Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
				<i>included in the landscape and visual assessment. If this occurs, the assessment in the ES must make it clear how the socio-economic effects have been assessed as distinct from the landscape and visual impacts. The Inspectorate agrees that apart from this point, socio-economic effects can be scoped out of further assessment in the ES.'</i>	different significant effects identified by the ES would trigger an assessment of effects on business receptors. If this occurs, the assessment in the ES will make it clear how the socio-economic effects have been assessed as distinct from the landscape and visual impacts.
Planning Inspectorate	3.3.6	Table 7-1 (original ES Chapter 10)	Transport	<i>'The Inspectorate notes comments in the Scoping Report, however without information provided on the current number of trips and the proposed increase, the Inspectorate is unable to scope this aspect out at this stage. Accordingly, the ES should include an assessment of this aspect or evidence demonstrating the absence of an LSE and agreement with the relevant stakeholders that they agree with this approach. The ES should also consider cumulative effects with other planning applications would arise which result in increased trips to the Hinkley Point C site.'</i>	See Chapter 4 which assesses whether there are any likely significant effects related to transport. See Volume 4 Chapter 2 for further information on the cumulative effects assessment.
National Highways	No ID provided in Scoping Opinion	No reference provided in Scoping Opinion	Transport	<i>'Based on the scope of the proposed amendments we consider the application unlikely to result in a material change to the traffic impact associated with the construction of Hinkley Point C. We would however expect the applicant to quantify any changes to the forecast traffic impact as a result of the proposal, as part of any future application.'</i>	See Volume 2 Chapter 4 which assesses whether there are any likely significant effects related to transport including likely changes in traffic flows generated by the proposed changes on-site.
Planning Inspectorate	3.3.7	Table 7-1 (original ES Chapter 11)	Noise and vibration	<i>'The Inspectorate agrees that the Proposed Changes are unlikely to significantly alter operational noise levels. During construction the Scoping Report acknowledges that the Proposed Changes may give rise to temporary noise impacts, however these are unlikely to be materially different from those</i>	It is acknowledged that the Planning Inspectorate agrees that noise and vibration can be scoped out of further assessment.

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Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
				<i>assessed in the original ES. This aspect can be scoped out of further assessment in the ES.'</i>	
Planning Inspectorate	3.3.8	Table 7-1 (original ES Chapter 12)	Air quality	<i>'The Inspectorate agrees that the Proposed Changes will not result in significantly different air quality impacts from those assessed in the original ES. This aspect can be scoped out of further assessment.'</i>	It is acknowledged that the Planning Inspectorate agrees that air quality can be scoped out of further assessment.
Planning Inspectorate	3.3.9	Table 7-1 (original ES Chapter 13)	Soils and land use	<i>'The Inspectorate agrees that this aspect can be scoped out of further assessment, on the basis that the Proposed Changes are located within existing development areas that have been subject to an assessment of soils and land use effects as part of the original ES.'</i>	It is acknowledged that the Planning Inspectorate agrees that soils and land use can be scoped out of further assessment.
Planning Inspectorate	3.3.10	Table 7-1 (original ES Chapter 14)	Geology and land contamination	<i>'The Scoping Report states that the Proposed Changes would be limited to areas of land (Building Development Areas East and West) which were assessed in the original ES. There is known ground contamination present in the ground in Building Development Area West. As the footprint of the ISFS would increase over that assessed in the ES, there is potential for additional areas of contaminated soil to be affected. Mitigation for dealing with contaminated land has already been secured through the Environmental Management and Monitoring Plans in Annex 3 of the original ES. On this basis the Inspectorate agrees that new or additional LSE are unlikely and this matter can be scoped out of further assessment. The Scoping Report also states that the change from wet to dry storage of fuel in the ISFS represents Best Available Technology and would not lead to additional land contamination from increased radioactive discharges. The Inspectorate agrees that this matter can be scoped out of further assessment.'</i>	It is acknowledged that the Planning Inspectorate agrees that geology and land contamination can be scoped out of further assessment.

Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
Planning Inspectorate	3.3.11	Table 7-1 (original ES Chapter 15)	Groundwater	<i>'The Scoping Report states that the Proposed Changes mean that the ISFS would no longer include a subsurface structure so the extent of dewatering would be reduced. The magnitude of change is not expected to be significant in the context of construction of the Hinkley Point C development. However, the Scoping Report states that it is assumed that embedded mitigation will be reviewed to account for the change so that potential structural impacts are avoided. Effects from the sluice gates on groundwater are not expected to change the magnitude of effects assessed in the original ES. The Inspectorate does not consider that the Scoping Report has provided sufficient evidence to support these statements. Accordingly, the ES should include an assessment of the effects on this matter or evidence demonstrating the absence of an LSE and agreement with the relevant stakeholders that they agree with this approach. The Inspectorate agrees that the Proposed Changes affecting the meteorological mast and the substation are unlikely to give rise to new or additional LSE beyond those reported in the original ES. These matters can be scoped out of further assessment.'</i>	See Chapter 3 which assesses whether there are any likely significant effects related to groundwater.
Planning Inspectorate	3.3.12	Table 7-1 (original ES Chapter 16)	Surface water	<i>'The Inspectorate agrees that the Proposed Changes are unlikely to lead to new or additional significant effects on surface water since the mitigation measures described in Appendix 2A of the original ES would deal with any additional run-off. This matter can be scoped out of further assessment in the ES.'</i>	It is acknowledged that the Planning Inspectorate agrees that surface water can be scoped out of further assessment.
Planning Inspectorate	3.3.13	Table 7-1 (original ES)	Coastal hydrodynamics and geomorphology	<i>'The Inspectorate agrees that the removal of the AFD is the only element of the Proposed Changes which is likely to lead to effects on this aspect. It does not appear likely that removal of the AFD would lead to new or additional significant effects'</i>	It is acknowledged that the Planning Inspectorate agrees that coastal hydrodynamics and geomorphology

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Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
		Chapter 17)		<i>not already assessed in the original ES. This aspect can be scoped out of further assessment in the ES.'</i>	can be scoped out of further assessment.
Planning Inspectorate	3.3.14	Table 7-1 (original ES Chapter 18)	Marine water and sediment quality	<i>'The Inspectorate notes the concerns of the Marine Management Organisation (MMO) that changes in the quantity of dead fish discharged could affect marine water quality (see Appendix 2 of this report). The Inspectorate does not agree that this matter can be scoped out of further assessment. Accordingly, the ES should include an assessment of the effects arising from discharge of dead fish or evidence demonstrating the absence of an LSE and agreement with the relevant stakeholders.'</i>	<p>Potential effects on marine water quality are considered within this PEIR (see Chapter 5) and will be considered within the ES, drawing primarily on the findings of TR515: <i>Water quality effects of the fish recovery and return system</i> (Cefas, 2020), and TR479: <i>Particle tracking study of impinged sprat from the proposed Hinkley Point C fish recovery and return system</i> (Cefas, 2019), which focused on the fate of impinged sprat from the CWS.</p> <p>With regards to marine sediment quality, it is proposed that, as there is no additional interaction with the seabed as a result of the proposed changes, there will be no associated effects on sediment quality. The potential for dead/decaying fish material to fall to the seabed and become part of the sedimentary composition is noted; however, the level of increased material is not considered to be significant, and it is proposed that this is scoped out of future assessment. This is supported by TR479: <i>Particle tracking study of</i></p>

Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
					<i>impinged sprat from the proposed Hinkley Point C fish recovery and return system (Cefas, 2019), which focused on the fate of impinged sprat from the CWS.</i>
Marine Management Organisation	n/a	Table 7-1 (original ES Chapter 18)	Marine water and sediment quality	<i>'The MMO do not consider that marine water and sediment quality should be scoped out at this stage. As noted in section 9.4.5 of the EIA Scoping Report, changes in the quantity of dead fish discharged could have implications for marine water quality which require further assessment.'</i>	Noted; see the response to comment 3.3.14.
Planning Inspectorate	3.3.15	Table 7-1 (original ES Chapter 20)	Terrestrial ecology and ornithology	<i>'The Inspectorate agrees that the Proposed Changes would be unlikely to give rise to new or additional LSE to terrestrial plants, habitats, invertebrates and birds using terrestrial and intertidal habitats and these matters can be scoped out of further assessment. In relation to piscivorous birds, the Scoping Report seeks to scope these species out of further assessment on the grounds that the additional entrainment or impingement of fish without the AFD would affect less than 0.1% of fish stocks. As noted in section 3.1 of this report, the Inspectorate has raised queries about the assessment of effects on fish populations. It is therefore premature to exclude this matter from further assessment. Accordingly, the ES should include an assessment of this matter or evidence demonstrating the absence of an LSE and agreement with the relevant stakeholders that they agree with this approach.'</i>	An interim assessment of the potential effects on piscivorous birds is presented in Volume 2 Chapter 5 .
Planning Inspectorate	3.3.16	Table 7-1 & Section 7.3	Radiological	<i>'The Inspectorate agrees to scope this aspect out of further assessment as the Proposed Changes are unlikely to increase emissions and would be regulated by the Radioactive Substances Regulation Permit. The Scoping Report also notes</i>	It is acknowledged that the Planning Inspectorate agrees that radiological impacts can be scoped out of further assessment.

Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
		(original ES Chapter 21)		<i>that the removal of the flue on the spent fuel storage facility further reduces the likelihood of any emissions.'</i>	
Planning Inspectorate	3.3.17	Table 7-1 (original ES Chapter 23)	Historic environment	<i>'The Scoping Report states that the Proposed Changes do not change the assessment of effects presented in the original ES. The Inspectorate agrees that new or additional significant effects are unlikely to arise. This matter can be scoped out of further assessment in the ES.'</i>	It is acknowledged that the Planning Inspectorate agrees that historic environment can be scoped out of further assessment.
Planning Inspectorate	3.3.18	Table 7-1 (original ES Chapter 24)	Offshore and intertidal archaeology	<i>'The Inspectorate agrees that it is unlikely that there would be new or additional significant effects on marine and intertidal archaeology as a result of the Proposed Changes compared to those assessed in the original ES. This aspect can be scoped out of further assessment in the ES.'</i>	It is acknowledged that the Planning Inspectorate agrees that offshore and intertidal archaeology can be scoped out of further assessment.
Planning Inspectorate	3.3.19	Table 7-1 (original ES Chapter 25)	Amenity and recreation: PRow (Hinkley Point C Development Site, C182 Wick Moor Drove, off-site highway improvements); Sports and recreation facilities (Hinkley Point C Development	<i>'It is noted that the Scoping Report states that if new or materially different LSE are identified from the landscape and visual impact assessment then effects on users of amenity or recreational areas would be considered. On this basis the Inspectorate agrees that this aspect can be scoped out of further assessment in the ES.'</i>	It is acknowledged that the Planning Inspectorate agrees that amenity and recreation (excluding coastal path) impacts can be scoped out of further assessment unless new or materially different likely significant effects are identified from the LVIA. If this occurs, the effects on users of amenity or recreational areas would be considered.

NOT PROTECTIVELY MARKED

Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
			Site, C182 Wick Moor Drove, off-site highways improvements); Open Access land and Public Open Space (Hinkley Point C Development Site, C182 Wick Moor Drove, off-site highway improvements)		
Somerset Council (formerly West Somerset Council and then Somerset West and Taunton Council)	No ID provided in Scoping Opinion	No reference provided in Scoping Opinion	Amenity and recreation – coastal path	<i>'In Table 7.1 section 25 (Amenity and recreation), the applicant has not referenced this potential for the significant increase in the size of the Interim Spent Fuel Store (ISFS) to impact views from the National Coastal Footpath. This footpath will run adjacent to the proposed new dry store facility, when it is restored to its original position following the agreed diversion during certain construction phases. The proposed increase in size of the facility has the potential to have a detrimental impact on the views from and enjoyment of the footpath at this point. As this footpath is part of the National Coastal trail, this aspect most definitely does need to be included in the assessment and should not be 'scoped out'. It is noted from section 8 that landscape and visual effects have been scoped into the EIA and this is recommended to be the case by the LPA, for this very reason.'</i>	The visual impacts from the West Somerset Coastal Path will be assessed within the LVIA. An additional viewpoint (representative viewpoint VP19a) has been identified along the West Somerset Coastal Path which represents the views from the National Coastal Footpath (refer to Figure 6.1 and Figure 6.2 in PEIR Figures – Volume 2 for the location of this viewpoint). The viewpoint is closer to the Hinkley Point C site and provides views to the ISFS. This will be included in the ES.

Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
Planning Inspectorate	3.3.20	Table 7-1 (original ES Chapter 26)	Shipping and navigation	<i>'The Inspectorate agrees that there is no pathway by which the Proposed Changes could lead to new or additional LSE on shipping and navigation. This matter can be scoped out of further assessment.'</i>	It is acknowledged that the Planning Inspectorate agrees that shipping and navigation can be scoped out of further assessment.
Maritime and Coastguard Agency	No ID provided in Scoping Opinion	No reference provided in Scoping Opinion	Shipping and navigation	<i>'The MCA has an interest in the works associated with the marine environment, and the potential impact on shipping, the safety of navigation, access to ports, harbours and marinas and any impact on our search and rescue obligations. The MCA would expect the impact of the above changes on shipping and navigation to be considered in the scoping documents.'</i>	Impacts on shipping and navigation were included in the Scoping Report in Table 7-1. As outlined in the Scoping Opinion (ID 3.3.20), the Planning Inspectorate agrees that shipping and navigation can be scoped out of further assessment.
Planning Inspectorate	3.3.21	Table 7-1 (no chapter in the original ES)	Population and human health	<i>'It is noted that the original ES contained various assessments of impacts on population and human health and a stand-alone health assessment was also produced. These documents considered potential effects and identified relevant mitigation. The inspectorate agrees that the Proposed Changes would be unlikely to give rise to any new or additional LSE. The Inspectorate notes that if any new or materially different significant effects are identified through the landscape and visual impact assessment, population and human health effects would be considered as part of that assessment. If this occurs, the assessment in the ES must make it clear how the population and human health effects have been assessed as distinct from the landscape and visual impacts. The Inspectorate agrees that apart from this point, population and human health effects can be scoped out of further assessment in the ES.'</i>	It is acknowledged that the Planning Inspectorate agrees that population and human health can be scoped out of further assessment unless any new or materially different significant effects are identified through the LVIA. If this occurs, the assessment in the ES will make it clear how the population and human health effects have been assessed as distinct from the landscape and visual impacts.

Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
Planning Inspectorate	3.3.22	Section 7.4 Table 7-1 (no chapter in the original ES)	Climate change	<i>'The Inspectorate notes that the increase in the footprint of the ISFS would lead to additional greenhouse gas (GHG) emissions of 89,000 tonnes of CO2 equivalent. The total estimated carbon emissions for the construction of the Hinkley Point C power station site are stated to be approximately 8,624,838 tonnes of CO2 equivalent, with GHG emissions from other elements of the Proposed Changes being small or negligible. The Inspectorate agrees that the additional emissions associated with the Proposed Changes result in a proportionately small increase in the volume of GHG emissions. The limited nature of the Proposed Changes would not significantly increase the vulnerability of the Hinkley Point C power station site to climate change effects such as increased flood risk. The Inspectorate agrees that, set against the Hinkley Point C development as a whole, the effects associated with the Proposed Changes are unlikely to be significant. This matter can be scoped out of further assessment in the ES.'</i>	It is acknowledged that the Planning Inspectorate agrees that climate change can be scoped out of further assessment.
Marine Management Organisation	No ID provided in Scoping Opinion	No reference provided in Scoping Opinion	Climate change / marine ecology	<i>'The MMO note that the applicant is scoping out climate change from the updated EIA, and would like clarification on whether climate change will be taken into account in the assessment of the significance of effects on marine ecology receptors?'</i>	The potential effects of climate change have been addressed from the perspective of inclusion in the future baseline as part of the ongoing assessment.
North Somerset Council	No ID provided in Scoping Opinion	No reference provided in Scoping Opinion	Climate change	<i>'North Somerset Council declared a climate emergency in February 2019. Since then, North Somerset Council has been dedicated to combating Climate Change agreeing to become carbon neutral by 2030. Therefore taking this into account, whilst North Somerset Council does not have any objection to the amendments to the approved scheme in principle, the</i>	As outlined in the Scoping Opinion (ID 3.3.22), the Planning Inspectorate agrees that climate change can be scoped out of further assessment.

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Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
				<i>North Somerset Council Sustainability Coordinator has recommended that a section on climate changes impacts should be provided for consideration that includes quantification of greenhouse gas emissions associated with the proposal.'</i>	
Planning Inspectorate	3.3.23	Table 7-1 Section 7.5 (no chapter in the original ES)	Major accidents and disasters	<i>'The Inspectorate is content that the Proposed Changes will be required to adhere to the same strict legal requirements governing the construction and operation of nuclear power stations and therefore this aspect can be scoped out the ES.'</i>	It is acknowledged that the Planning Inspectorate agrees that major accidents and disasters can be scoped out of further assessment.
Environment Agency	No ID provided in Scoping Opinion	No reference provided in Scoping Opinion	Major accidents and disasters	<i>'Notwithstanding the above, we note the statements regarding scoping out major accidents and disasters. Acknowledging that this site is heavily regulated, to ensure an appropriate EIA, we would expect to see the applicant addressing foreseeable events which may occur within their EIA.'</i>	Information was provided in Section 7.5 of the Scoping Report to justify why major accidents and disasters are proposed to be scoped out of further assessment. The Institute of Environmental Management and Assessment ('IEMA') published <i>Major Accidents and Disasters in EIA: A Primer</i> ⁴ in 2020 that defines major accidents and disasters as follows: <ul style="list-style-type: none"> Major Accident: 'Events that threaten immediate or delayed serious environmental effects to

⁴ IEMA (2020). Major Accidents and Disasters in EIA: A Primer. [\[Online\]](#). Accessed 28 November 2023.

Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
					<p><i>human health, welfare and/or the environment and require the use of resources beyond those of the client or its appointed representatives to manage. Whilst malicious intent is not accidental, the outcome (e.g. train derailment) may be the same and therefore many mitigation measures will apply to both deliberate and accidental events.'</i></p> <ul style="list-style-type: none"> Disaster: <i>'May be a natural hazard (e.g. earthquake) or a man-made/external hazard (e.g. act of terrorism) with the potential to cause an event or situation that meets the definition of a major accident.'</i> <p>In line with the definitions of major accidents and disasters set out above, foreseeable events are not within the scope of major accidents and disasters.</p> <p>As outlined in the Scoping Opinion (ID 3.3.23), the Planning Inspectorate agrees that major accidents and disasters can be scoped out of further assessment.</p>

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Consultee	Scoping Opinion ID	Ref	Description	Comment	Applicant Response
Planning Inspectorate	3.3.24	Table 7-1 (original ES Volume 11)	Project-wide cumulative effects	<i>'It is noted that the ES will include an updated cumulative effects assessment which will consider interactions with other developments or projects. The Inspectorate agrees that the Proposed Changes are unlikely to give rise to any new or additional project-wide cumulative effects above those assessed in the original ES. This matter can be scoped out of further assessment in the ES.'</i>	It is acknowledged that the Planning Inspectorate agrees that Hinkley Point C Project-wide cumulative effects can be scoped out of further assessment. Project-wide cumulative effects are those which relate specifically to the Hinkley Point C development site and the associated on-site and off-site developments in the original DCO application. Information relating to the cumulative effects of the proposed material change application with other projects has been provided in Volume 4 .

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3. GROUNDWATER

3.1 Introduction

- 3.1.1 An analysis of the potential for the Hinkley Point C Project, as changed by the proposed changes on-site, to result in any new or materially different likely significant effects on groundwater from the those identified in the original ES has been carried out.
- 3.1.2 As set out in this chapter of the PEIR, the analysis has concluded that there are no new or materially different likely significant effects on the groundwater environment due to the Hinkley Point C Project as changed by the proposed changes on-site.
- 3.1.3 NNB has agreed with relevant stakeholders (Environment Agency, Somerset Drainage Board and Somerset Council) that Groundwater can be scoped out of further assessment of the proposed changes on-site.
- 3.1.4 This chapter has been provided as evidence to demonstrate the absence of a likely significant effect and agreement with the relevant stakeholders that they agree with this approach.

3.2 Scoping

- 3.2.1 The Scoping Report² was submitted to the Planning Inspectorate on 23 March 2022 and proposed that groundwater be scoped out of the updated EIA.
- 3.2.2 The Scoping Opinion was issued by the Planning Inspectorate on 3 May 2022. With respect to groundwater aspects, the Planning Inspectorate in their Scoping Opinion (ID 3.3.11) stated that:

‘The Scoping Report states that the Proposed Changes mean that the ISFS would no longer include a subsurface structure so the extent of dewatering would be reduced. The magnitude of change is not expected to be significant in the context of construction of the Hinkley Point C development. However, the Scoping Report states that it is assumed that embedded mitigation will be reviewed to account for the change so that potential structural impacts are avoided. Effects from the sluice gates on groundwater are not expected to change the magnitude of effects assessed in the original ES. The Inspectorate does not consider that the Scoping Report has provided sufficient evidence to support these statements. Accordingly, the ES should include an assessment of the effects on this matter or evidence demonstrating the absence of a Likely Significant Effect and agreement with the relevant stakeholders that they agree with this approach.’

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3.2.3 The Planning Inspectorate agreed that the *‘proposed changes affecting the meteorological mast and the substation are unlikely to give rise to new or additional LSE beyond those reported in the original ES’*. Consequently, it was agreed that these matters can be scoped out of further assessment.

3.2.4 The Scoping Opinion did not refer to effects as a result of the removal of the requirement to install the AFD on groundwater. However, as there are no pathways to effect as a result of this change, the removal of the requirement to install the AFD has been scoped out of further assessment.

3.2.5 Therefore, this chapter will describe the likely impacts to the groundwater environment resulting from the proposed changes to the ISFS, the replacement of the Access Control Building with the Equipment Storage Building and the sluice gate storage structures to demonstrate the absence of likely significant effects.

3.3 Baseline

3.3.1 As explained in **Volume 1 Chapter 4**, this assessment has been undertaken with consideration of three baseline scenarios:

- the original baseline: as outlined in the original ES;

- the current baseline: for the purposes of this groundwater assessment, the current baseline remains unchanged from the original baseline save in relation to groundwater levels (see **paragraph 3.3.2** below) as the non-material changes and consents obtained under the Town and Country Planning Act 1990 since the original baseline was prepared do not alter the groundwater baseline; and
- the future baseline: water level coincident with the elevation of the Drainage Gallery (+6.6 m Above Ordnance Datum (‘AOD’) to +7.0 m AOD), i.e. the level to which the groundwater level will recover following cessation of construction dewatering as currently approved within DCO.

3.3.2 With respect to groundwater levels, the elevation of hydraulic head reported in the original baseline has been reduced during construction dewatering. This was simulated as part of the original ES using a groundwater model. Furthermore, groundwater will be managed to a fixed level during operation of the Hinkley Point C Project, which itself is lower than that outlined in the original baseline. This is coincident with the elevation of the Drainage Gallery (+6.6 m AOD to +7.0 m AOD).

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3.3.3 This PEIR should be read in conjunction with the original ES⁵. For ease of reference, the following baseline components are outlined in the original ES:

- historical and current land use;
- topography and drainage;
- geology;
- hydrogeology;
- rainfall recharge and meteorology;
- groundwater use;

- groundwater chemistry;
- groundwater conceptual model (including numerical groundwater modelling);
- contaminant transport assessment; and
- groundwater receptors.

Geology

3.3.4 A summary of the underlying geology is presented in **Table 3-1**.

Table 3-1: Summary of underlying geology

Stage and Formation		'Up-to' Thickness (m)	Lithology
Lower Lias	Blue Lias (including the Angulata and Lower Liasicus Zones)	140	Alternation of shale/mudstone/limestone/mudstone sequences.
Penarth Group	Lilstock Formation	Langport Member	2
		Cotham Member	2
	Westbury Formation		14
Mercia Mudstone Group	Blue Anchor Formation	38	Thin dark grey mudstone beds and green to greenish grey mudstone and siltstone beds. Some are dolomitic in part. High amounts of gypsum are also present.

⁵ EDF Energy (2011) Hinkley Point C Development Consent Order Application: Environmental Statement – Volume 2 – Hinkley Point C Development Site. Document ref: Environmental Statement 4.3, October 2011. [[Online](#)]. Accessed 23 November 2023.

Stage and Formation		'Up-to' Thickness (m)	Lithology
	Undifferentiated	484	Upper units are reddish brown mudstones and siltstones (occasionally greenish grey) with halite, gypsum and anhydrite as minor components.

Conceptual Model

Previous conceptual models

3.3.5 As outlined in Chapter 15⁵ of the original ES, there has been a long history of groundwater modelling at the site of Hinkley Point C. Overall, these previous models are consistent with the conceptual model developed for the original ES which is described below.

Current hydrogeological conceptual models

3.3.6 The spatial limits of the conceptual model developed for the original ES are taken to be from approximately easting 318000 in the west (where the Penarth Group intersects the shoreline) to 323000 in the east (where Holford Stream discharges to the Bristol Channel); and from the shoreline in the north to Stogursey in the south (i.e., the outcrop boundary between the Blue Lias and the Mercia Mudstones).

3.3.7 Figure 15.6, Figure 15.7, and Figure 15.15 of the original ES summarise the conceptual understanding of the local

hydrogeological system. The aquifer system is considered to extend down to the Blue Anchor Formation, although the base of the system is not well defined stratigraphically. Locally, in association with fault zones, the Mercia Mudstone can be fractured, and locally shallower layers contain hypersaline water that must have been isolated from active circulation over geological periods of time. These waters are found below the level of construction dewatering for Hinkley Point C and do not take an active part in the baseline groundwater flow regime (if they did, they would have been already diluted by throughflow of fresher water).

3.3.8 The most permeable units are the weathered Blue Lias and the Lilstock Formation. The Planorbis zone at the base of the Blue Lias can also exhibit higher permeabilities than the Blue Lias in general. Flow in the Blue Lias occurs extensively along joints in limestone horizons, and in a more concentrated fashion along fault zones, where these coincide with laterally persistent fracturing. Because the limestones are typically 0.5 m thick, their lateral continuity will be readily disrupted by faults. The faults themselves will tend to act as barriers

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to flow perpendicular to the fault plane, but may provide high permeability pathways along their length. The barrier-boundary responses seen in pumping tests thus support the interpretation that the aquifers behave as a series of compartments where faulting is present, with dimensions of the order of hundreds of metres and which have limited hydraulic continuity across faults between compartments.

3.3.9 At the regional scale (see Figure 15.7 of the original ES) the Blue Lias aquifer is fed by rainfall recharge, either directly or, where present, through the sand and gravel and/or Made Ground. Groundwater flows approximately south to north from the area of Mercia Mudstone outcrop south of Stogursey (about northing 145300) to discharge directly into the Bristol Channel, or indirectly following baseflow discharge to the surface freshwater network. The Penarth Group/Mercia Mudstone forms the lower boundary to the system.

3.3.10 However, at the scale of the Hinkley Point C site (see Figure 15.6 of the original ES) this general natural flow regime is intercepted by another upfaulted inlier of Mercia Mudstone on the southern margin of the Built Development Area West ('BDAW') (about northing 145600). The BDAW and the Built Development Area East ('BDAE') are therefore likely to be largely self-contained as a groundwater system, bounded by the Mercia Mudstone and Penarth Groups beneath, the

faulted inlier to the south (about northing 145600), and the Bristol Channel to the north.

3.3.11 The groundwater flow system across the whole model domain as described above is illustrated in the site-wide piezometry map (see Figure 15.15 of the original ES).

Groundwater Modelling

3.3.12 As part of the original EIA, a numerical groundwater model was developed to represent as closely as possible the observed baseline groundwater regime in the vicinity of the Hinkley Point C site. This was intended to provide a basis for assessment of scenarios relevant to the construction phase of the Hinkley Point C Project. The principal objectives of the model simulations were:

- To predict the magnitude and lateral extent of drawdowns during construction dewatering; and
- To determine the effect of construction dewatering on groundwater flow from beneath the Hinkley Point A station, and hence provide the basis for assessing possible mobilisation of contaminants from beneath that site.

3.3.13 Details of the original model construction including model geometry and grid definition, boundary conditions, hydrodynamic parameters and recharge, calibration, and modelled development scenarios are presented in

Section 15.5 of the original ES Volume 2 Hinkley Point C Development Site – Chapter 15⁵.

3.3.14 The model has an initial steady state period based on the heads from the calibrated state model in order that the effects of dewatering over time from the baseline could be established. The following dewatering depths (drain stages) were derived for modelling purposes:

- Deep pumping station excavations – 25 m AOD;
- Nuclear Island North – 12 m AOD;
- Nuclear Island South – 4.2 m AOD; and
- ISFS – 12 m AOD.

3.3.15 The deep dewatering simulation assumed (conservatively) no residual drawdown from any previous dewatering in the Preliminary Works⁶, and was simulated to last for eight years in total and comprised the following:

- Five years of main Nuclear Island Dewatering. Five years was considered a conservative assumption and was one year longer than the design duration at that time.

- Two and a half years of ISFS dewatering, immediately following the cessation of the main Nuclear Island dewatering.
- Six months of recovery where no dewatering on the Hinkley Point C site takes place.

Future Baseline

3.3.16 Following completion of construction dewatering the groundwater is expected to recover, but only to a level coincident to the elevation of the Drainage Gallery (the foundational base of the Drainage Gallery), which passively controls groundwater using relief wells on a perpetual basis. The elevation of Drainage Gallery (+6.6 m AOD to +7.0 m AOD) is below the baseline groundwater levels presented in the original ES. Consequently, the construction and operational impacts of the ISFS and Equipment Storage Building have been assessed against a water level coincident with the elevation of the Drainage Gallery (+6.6 m AOD to +7.0 m AOD).

⁶ As defined in the Original ES as 'preparing the Hinkley Point C site for development along with the construction of a sea wall and the jetty, ahead of the main DCO application'.

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3.3.17 It is assumed the construction of the ISFS and Equipment Storage Building will take place after the Drainage Gallery (+6.6 m AOD to +7.0 m AOD) is operational.

3.4 Assessment Methodology

3.4.1 The assessment outlined in this chapter follows the methodology outlined in **Volume 1 Chapter 4** and also takes into consideration the methodology as in the original ES (see Section 15.4 of original ES Volume 2 Hinkley Point C Development Site – Chapter 15⁵).

3.5 Likely Significant Effects

ISFS and Equipment Storage Building

3.5.1 Aspects of the proposed changes to the ISFS and Equipment Storage Building that are relevant to groundwater are those for depth and footprint.

3.5.2 In terms of depth, the ISFS and Equipment Storage Building are only subsurface for the purposes of their own founding, and both are shallow in nature. If either foundation interacts with groundwater, the interaction will be limited in terms of control depth. Therefore the extent of dewatering will be considerably reduced compared to that outlined in the original ES. For the ISFS wet storage design; the original ES identified this as -12 m AOD

(approximately 26 m below ground level based on platform level of 14 m AOD). The original dewatering proposal would have also managed any groundwater control for the construction of the Equipment Storage Building in parallel. Therefore, the proposed change should limit any dewatering to management of shallow (nuisance) seepage within the top few metres of the ground only for either structure, providing shallow groundwater is present.

3.5.3 All other deep groundwater is expected to be regulated to the level of the Drainage Gallery (+6.6 m AOD to +7.0 m AOD), some 7 m below the platform level (+14 m AOD) and well below the shallow footing required for the revised ISFS construction. Therefore, deep groundwater is not considered to interact with the construction and operation of the ISFS or Equipment Storage Building.

3.5.4 As only shallow (nuisance) seepage would need to be dealt with during construction of foundations for the revised dry storage design of the ISFS and Equipment Storage Building, coupled with the fact that deep foundations have also been removed from the design that might otherwise act as barrier to groundwater flow, then the proposed changes to the ISFS and Equipment Storage Building are considered to result in a slight improvement to the impacts originally presented for the consented Hinkley Point C Project.

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- 3.5.5 The footprint of the ISFS will increase from 150 m x 65 m (9,750 m²) to 229 m x 73 m (16,717 m²), an increase of 70 %; however this extra footprint is only 6,967 m² and is a small percentage (5.25 %) of the overall construction / built up area of the power station considered in the original ES.
- 3.5.6 The groundwater environment is not affected by removal of the 55 m high stack associated with the ISFS. This is because it does not have its own subsurface foundations that may interact with the water table. Consequently, the removal of this feature is not explicitly considered further in the assessment of likely significant effects associated with the ISFS.
- 3.5.7 Similarly, the footprint of the Equipment Storage Building will increase from 29 m x 17 m (493 m²) to 31 m x 23 m (713 m²), an increase of 45 %. This extra footprint is only 220 m² and is also a small percentage (0.16 %) of the overall construction / built up area of the power station considered in the original ES.
- 3.5.8 The original surfacing set out in the Hinkley Point C Site Design and Access Statement (pages 150, 151 and 276) at the location of the additional footprint of the Equipment Storage Building would have been a mixture of tarmac and block paving. As such the Equipment Storage Building would not lead to additional impacts on groundwater. Project activities, as defined in the original

ES, in relation to groundwater that are relevant to the ISFS and Equipment Storage Building are as follows:

- Impacts during preliminary works, main construction phase and operation hardstanding areas impact on groundwater recharge;
- Impacts during preliminary works site clearance impact on groundwater recharge;
- Impacts during preliminary works ground preparation impact on groundwater recharge;
- Impacts during preliminary works site levelling/terracing impact on groundwater levels;
- Impacts during main construction phase (including ISFS construction) construction dewatering impact on controlled waters (groundwater levels);
- Impacts during main construction phase (including ISFS construction) construction dewatering impact on controlled waters (groundwater quality);
- Impacts during main construction phase (including ISFS construction) construction dewatering impact on controlled waters (other groundwater abstractions); and

- Impacts during main construction phase (including ISFS construction) construction dewatering impact on buildings and infrastructure.

3.5.9 A summary of the updated assessment of the potential for likely significant effects of the above activities associated with the ISFS and Equipment Storage Building is outlined in **Table 3-2**.

Table 3-2: Overall summary of effects: ISFS and Equipment Storage Building

Project Activity	Receptor	Potential Effect	Original ES Assessment findings for the Hinkley Point C consented development		Effects of the project as changed by the proposed changes on-site		Change in level of effect from original ES	Revised Effect*
			Baseline Scenario	Significance	Baseline Scenario	Significance		
Impacts during Preliminary Works, Main Construction Phase and Operation								
Hardstanding Areas	Groundwater	Impact on groundwater recharge and levels in hardstanding areas due to diversion of run-off into site drainage system	Original	Negligible	Original, current, future	Negligible	No change	Additional footprint of ISFS and Equipment Storage Building is a small percentage of the overall construction / built up area that was previously assessed as hardstanding. Furthermore, the proposed structures do not significantly increase the amount of hardstanding previously assessed. Therefore, the proposed changes to the ISFS and Equipment Storage Building should result in no significant net change to the infiltration potential. The current diversion of run-off into site drainage system is unlikely to significantly change during the works resulting in no change to impacts on recharge to groundwater.

Project Activity	Receptor	Potential Effect	Original ES Assessment findings for the Hinkley Point C consented development		Effects of the project as changed by the proposed changes on-site		Change in level of effect from original ES	Revised Effect*
			Baseline Scenario	Significance	Baseline Scenario	Significance		
								No further mitigation required.
Impacts during Preliminary Works (N.B. all Preliminary Works ⁷ are now mostly complete. However, Preparatory Works ⁸ associated with getting the site ready for the ISFS and Equipment Storage Building to be built are not. The Preliminary Works presented in the original ES have been reassessed in relation to the Preparatory Works that may be required prior to construction of the ISFS and Equipment Storage Building).								
Site Clearance – vegetation removal	Groundwater	Impact on groundwater recharge and levels in hardstanding areas due to diversion of run-off into site drainage system. The vegetation removal activity would cause a slight reduction in overall evapotranspiration and consequently a slight increase in	Original	Negligible	Original, current, future	Negligible	No change	Additional footprint of ISFS and Equipment Storage Building is a small percentage of the overall construction / built up area previously considered. Additional impacts to recharge, i.e., beyond that which are likely to have already occurred across the whole Hinkley Point C construction area, resulting from vegetation removal, stripped areas, and material stockpiling are likely to be indiscernible and result in no greater impact than previously assessed.

⁷ As defined in the Original ES as ‘preparing the Hinkley Point C site for development along with the construction of a sea wall and the jetty, ahead of the main DCO application’.

⁸ As defined in the Original ES as ‘preliminary works that are proposed to facilitate the construction of Hinkley Point C should it be consented. The works would involve fencing, site clearance, earthworks to level and terrace the site and the installation of construction drainage.’

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Project Activity	Receptor	Potential Effect	Original ES Assessment findings for the Hinkley Point C consented development		Effects of the project as changed by the proposed changes on-site		Change in level of effect from original ES	Revised Effect*
			Baseline Scenario	Significance	Baseline Scenario	Significance		
		groundwater recharge and hence groundwater levels in aquifer outcrop areas.						No further mitigation required.
Ground Preparation – stripped areas	Groundwater	Impact on groundwater recharge and levels, source and platform areas. In source areas where material is stripped there could be some minor but possibly indiscernible impact on groundwater recharge and levels as recharge is enhanced due to the removal of soil moisture retention characteristics or levels	Original	Negligible	Original, current, future	Negligible	No change	Additional footprint of ISFS and Equipment Storage Building is a small percentage of the overall construction / built up area previously considered. Additional impacts to recharge, i.e., beyond that which are likely to have already occurred across the whole Hinkley Point C construction area, resulting from vegetation removal, stripped areas, and material stockpiling are likely to be indiscernible and result in no greater impact than previously assessed. No further mitigation required.

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Project Activity	Receptor	Potential Effect	Original ES Assessment findings for the Hinkley Point C consented development		Effects of the project as changed by the proposed changes on-site		Change in level of effect from original ES	Revised Effect*
			Baseline Scenario	Significance	Baseline Scenario	Significance		
		reduced by drainage in platform areas.						
Ground Preparation – material stockpiling	Groundwater	Impact on groundwater recharge and levels, stockpile areas. Stockpiling may result in a reduction in direct recharge to the stockpile footprint in areas where the Lower Lias aquifer outcrops. This results from the enhanced run-off from the stockpile slope faces.	Original	Negligible	Original, current, future	Negligible	No change	Additional footprint of ISFS and Equipment Storage Building is a small percentage of the overall construction / built up area previously considered. Additional impacts to recharge, i.e., beyond that which are likely to have already occurred across the whole Hinkley Point C construction area, resulting from vegetation removal, stripped areas, and material stockpiling are likely to be indiscernible and result in no greater impact than previously assessed. No further mitigation required.
Site levelling / terracing	Groundwater	Impact from stripped areas on groundwater levels.	Original	Negligible	Original, current, future	Negligible	No change	Additional footprint of ISFS and Equipment Storage Building is a small percentage of the overall construction / built up area previously considered.

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Project Activity	Receptor	Potential Effect	Original ES Assessment findings for the Hinkley Point C consented development		Effects of the project as changed by the proposed changes on-site		Change in level of effect from original ES	Revised Effect*
			Baseline Scenario	Significance	Baseline Scenario	Significance		
								No additional groundwater level lowering as a result of site levelling/terracing is likely to occur resulting in no change to the current impact assessment. No further mitigation required.
Site levelling / terracing	Groundwater	Impact on groundwater recharge and levels, stockpile areas. Topsoil stockpiling may result in a reduction in direct recharge to the stockpile footprint in areas where the Lower Lias aquifer outcrops. This results from the enhanced run-off from the stockpile slope faces.	Original	Negligible	Original, current, future	Negligible	No change	Additional footprint of ISFS and Equipment Storage Building is a small percentage of the overall construction / built up area previously considered. Additional impacts to recharge, i.e., beyond that which are likely to have already occurred across the whole Hinkley Point C construction area, resulting from vegetation removal, stripped areas, and material stockpiling are likely to be indiscernible and result in no greater impact than previously assessed. No further mitigation required.
Impacts during Main Construction Phase (including ISFS construction)								

Project Activity	Receptor	Potential Effect	Original ES Assessment findings for the Hinkley Point C consented development		Effects of the project as changed by the proposed changes on-site		Change in level of effect from original ES	Revised Effect*
			Baseline Scenario	Significance	Baseline Scenario	Significance		
Construction dewatering	Groundwater	<p>Impact on controlled waters (groundwater levels).</p> <p>The dewatering activity will cause the drawdown of groundwater to create cones of depression. For the main Nuclear Island, this drawdown is assumed to reach a maximum of 29 m below platform level, i.e. to -15 to -19 m AOD, assumed to represent about 30-40 m total drawdown in practice. For the ISFS this drawdown is assumed to</p>	Original	Negligible-Minor	Original, current, future	Negligible-Minor	No change	<p>Groundwater dewatering requirements for the ISFS and Equipment Storage Building construction are now markedly reduced due to reducing the depth of excavation required for the buildings. The proposed changes should limit any dewatering to management of shallow (nuisance) seepage within the top few metres of the ground only, providing shallow groundwater is present.</p> <p>As residual impacts of construction dewatering during the main construction phase (which includes the ISFS and Equipment Storage Building construction) were all assessed as negligible-minor, a reduction in the overall dewatering completed will not lead to greater impacts to controlled waters (level and quality), controlled waters (other abstractors), or nearby</p>

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Project Activity	Receptor	Potential Effect	Original ES Assessment findings for the Hinkley Point C consented development		Effects of the project as changed by the proposed changes on-site		Change in level of effect from original ES	Revised Effect*
			Baseline Scenario	Significance	Baseline Scenario	Significance		
		reach a level of -12 m AOD.						buildings and infrastructure being realised. It is expected that the impacts will remain unchanged or reduce in significance. However, no change to impact scoring is proposed as general long-term drainage across the site will be occurring to greater depths (e.g., the controlled, long-term groundwater level managed by the Drainage Gallery will be much deeper than the shallow foundation for the dry storage ISFS and Equipment Storage Building). No further mitigation required.
Construction dewatering	Groundwater	Impact on controlled waters (groundwater quality). The dewatering activity will cause the movement of	Original	Minor	Original, current, future	Minor	No change	Groundwater dewatering requirements for the ISFS and Equipment Storage Building construction are now markedly reduced due to reducing the depth of excavation required for the buildings. The proposed changes should limit any

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Project Activity	Receptor	Potential Effect	Original ES Assessment findings for the Hinkley Point C consented development		Effects of the project as changed by the proposed changes on-site		Change in level of effect from original ES	Revised Effect*
			Baseline Scenario	Significance	Baseline Scenario	Significance		
		groundwater in the cones of depression towards the abstraction points, i.e., the deep excavations. If the groundwater contains contaminants, then the contaminants will also move.						<p>dewatering to management of shallow (nuisance) seepage within the top few metres of the ground only, providing shallow groundwater is present.</p> <p>As residual impacts of construction dewatering during the main construction phase (which includes the ISFS and Equipment Storage Building construction) were all assessed as minor, a reduction in the overall dewatering completed will not lead to greater impacts to controlled waters (level and quality), controlled waters (other abstractors), or nearby buildings and infrastructure being realised.</p> <p>It is expected that the impacts will remain unchanged or reduce in significance. However, no change to impact scoring is proposed as general drainage across the site will be occurring to greater depths (e.g. the controlled,</p>

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Project Activity	Receptor	Potential Effect	Original ES Assessment findings for the Hinkley Point C consented development		Effects of the project as changed by the proposed changes on-site		Change in level of effect from original ES	Revised Effect*
			Baseline Scenario	Significance	Baseline Scenario	Significance		
								long-term groundwater level managed by the Drainage Gallery will be much deeper than the shallow foundation for the dry storage ISFS and Equipment Storage Building). No further mitigation required.
Construction dewatering	Groundwater	Impact on controlled waters (other groundwater abstractions). Dewatering could impact the water levels and yields of any licensed abstractions in the area of influence.	Original	Negligible	Original, current, future	Negligible	No change	Groundwater dewatering requirements for the ISFS and Equipment Storage Building construction are now markedly reduced due to reducing the depth of excavation required for the buildings. The proposed changes should limit any dewatering to management of shallow (nuisance) seepage within the top few metres of the ground only, providing shallow groundwater is present. As residual impacts of construction dewatering during the main construction phase (which includes the ISFS and Equipment Storage Building

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Project Activity	Receptor	Potential Effect	Original ES Assessment findings for the Hinkley Point C consented development		Effects of the project as changed by the proposed changes on-site		Change in level of effect from original ES	Revised Effect*
			Baseline Scenario	Significance	Baseline Scenario	Significance		
								construction) were all assessed as negligible, a reduction in the overall dewatering completed will not lead to greater impacts to controlled waters (level and quality), controlled waters (other abstractors), or nearby buildings and infrastructure being realised. No further mitigation required.
Construction dewatering	Groundwater	Impact on buildings and infrastructure. If groundwater gradients under a structure increase significantly it is possible that stresses can be generated due to the differential hydrostatic pressures under the structures and potentially cause damage to the	Original	Negligible	Original, current, future	Negligible	No change	Groundwater dewatering requirements for the ISFS and Equipment Storage Building construction are now markedly reduced due to reducing the depth of excavation required for the buildings. The proposed changes should limit any dewatering to management of shallow (nuisance) seepage within the top few metres of the ground only, providing shallow groundwater is present. As residual impacts of construction dewatering during the main construction

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Project Activity	Receptor	Potential Effect	Original ES Assessment findings for the Hinkley Point C consented development		Effects of the project as changed by the proposed changes on-site		Change in level of effect from original ES	Revised Effect*
			Baseline Scenario	Significance	Baseline Scenario	Significance		
		foundations due to differential settlement.						phase (which includes the ISFS and Equipment Storage Building construction) were all assessed as negligible, a reduction in the overall dewatering completed will not lead to greater impacts to controlled waters (level and quality), controlled waters (other abstractors), or nearby buildings and infrastructure being realised. No further mitigation required.

* Revised effect of the Hinkley Point C Project as changed by the proposed changes on-site

Sluice Gate Storage Structures

- 3.5.10 There are only two locations required for the storage structures, one each per Unit of Hinkley Point C. The surface area of each location will not be greater than 200 m². This is compared to the footprint of 10,000 m² for one of the cooling water pumphouses and associated buildings (per reactor Unit); and the wider site footprint of 132,600 m² for the Nuclear Island, conventional island, operations, and cooling water buildings (as shown on the Site Layout Plan (Tracked Changes) (drawing reference HINK-A1-SL-00-GA-011) in **PEIR Plans - Proposed Changes On-Site**). The sluice storage locations represent 2 % of the footprint locally and 0.15 % of the wider site.
- 3.5.11 The depth of the structures will be limited and will not interact with the water table. This is in contrast to the larger and deeper structures that are already approved within the original DCO and assessed in the original ES.
- 3.5.12 The original surfacing at the location of the new, small storage structures is not explicitly identified in the original ES. Notwithstanding, the original ES assesses the construction area generally as the whole built up area
- and this is considered to correspond to the area of all buildings within the fenced area shown in the Site Layout Plan (Tracked Changes) (although the exact limits and plan area are not available in the original ES).
- 3.5.13 Therefore, the activities associated with construction and operation of the sluice gate structures are considered to fall within the following broad impacts already considered in the original ES:
- Impacts during preliminary works, main construction works and operation - hardstanding areas - impact on groundwater recharge;
 - Impacts during preliminary works - site clearance - impact on groundwater recharge;
 - Impacts during preliminary works - ground preparation - impact on groundwater recharge; and
 - Impacts during preliminary works - site levelling/terracing - impact on groundwater levels.
- 3.5.14 A summary of the updated assessment of the potential for likely significant effects of the above activities associated with the sluice gate structures is outlined in **Table 3-3**.

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Table 3-3: Overall summary of effects: sluice gate structures

Project Activity	Receptor	Potential Effect	Original ES Assessment findings for the Hinkley Point C consented development		Effects of the project as changed by the proposed changes on-site		Change in level of effect from original ES	Revised Effect*
			Baseline Scenario	Significance	Baseline Scenario	Significance		
Impacts during Preliminary Works, Main Construction Phase and Operation								
Hardstanding Areas	Groundwater	Impact on groundwater recharge and levels in hardstanding areas due to diversion of run-off into site drainage system	Original	Negligible	Original, current, future	Negligible	No change	Works are above the groundwater table and localised. Current diversion of run-off into the site drainage system is unlikely to significantly change during the works resulting in no significant change to impacts on recharge to groundwater. No further mitigation required.
Impacts during Preliminary Works (N.B. all Preliminary Works ⁹ are now mostly complete. However, Preparatory Works ¹⁰ associated with getting the site ready for the sluice gates to be built are not. The Preliminary Works presented in the original ES have been reassessed in relation to the Preparatory Works that may be required prior to construction of the sluice gate storage structures).								
Site Clearance – vegetation removal	Groundwater	Impact on groundwater recharge and levels in	Original	Negligible	Original, current, future	Negligible	No change	Works are above the groundwater table and localised.

⁹ As defined in the Original ES as 'preparing the Hinkley Point C site for development along with the construction of a sea wall and the jetty, ahead of the main DCO application'.

¹⁰As defined in the Original ES as 'preliminary works that are proposed to facilitate the construction of Hinkley Point C should it be consented. The works would involve fencing, site clearance, earthworks to level and terrace the site and the installation of construction drainage.'

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Project Activity	Receptor	Potential Effect	Original ES Assessment findings for the Hinkley Point C consented development		Effects of the project as changed by the proposed changes on-site		Change in level of effect from original ES	Revised Effect*
			Baseline Scenario	Significance	Baseline Scenario	Significance		
		<p>hardstanding areas due to diversion of run-off into site drainage system.</p> <p>The vegetation removal activity would cause a slight reduction in overall evapotranspiration and consequently a slight increase in groundwater recharge and hence groundwater levels in aquifer outcrop areas.</p>						<p>Additional impacts to recharge, i.e., beyond that which are likely to have already occurred across the whole Hinkley Point C construction area, resulting from vegetation removal, stripped areas, and material stockpiling are likely to be indiscernible and result in no greater impact than previously assessed.</p> <p>No further mitigation required.</p>
Ground Preparation – stripped areas	Groundwater	<p>Impact on groundwater recharge and levels, source and platform areas.</p> <p>In source areas where material is stripped there</p>	Original	Negligible	Original, current, future	Negligible	No change	<p>Works are above the groundwater table and localised.</p> <p>Additional impacts to recharge, i.e. beyond that which are likely to have already occurred across the whole Hinkley Point C construction area, resulting</p>

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Project Activity	Receptor	Potential Effect	Original ES Assessment findings for the Hinkley Point C consented development		Effects of the project as changed by the proposed changes on-site		Change in level of effect from original ES	Revised Effect*
			Baseline Scenario	Significance	Baseline Scenario	Significance		
		could be some minor but possibly indiscernible impact on groundwater recharge and levels as recharge is enhanced due to the removal of soil moisture retention characteristics or levels reduced by drainage in platform areas.						from vegetation removal, stripped areas, and material stockpiling are likely to be indiscernible and result in no greater impact than previously assessed. No further mitigation required.
Ground Preparation – material stockpiling	Groundwater	Impact on groundwater recharge and levels, stockpile areas. Stockpiling may result in a reduction in direct recharge to the stockpile footprint in areas where the Lower	Original	Negligible	Original, current, future	Negligible	No change	Works are above the groundwater table and localised. Additional impacts to recharge, i.e., beyond that which are likely to have already occurred across the whole Hinkley Point C construction area, resulting from vegetation removal, stripped areas, and material stockpiling are

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Project Activity	Receptor	Potential Effect	Original ES Assessment findings for the Hinkley Point C consented development		Effects of the project as changed by the proposed changes on-site		Change in level of effect from original ES	Revised Effect*
			Baseline Scenario	Significance	Baseline Scenario	Significance		
		Lias aquifer outcrops. This results from the enhanced run-off from the stockpile slope faces.						likely to be indiscernible and result in no greater impact than previously assessed. No further mitigation required.
Site levelling / terracing	Groundwater	Impact from stripped areas on groundwater levels. In some source areas where material would be stripped, notably in the BDAW, the existing groundwater levels are higher than the final platform elevations. These levels would be reduced prior to excavation by the provision of drains to undertake	Original	Negligible	Original, current, future	Negligible	No change	Works are above the groundwater table and localised. No additional groundwater level lowering as a result of site levelling/terracing is likely to occur resulting in no change to the current impact assessment. No further mitigation required.

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Project Activity	Receptor	Potential Effect	Original ES Assessment findings for the Hinkley Point C consented development		Effects of the project as changed by the proposed changes on-site		Change in level of effect from original ES	Revised Effect*
			Baseline Scenario	Significance	Baseline Scenario	Significance		
		shallow passive (gravity) dewatering, and so the existing groundwater regime would be impacted by having the water table lowered by up to 6 m to the level of the drainage inverts at around 9-10 m AOD.						
Site levelling / terracing	Groundwater	Impact on groundwater recharge and levels, stockpile areas. Topsoil stockpiling may result in a reduction in direct recharge to the stockpile footprint in areas where the Lower Lias aquifer outcrops. This results from the	Original	Negligible	Original, current, future	Negligible	No change	Works are above the groundwater table and localised. Additional impacts to recharge, i.e., beyond that which are likely to have already occurred across the whole Hinkley Point C construction area, resulting from vegetation removal, stripped areas, and material stockpiling are likely to be indiscernible and result in no greater impact than previously assessed.

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Project Activity	Receptor	Potential Effect	Original ES Assessment findings for the Hinkley Point C consented development		Effects of the project as changed by the proposed changes on-site		Change in level of effect from original ES	Revised Effect*
			Baseline Scenario	Significance	Baseline Scenario	Significance		
		enhanced run-off from the stockpile slope faces.						No further mitigation required.

* Revised effect of the Hinkley Point C Project as changed by the proposed changes on-site

3.6 Summary

3.6.1 It is not anticipated that there would be any new or materially different likely significant effects of the Hinkley Point C Project as changed by the proposed changes to the ISFS, Equipment Storage Building and Sluice Gates on the groundwater environment from those identified in the original ES, as demonstrated in this chapter. Therefore, there are no proposed amendments to the mitigation and enhancements measures for groundwater that are outlined in the original ES.

3.7 Next Steps

3.7.1 The assessment outlined in this chapter has been consulted on with relevant stakeholders (Environment

Agency, Somerset Drainage Board, and Somerset Council) with the objective to agree that a detailed assessment of groundwater impacts can be scoped out of the updated EIA. Responses were received on the 30 August 2023, 21 August 2023, and 21 September 2023, respectively. All stakeholders agreed that Groundwater can be scoped out of the updated EIA. Somerset Council additionally advised that “*where there is any increase to impermeable area, that this should be considered within the surface water drainage strategy for the site*”. Changes in the amount of impermeable area will be assessed and addressed within the detailed submission which will be made to Somerset Council to discharge DCO Requirements MS30 and MS25 which deal with the drainage details and surface treatment (amongst other things) respectively. As set out above, no significant changes are anticipated as a result of the proposals.

3.7.2 This chapter has demonstrated the absence of a new or materially different likely significant effect and agreement with the relevant stakeholders that they agree with this approach. Therefore, Groundwater will not be assessed within the ES in relation to the proposed changes on-site.

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4. TRANSPORT

4.1 Introduction

- 4.1.1 An analysis of the potential for the Hinkley Point C Project, as changed by the proposed changes on-site, to result in any new or materially different likely significant effects on Transport from those identified in the original ES⁵ has been carried out. As set out in this chapter of the PEIR, that analysis has concluded that there are no new or materially different likely significant effects on Transport due to the Hinkley Point C Project as changed by the proposed changes on-site.
- 4.1.2 The Hinkley Point C TRG comprises representatives from National Highways, Somerset Council and NNB. The TRG reviews forecasted movements to and from Hinkley Point C to identify any Transport issues and to ensure that traffic impacts associated with Hinkley Point C are within the traffic caps outlined in and controlled by the original DCO.
- 4.1.3 Following the TRG's review of this PEIR, NNB will engage with the TRG to seek agreement that Transport can be scoped out of further assessment.

4.2 Scoping

- 4.2.1 The Scoping Report² was submitted to the Planning Inspectorate on 23 March 2022 and NNB proposed that Transport be scoped out of the updated EIA.
- 4.2.2 The Scoping Opinion was issued by the Planning Inspectorate on 3 May 2022. With respect to Transport, the Planning Inspectorate in their Scoping Opinion (ID 3.3.6) stated that:
- 'The Inspectorate notes comments in the Scoping Report, however without information provided on the current number of trips and the proposed increase, the Inspectorate is unable to scope this aspect out at this stage. Accordingly, the ES should include an assessment of this aspect or evidence demonstrating the absence of an LSE and agreement with the relevant stakeholders that they agree with this approach. The ES should also consider cumulative effects with other planning applications would arise which result in increased trips to the Hinkley Point C site.'*
- 4.2.3 This chapter describes the likely changes in the construction traffic flows generated by the proposed changes and presents a comparative analysis with the level of construction traffic permitted in the original DCO to determine whether there are any likely significant effects.

- 4.2.4 The proposed changes on-site as identified in **Section 4.7** would not require a larger operational workforce or any changes to the maintenance schedule. Therefore, these changes would not result in any changes to the vehicular movements associated with Hinkley Point C's operational workforce, maintenance, and servicing activities. These impacts are therefore scoped out of this assessment.
- 4.2.5 The cumulative effects are considered in **Volume 4**.
- 4.2.6 This chapter assesses whether the changes in the construction traffic generated by the proposed changes exceed the permitted construction traffic caps agreed pursuant to the DCO, and consequently whether the predicted 'with development' traffic scenarios for 2016 and 2021 in the original DCO Transport Assessment ('TA')⁵ are still valid.
- 4.2.7 Furthermore, the chapter also determines if the consented non-material changes to the DCO and other relevant applications have an impact on the current traffic flows on the relevant transport network.
- 4.2.8 The next section summarises the key data sources and extracts from the original DCO TA that have been used to assess the traffic impacts of the proposed changes.

4.3 DCO TA's Assessment Years

- 4.3.1 The original DCO TA considered three assessment years, namely 2009 Baseline, 2016 peak construction and 2021 opening year of operation.
- 4.3.2 The 2009 Baseline was the traffic baseline without any growth in background traffic, committed development and the proposed development.
- 4.3.3 The 2016 assessment year was the assessment year for the analysis of the impact of construction traffic during peak construction.
- 4.3.4 The 2021 assessment year was chosen for the analysis of the impact of operational traffic after completion of the construction, which at the time of submission of the DCO application was the assumed year of completion, that is the opening year.
- 4.3.5 Since this assessment is now considering the impact of the proposed changes on the levels of construction traffic on the current road network, the above scenarios are no longer relevant.

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4.4 DCO TA's Predicted Peak Construction Traffic

- 4.4.1 The peak construction traffic can be discussed in the context of annual average daily traffic ('AADT') flows for comparative purposes. The peak construction traffic is shown in the column "Increase" in Table 15.4: 2016 Reference Case vs. 2016 With Development and Mitigation Daily, (24-Hour AADT) Two-Way All Vehicles Traffic Flows on page 246 in the original ES at Annex 7 Transport Assessment – Doc Ref 4.19¹¹.
- 4.4.2 The "Increase" represents the peak construction traffic with the mitigation measures set out in the Construction Traffic Management Plan ('CTMP')¹². **Section 4.9** demonstrates that this predicted construction traffic is still correct.
- 4.4.3 The DCO TA summarises the number of Heavy Goods Vehicles ('HGV') trips generated by construction activity at the Hinkley Point C site, with the site generating 594 two-way HGV movements daily at the peak of 2021 Q4.

- 4.4.4 The links listed in **Table 4-1** represent key sections on the identified HGV routes from the M5 strategic road network to Hinkley Point C, which broadly define a more focussed area of study to consider the traffic impacts of the construction traffic generated by Hinkley Point C nuclear power station including all associated developments. The total construction HGV movements are assigned to each link based on their routing identified in the DCO TA. HGVs for the Bridgwater A development (which is now completed) were all assigned to HGV Route 2 (via M5 Junction 24) to prevent the DCO's HGV caps being exceeded on HGV Route 1 (via M5 Junction 23).
- 4.4.5 This includes the A38 north of Bridgwater (HGV Route 1), A38 south of Bridgwater (HGV Route 2), and A39 from west of Bridgwater to south of Cannington. The remaining sections include a combination of both routes before all construction traffic turns north at Cannington.

¹¹ EDF Energy (2011) Hinkley Point C Development Consent Order Application: Environmental Statement – Annex 7 – Transport Assessment. Document ref: Environmental Statement 4.19, October 2011. [[Online](#)]. Accessed 28 November 2023.

¹² NNB Generation Company (2018). DCO Construction Traffic Management Plan.

Table 4-1: Predicted Peak Construction Traffic Link flows for Hinkley Point C and associated developments

Link	Map ID	2021 Ref. Case	HGVs to Hinkley Point C (2021 Q4 Peak DCO TA)	HGVs to J23	HGVs to Bridgwater	Total Construction HGVs
A39 Spur east of Dunball	H01	21,993	356	260	-	616
A39 South of Cannington	H11	6,840	594	-	-	594
A38 Taunton Road south of Showground	H07	24,123	238	-	304	542
A38 Taunton Road (south of Broadway)	H08	27,338	238	-	304	542
A38 between Wylde Road and The Drove	H03	16,008	356	-	-	356
A39 west of Quantock Roundabout	H010	13,414	594	-	-	594
Rodway North of Bypass	H12	6,832	238	-	-	238

4.5 Current Operation of Hinkley Point C

4.5.1 Currently, Hinkley Point C is a ‘managed traffic environment’ where the levels of construction workforce traffic, construction HGV traffic and the planned measures in the event of any closure of the designated HGV access routes, is controlled by the Construction Workforce Travel Plan (‘CWTP’) Addendum (Version 05)¹³, CTMP, and Traffic Incident Management Plan (‘TIMP’)¹⁴. These documents are available on the consultation website for reference.

4.5.2 These form a package of management documents to assist in the control of transport movements for the Hinkley Point C construction works. **Diagram 4–1** is taken from the original CWTP and has been amended slightly to capture the current monitoring systems used to monitor mode share targets for the workforce, as described and approved by the TRG.

Management Plan	CWTP	CTMP	TIMP
Movements to be managed	People Movements	Freight Movements	Park and Ride Bus and HGV Movements, including exceptional circumstances
Monitoring System	Monitoring of Mode Share Targets through an infra-red system	Traffic Management and Monitoring Systems (‘TMMS’)	TMMS

Diagram 4–1: Transport Management Plans for Hinkley Point C Construction Works

4.5.3 The following paragraphs describe the CWTP, CTMP and TIMP and changes approved by the TRG to these documents subsequent to the grant of the DCO.

¹³ NNB Generation Company (2022). Construction Workforce Travel Plan Addendum Version 05.

¹⁴ NNB Generation Company (2012) DCO Traffic Incident Management Plan.

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- 4.5.4 The CWTP manages the daily movement of the construction workforce to and from the Hinkley Point C site, as these movements represent the large majority of construction workforce movements associated with the construction phase of the Hinkley Point C Project. The CWTP also considers the scope for encouragement of sustainable mode choice in respect of non-work-related travel by the construction workforce, as well as site specific travel planning issues. The monitoring of mode share of people’s movements is now managed by an infra-red system that tracks passengers as they board the bus as opposed to a smart card system that was previously proposed in the original CWTP.
- 4.5.5 The original CWTP¹⁵ anticipated 5,600 workers during the peak construction period, and the CWTP set out the travel plan strategies and mitigation measures to manage this peak workforce travel demand.
- 4.5.6 A CWTP Addendum (Version 05) was issued on 6 May 2022 and approved by the TRG on 16 May 2022, which identified 8,170 workers on the Hinkley Point C site.
- 4.5.7 Subsequently the peak workforce was uplifted to 8,600 (‘Initial Workforce Uplift’) and a voluntary package of mitigation measures was agreed by the TRG on 16 May 2022 and relevant strategies were updated and agreed by the TRG on 16 May 2022 to address the impacts which might arise from the increased peak workforce.
- 4.5.8 A second workforce uplift was discussed with the TRG on 7 July 2023 (‘Second Workforce Uplift’). The premise of a Second Workforce Uplift includes a peak workforce increasing to 12,040 (rounded). This was revised in light of the need for greater overlap between Hinkley Point C’s Civils and Mechanical, Electrical and HVAC (Heating, ventilation and air conditioning) (‘MEH’) phases and a larger number of support, professional and management roles to be based at the Hinkley Point C.
- 4.5.9 Impacts associated with the operation of the CWTP will be explored as part of discussions regarding the Second Workforce Uplift, this is expected to include the development of a new Action Plan to meet car share targets, which will be reviewed by TRG. It is also proposed that the parking spaces provided at J23 Park and Ride will increase from 920 to 1,300 although this will be subject to the approval of the TRG. The CWTP will also be subject to approval from the TRG if it requires amendments and will thereafter, be reported to the TRG. Any changes to other transport measures will be outlined in the Mitigation Proposals section of the plan.

¹⁵ EDF Energy (2012) Construction Workforce Travel Plan.

4.5.10 The impacts of the Initial Workforce Uplift in the peak workforce are summarised in Hinkley Point C Workforce Uplift – Update Transport Topic Paper¹⁶, issued to the TRG on 14 January 2022 and agreed on 16 May 2022.

4.5.11 The conclusion of this topic paper was as follows:

‘Paragraph 227. The analysis and assessment set out within the topic paper demonstrates that there continues to be no change in each of the five assessment criteria set out in the DCO Environmental Statement (severance, driver delay, pedestrian delay, pedestrian amenity and accidents and safety) when considering the increased workforce now being considered.

Paragraph 170. The objectives of the Construction Workforce Travel Plan and the key mitigation measures to ensure that the transport impact of the HPC Project remain relevant and analysis and assessment within the topic paper demonstrates that with the additional measures proposed including an updated Construction Workforce Travel Plan Action Plan, there would not be any new any new or materially different environmental effects from the proposed increase in the workforce. Furthermore, the s106 agreement includes a mechanism under which contingency payments will be made if

impacts arise as a result of the methods set out within the Construction Workforce Travel Plan not being effective.

Paragraph 229. On this basis and on the basis of the analysis set out within this topic paper, the Construction Workforce Travel Plan does not need to be amended as a result of the workforce uplift. That is, with the proposed measures referred to above in place, no breaches of the s106 obligations relating to the CWTP are anticipated and the CWTP targets are expected to be achievable; and in any event the DCO s106 agreement already includes a mechanism which provides for additional mitigation (in the form of additional measures/payments) in the event CWTP targets are not being met.’

4.5.12 The latest quarter reported by the TRG (2023 Q2) set out that there were 9,783 workers on the Hinkley Point C site for a minimum of 5 separate days in the 30-day monitoring period.

4.5.13 The CWTP Addendum (Version 05) approved on 16 May 2022 details the current strategy for facilitating worker movements to and from Hinkley Point C site which is focused on achieving 87 % of the workforce travelling to the Hinkley Point C site by bus. The CWTP identifies 300 parking spaces at the Hinkley Point C site with barrier

¹⁶ EDF Energy (2023). HPC Workforce Uplift 2 - Update Transport Topic Paper.

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controls, which are pre-allocated for staff use, visitors and those with mobility issues. Space is available for up to 50 motorcycles on site, with other parking being available for motorcycles and car users at the park and & ride sites. For all car users allocated to the park and ride sites, car sharing is promoted. Workers have the opportunity to walk or cycle directly to the Hinkley Point C site if they choose.

4.5.14 All other construction workers are still expected to travel to and from the Hinkley Point C construction site by one of the following bus-based means:

- Bus to/from one of the four original park and ride developments (M5 Junctions 23 and 24, Cannington and Washford Cross (formerly Williton)) all of which are operational;
- Bus to/from one of the two temporary park and ride developments (M5 Junctions 25 and Quantock Lakes) both of which will be operational until December 2025 when it is considered that these two facilities will no longer be required;
- Bus to/from the Sedgemoor accommodation campus (originally known as Bridgwater A);
- Bus to/from the Hinkley Logistics Hub, which will be operational until August 2028;

- Bus to/from Worle Parkway (Diamond Batch), an existing park and ride site consented with temporary planning permission by North Somerset Council after the DCO was granted, being proposed as a transport infrastructure allocation under Policy LP10 of their Draft Local Plan in 2022; and
- Direct bus to/from a number of specified locations where workers live within 800 m of a service route bus stop/or within the urban area of Bridgwater.

4.5.15 As mentioned in the original CWTP, the original DCO and supporting TA expected the Hinkley Point C site to commence construction in Q1 of 2013 and to be completed by 2020. However, work pursuant to the DCO did not begin until September 2016 and with the impact of Covid-19 Unit 1 is expected to be completed in 2027, with Unit 2 approximately 12 months later in 2028.

4.5.16 The use of the Hinkley Point C accommodation campus, on-site parking spaces and park and ride sites are extended to reflect the proposed completion dates.

4.5.17 The CTMP manages the movement of construction freight between the strategic road network and the Hinkley Point C site. This includes the delivery scheduling system where deliveries can be booked and managed so that the permitted traffic caps are not exceeded, the monitoring of actual deliveries and the reporting of any contraventions of the management plan.

- 4.5.18 The CTMP dated 11 November 2019 was approved for the Hinkley Point C Project by the TRG on 11 November 2019.
- 4.5.19 Paragraphs 5.2.16, 5.2.17 and 5.2.18 of the approved CTMP (noting that the jetty is now fully operational) set out that the number of HGV movements for the Hinkley Point C construction works *'will be subject to a limit that the number of HGV movements will not exceed an average of 500 movements per day in any given quarter (N.B. a quarter is defined as the calendar quarters January-March, April-June, July-September and October-December). This limit will be applied to HGV movements for the Hinkley Point C Construction Works on the C182 Rodway north of Cannington, at the location of the junction of the C182 with the new Cannington bypass.'*
- 4.5.20 Furthermore, as outlined in the DCO TA, the following maximum daily limits on HGV movements associated with the Hinkley Point C construction works will be:
- a one-day maximum limit of 750 HGV movements (Monday-Friday);
 - a one-day maximum limit of 375 HGV movements (Saturdays);
 - a quarterly average daily limit of 500 HGV movements on the C182;
- a daily maximum of 450 HGV movements on HGV Route 1 (M5 J23); and
 - a daily maximum of 300 HGV movements on HGV Route 2 (M5 J24).
- 4.5.21 These limits are applied to HGV movements on the C182 at the location of the junction of the C182 with the new Cannington bypass, they are unaffected and will continue to apply to the DCO as changed.
- 4.5.22 The TIMP sets out the processes for managing Hinkley Point C Project related traffic during exceptional circumstances, including any event or incident that results in a loss of highway capacity on the two prescribed HGV routes to Hinkley Point C site. This was approved with the original DCO approval.
- 4.5.23 The following measures will be implemented if the TIMP is triggered:
- The Delivery Management System ('DMS') enables traffic incident information to be disseminated to all contractors and suppliers who are making a delivery on a given day;
 - The Variable Messaging System will be activated at strategic locations to support implementation of the operation of the Hinkley Alternative Routes Operating Local Diversion;

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- Freight Management Facilities will be operational to enable HGVs to be held within the Incident Management Area ('IMA') in the event of a traffic incident until it is appropriate to release them;
- It also includes the ability to hold buses at the park and ride sites and accommodation campuses in the event of an incident within the IMA; and
- Similarly, it includes the ability to vary hours and movements within overall vehicle caps in 'exceptional circumstances' and with environmental monitoring in place to ensure compliance within environmental limits.

4.6 Assessment Methodology

- 4.6.1 This assessment methodology has been amended after discussion with the TRG and was agreed on 7 July 2023 by both Somerset Council and National Highways.
- 4.6.2 This assessment does not provide an existing baseline and a future baseline with and without the development traffic as agreed with the TRG in June 2023. This is due to the fact that the years to be assessed do not align with the years previously assessed at the original DCO submission.

4.6.3 The monitoring of the CTMP has demonstrated that the predicted HGV flows for remainder of the construction period are significantly below the caps, as shown later under **paragraph 4.8.7**. This is underpinned by the daily records of HGVs arriving and departing every day over the previous years of construction. This is a more robust methodology than a traffic model that predicts flows a few years into the future where the long-term impacts of COVID19 on traffic levels across Somerset are not fully understood.

4.6.4 There are two parts to the assessment, namely an assessment of the predicted construction traffic generated by the proposed changes, and an assessment as to whether the implementation of the CWTP, CTMP and TIMP will prevent any likely significant effects.

4.6.5 As the proposed changes on-site are not expected to result in changes to the vehicular movements associated with Hinkley Point C's operational workforce, maintenance and servicing activities, these impacts are scoped out.

4.6.6 Firstly, the likely changes in construction traffic due to the proposed changes will be assessed based on whether they fall within the vehicle caps permitted by the DCO.

4.6.7 And secondly in light of the proposed changes, the monitoring and evaluation of the CTMP and CWTP will

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determine whether NNB and its contractors are compliant with the agreed construction traffic mitigation measures and that no significant traffic effects will be generated by the proposed changes since all construction traffic is limited by the permitted caps on the construction workforce and daily HGV deliveries.

4.7 Analysis of the predicted traffic changes

Proposed changes to the DCO

- 4.7.1 The proposed changes on-site to the Hinkley Point C Project consented under the DCO are summarised in **Table 4-2**. This table also summarises the anticipated impacts on the number of construction workforce on-site and the level of HGV construction traffic generated by the particular element. The anticipated impacts are described in more detail in the following sections.

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Table 4-2: Proposed changes on-site

Element	DCO	Proposed Change	Potential impact on construction workforce numbers	Potential impact on HGV construction traffic
AFD	Included	Not required	Reduction, see paragraphs 4.7.2 to 4.7.3	Reduction, see paragraphs 4.7.2 to 4.7.3
ISFS	Wet store, with 55 m high gaseous stack	Dry store and change to dimensions, with no 55 m high gaseous stack	Reduction, see paragraphs 4.7.4 to 4.7.9	Reduction, see paragraphs 4.7.4 to 4.7.9
Equipment Storage Building	Access Control Building	Replacement of Access Control Building with relocated Equipment Storage Building and change to dimensions	Negligible increase, see paragraph 4.7.9	Negligible increase, see paragraph 4.7.9
Meteorological Mast	Included, with equipment located in a meteorological station building	Relocated and reduced height of mast, with meteorological station building replaced by a compound situated proximate to the mast	No change, see paragraph 4.7.12	Negligible reduction, see paragraphs 4.7.10 and 4.7.11
Hinkley Point Substation	Temporary substation to be retained only during the construction of Hinkley Point C (on-site)	No new substation required, and the existing substation is retained as a permanent feature to supply electricity to Hinkley Point A and Hinkley Point B.	Reduction, see paragraph 4.7.13	Reduction, see paragraph 4.7.13
	Build an 11kV overhead line to Hinkley Point B (off-site)	Not required	No change to on-site personnel, and reduction to off-site personnel, see paragraph 4.7.14	No change to on-site traffic, and reduction to off-site traffic, see paragraph 4.7.14
Sluice Gate Storage Structures	No provision	Four new structures to house sluice gates and lifting beams	Negligible increase, see paragraph 4.7.15 and 4.7.16	Negligible increase, see paragraphs 4.7.15 and 4.7.16

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Anticipated changes to construction workforce and construction HGV traffic

AFD

- 4.7.2 The removal of the requirement to install an AFD system will result in a reduction in construction traffic, as it is likely to reduce the number of workers required to install it, and the number of HGVs delivering the components to site.
- 4.7.3 There is an overall reduction in the number of workers required and the number of HGVs travelling to and from site on the external road network.

ISFS and Equipment Storage Building

- 4.7.4 The change to the ISFS from wet storage to dry storage requires more space per unit of fuel stored. Therefore, the ISFS building dimensions will increase from 150 m x 65 m x 25 m to 229 m x 73 m x 30 m (length x width x height) to accommodate dry storage.
- 4.7.5 The design of a wet ISFS would need to include an aircraft protection shell to avoid the risk of radiological release in the case of an aircraft strike. This would involve significant use of reinforced concrete as part of the civil construction. Raw material for concrete production would therefore be required alongside reinforcement bars which would be delivered by sea and road respectively,

although some elements of raw material (around 35 %) for concrete would also be delivered by road. Mobile concrete pumps and mixers would also be required during construction along with significant shuttering during pours. Excavation required to create the storage pools would involve the use of excavators and articulated dump trucks. While this form of construction activity is commonly used within the wider Hinkley Point C Project it is a significantly more intensive form of construction, requiring a range of personnel, raw material and use of various types of heavy machinery during a prolonged period of construction. A wet ISFS would also require the installation of significant equipment to ensure appropriate temperature control and circulation within the pools was maintained, all of which would be delivered by road.

- 4.7.6 While the proposed dry ISFS will have a larger footprint, the construction methodology is much more straightforward, less intensive and can be completed more quickly than the wet ISFS. Protection from aircraft strike is provided by the casks themselves (which will be manufactured off-site and delivered during the operational phase of Hinkley Point C) and so the building is more akin to a metal framed warehouse rather than a reinforced concrete structure. Very little excavation is required, and passive air circulation means that additional equipment to support the operation of the building is not required. The frame and panelling for the building will be delivered by road.

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- 4.7.7 Since the spent fuel will be stored in sealed concrete and steel canisters rather than in pools, there are no gaseous emissions. Consequently, the 55 m high gaseous stack will not be required.
- 4.7.8 Both a wet ISFS and a dry ISFS would be capable of being constructed within the pre-existing HGV caps. However, overall, the proposed dry ISFS will result in fewer HGV movements and lower numbers of construction personnel during its shorter construction than the wet ISFS.
- 4.7.9 It is also proposed that the Access Control Building associated with the ISFS is replaced with a new Equipment Storage Building in a new location within the same vicinity. The Equipment Storage Building is only marginally larger than the Access Control Building and will create a negligible increase in the total number of HGV movements (and remain within the daily maximum limit on HGV movements). Similarly, there will only be a negligible increase in the number of construction workers to construct the new Equipment Storage Building.

Meteorological Mast

- 4.7.10 The relocation and reduction in the height of the meteorological mast and the replacement of the meteorological station building with an outdoor

compound situated proximate to the mast is likely to result in a negligible change in construction traffic.

- 4.7.11 The number of HGVs delivering materials to site will be reduced since the height of the mast is reduced, but this is negligible.
- 4.7.12 The number of workers required to construct the meteorological mast will not change, but it is likely to take less time to construct.

Hinkley Point Substation

- 4.7.13 The Hinkley Point Substation, that is proposed to be retained as a permanent feature, is an existing building that has already been constructed. The proposed change to not remove it and no longer construct a new 11 kV substation to supply Hinkley Point A and Hinkley Point B will reduce the level of workforce and construction traffic required later in the construction programme.
- 4.7.14 Furthermore, the original proposal to build a new 11 kV overhead line to Hinkley Point B will no longer be required. However, this only reduces the off-site construction traffic and personnel numbers and will have no change on the on-site traffic and personnel.

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Sluice Gate Storage Structures

- 4.7.15 The new sluice gate storage structures will require additional workforce to construct, and additional HGV trips to deliver the building materials. However, given that they are relatively minor structures, this is likely to only cause a negligible increase in the overall numbers of workforce on the Hinkley Point C site and the number of HGV deliveries. The precast beams manufactured off-site can be accommodated on between two and five HGV deliveries.
- 4.7.16 To summarise, the proposed changes have a negligible change on the number of workers on site and the number of deliveries to site.
- 4.7.17 The Overall Traffic Impacts are considered in **Section 4.9**.

4.8 CWTP, CTMP and TIMP Monitoring Reports

- 4.8.1 This section describes the current and predicted level of construction HGV traffic and construction workforce that travel to and from the Hinkley Point C site and how this is

managed to remain within the movement caps set through the DCO.

- 4.8.2 As part of the DCO, NNB must implement and monitor the CWTP and CTMP until the end of the construction period. The monitoring of the package of management plans is reported quarterly by NNB to the TRG in the TRG Quarterly Report in accordance with the DCO Section 106 Agreement which can be found via NNB's consultation website at: www.edfenergy.com/hpccommunity. This includes the monitoring of the implementation of these plans and includes the extent to which all of the limits and other targets set out in the plans have been achieved and / or are reasonably likely to be achieved. If the TIMP has been implemented during the quarter, such as a variation in hours in 'exceptional circumstances', this will be referenced in the report.
- 4.8.3 A recent TRG Quarterly Report (Document Ref. Hinkley Point C 101130752)¹⁷ for the TRG has been used for the purposes of assessment within the PEIR and covers the three-month period from April 2023 to June 2023 (Quarter 2). This document will be made available to the public at www.somerset.gov.uk/planning-buildings-and-

¹⁷ Transport Review Group Quarterly Report 2023 Q2 (Document No 101130752).

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[land/transport-review-group](#) but has been added to the consultation website for ease of reference.

4.8.4 The TRG includes the following members:

- the Transport Co-ordinator (employed by NNB);
- three representatives to be nominated by Somerset Council;
- one representative to be nominated by National Highways; and
- up to three representatives to be nominated by NNB.

4.8.5 The CWTP contains the following information:

- Mode Share Target Report Table;
- Construction Workforce Travel Plan Action Plan;
- Cycle and Motorcycle Parking Utilisation;
- Car Share database enrolment;
- Patronage on each bus service;
- Number of parking permits issued; and
- Annual staff travel survey results.

4.8.6 The final mode journey to work is summarised in the TRG Quarterly Report 2023 Q2. This demonstrates that the

mode share targets to the Hinkley Point C site have broadly been achieved. The differences in modal share are a slight percentage point at most (0 to 1.5 percentage points) in the most recent quarter, being closer to the modal share targets than the prior quarter. The slight percentage point differences are not considered significant, particularly when considered in absolute terms. For example; on 14 June 2023, the target for the Hinkley Point C bus service was missed by 0.4 % out of a total of 7,683 workers surveyed on the day.

4.8.7 **Table 4-3** and **Table 4-4** set out the final mode used for the workforce's journeys to work in 2023 Q2. Modal share targets from the DCO have been applied to **Table 4-3**, whilst the car-sharing targets identified in the Hinkley Point C Car Share Strategy have been applied to the Park and Ride sites listed in **Table 4-4**.

Table 4-3: Hinkley Point C Site – Final Mode Journey to Work – All modes (14 June 2023)

Final Mode Journey to Hinkley Point C Site	Mode Share Target (DCO)	No. of Workforce	Actual mode share
Walk	9 %	909	10 %
Cycle	0 %	30	0.3 %
Public Bus	0 %	0	0 %
Rail	0 %	0	0 %
Motorcycle	0 %	50	0.6 %
Car	4 %	224 (192 drivers and 32 passengers)	2.5 %
Hinkley Point C Bus Service	87 %	7,863	86.6 %
Total	100 %	9,076	100 %

Table 4-4: Hinkley Point C Site Final Mode Journey to Work – Bus Services (14 June 2023)

Hinkley Point C Bus Service – Estimated Split	Mode Share Target (Hinkley Point C Car Share Strategy)	No. of Workforce	Actual mode share
Direct Bus	21 %	2,410	26.6 %
Park and Ride	49 %	3,620	39.9 %
Sedgemoor Campus	17 %	1,270	14.0 %
Brean Sands Campus	n/a	563	6.2 %
Total	87 %	7,863	86.6 %

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- 4.8.8 However, the current mode share figures for workforce travel to and from some of the park and ride sites are below target. However, workers who are closer to the Park and Ride sites and more likely to car share are now walking to board a Direct Bus instead of car sharing to a Park and Ride. As part of the update of the CWTP Action Plan¹⁸, NNB is continuing to promote walking to a Direct Bus and taking steps to increase car sharing as part of the commitments agreed as part of the Second Workforce Uplift.
- 4.8.9 The CTMP sets out how NNB manages freight traffic during the construction of Hinkley Point C. NNB must monitor progress against the controls and targets set out and report these within the Quarterly TRG Report. This will evidence if NNB is meeting or on track to meet these and no amendments to the CTMP are required.
- 4.8.10 The TRG Quarterly Report 2023 Q2 contains:
- Record of the DMS bookings and comparison of actual Hinkley Point C construction works HGV deliveries (see **Table 4-5**);
 - Comparison of Hinkley Point C construction works HGV deliveries against HGV maximum daily (see **Table 4-6**) and hourly (see **Table 4-7**) limits and average quarterly limits; and
 - Origins of HGV movements.
- 4.8.11 All HGVs utilised for deliveries are expected to be Euro IV compliant, which is monitored through the DMS system. Non-compliant vehicles will be raised by exception to the TRG.
- 4.8.12 The DMS is a system to schedule the deliveries so that they are distributed across the permitted hours so that the DCO caps on daily and hourly movements are achieved. This also allocates the permitted route for each delivery booked. The quarterly record shows the total movements for each quarter (Booked and Actual), the daily movements along the two permitted routes, and the hourly HGV movements between 07:00 and 21:59.

¹⁸ Somerset Council (2023) Transport Review Group [\[Online\]](#) Accessed 20 December 2023.

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Table 4-5: DMS Bookings against Actual Deliveries during 2023 Quarter 2

No. of Hinkley Point C HGV Delivery Bookings (one way trips)	Actual HGV Deliveries (one way trips)	Actual HGV Movements (two way trips)
9,164	5,101	10,133

Table 4-6: Construction Works HGV Movements against HGV Route, Average Quarterly Limit and Maximum Daily Limits in 2023 Quarter 2

HGV Movements	DCO Daily Caps (Movements)	Average Daily	Maximum on any day (Mon – Fri)	Maximum on any day (Sat)
HGV Movements (Including Local Routes)	500 (quarterly average) 750 (Mon to Fri) 375 (Saturday)	139	243	34
HGV Route 1 (J23)	450	113	187	34
HGV Route 2 (J24)	300	25	71	0

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Table 4-7: Construction Works HGV Movements against Time Restrictions, Average Quarterly Limit and Maximum Daily Limits

HGV Movements	DCO Daily Caps (Movements)	Average Daily	Maximum on any day (Mon – Fri)	Maximum on any day (Sat)
07:00 – 07:59	40	24	39	4
08:00 – 08:59	30	16	28	6
09:00 – 09:59	50	17	36	10
10:00 – 10:59	No CAPS	19	42	6
11:00 – 11:59		15	28	2
12:00 – 12:59		12	30	4
13:00 – 13:59		16	34	0
14:00 – 14:59		10	28	2
15:00 – 15:59		4	13	0
16:00 – 16:59		50	4	13
17:00 – 17:59	40	2	8	0
18:00 – 18:59	40	0	2	0
19:00 – 21:59	No CAPS	0	2	0

- 4.8.13 The recent TRG Quarterly Report 2023 Q2 demonstrates that HGV movements were well within the capped limits for the average and maximum HGV movements and time periods during the last quarter.
- 4.8.14 The TIMP sets out the processes for managing Hinkley Point C Project related traffic during an event or incident that results in a loss of highway capacity on the two prescribed HGV routes to Hinkley Point C site. The TIMP was not implemented during 2023 Q2.
- 4.8.15 As shown in **Table 4-5**, **Table 4-6** and **Table 4-7**, the recent TRG Quarterly Report 2023 Q2 demonstrates that the implementation of the CWTP, CTMP and TIMP for the Hinkley Point C Project is effective and is achieving the objectives as set out in the DCO application.
- 4.8.16 Any proposed changes to the Hinkley Point C Project that have an impact on the construction traffic will be managed through the effective implementation of these plans.

4.9 Overall Traffic Impacts

- 4.9.1 As identified in **Table 4-2**, the proposed changes are anticipated to individually result in either no changes, reductions or negligible increases to the number of construction workforce on site and the number HGV construction movements to and from the Hinkley Point C site.
- 4.9.2 NNB has no specific trip generation calculations for individual buildings but has provided new profiles built bottom up from contractor estimations which include the new/altered features in their proposed form.
- 4.9.3 The construction HGV profile was updated in June 2023, as highlighted in TRG's latest Quarterly Report (Document Ref. Hinkley Point C 101130752).¹⁹ This HGV profile represents the HGV deliveries generated by various construction activities. The relevant totals are the overall total trips generated and the trips generated by "Civils". This category would include the trips generated by the proposed changes. The other categories are not relevant to this assessment and just form part of the total construction traffic.

¹⁹ Transport Review Group Quarterly Report 2023 Q2 (Document No 101130752).

- 4.9.4 The Initial Workforce Uplift was based on projections received from contract partners. The Initial Workforce Uplift was implemented on the basis of delivering Unit 1 in mid-2026 and Unit 2 in mid-2027 (now mid-2027 and mid-2028). The updated forecast (see **Figure 4–1**) provided to the TRG in respect of Workforce Uplift 2 is in alignment with the operational dates of mid-2027 and mid-2028.
- 4.9.5 It is noted that the contractors are required to programme all works so that the daily number of HGV trips do not exceed the permitted caps.
- 4.9.6 Consequently, any reduction or increase in daily HGV movements will be offset by a corresponding increase or reduction in other construction activity in order to remain within the caps set by the construction management strategies.
- 4.9.7 Though this implies that some construction activities could occur later, it can be seen from the predicted HGV profile in **Figure 4–2** that these can occur later within the permitted HGV cap. The activities are constrained by the number of permitted HGVs and there is sufficient headroom (difference in the permitted cap and the predicted HGV daily movements) in the availability of HGV movement slots in the subsequent quarters to allow the works to be completed without extending the final completion date.
- 4.9.8 The construction workforce profile includes workers from the broad definition of construction categories; namely Civils, MEH, Construction Management, Site Services and Operations.
- 4.9.9 The rapid fall off in construction workforce numbers after peak construction demonstrates that any delay in activities due to the permitted HGV caps number would be readily absorbed in the increasing headroom in the number of construction workforce anticipated to be on site.
- 4.9.10 The predicted construction workforce and HGV traffic will not exceed the permitted movements caps for the construction period that includes the proposed changes, with a maximum of 400 two-way HGV movements which will be experienced in Q2 2024.
- 4.9.11 This clearly demonstrates that there will be no material change in the total number of workforce on site and the daily HGV movements on the external road network due to the proposed changes on-site.

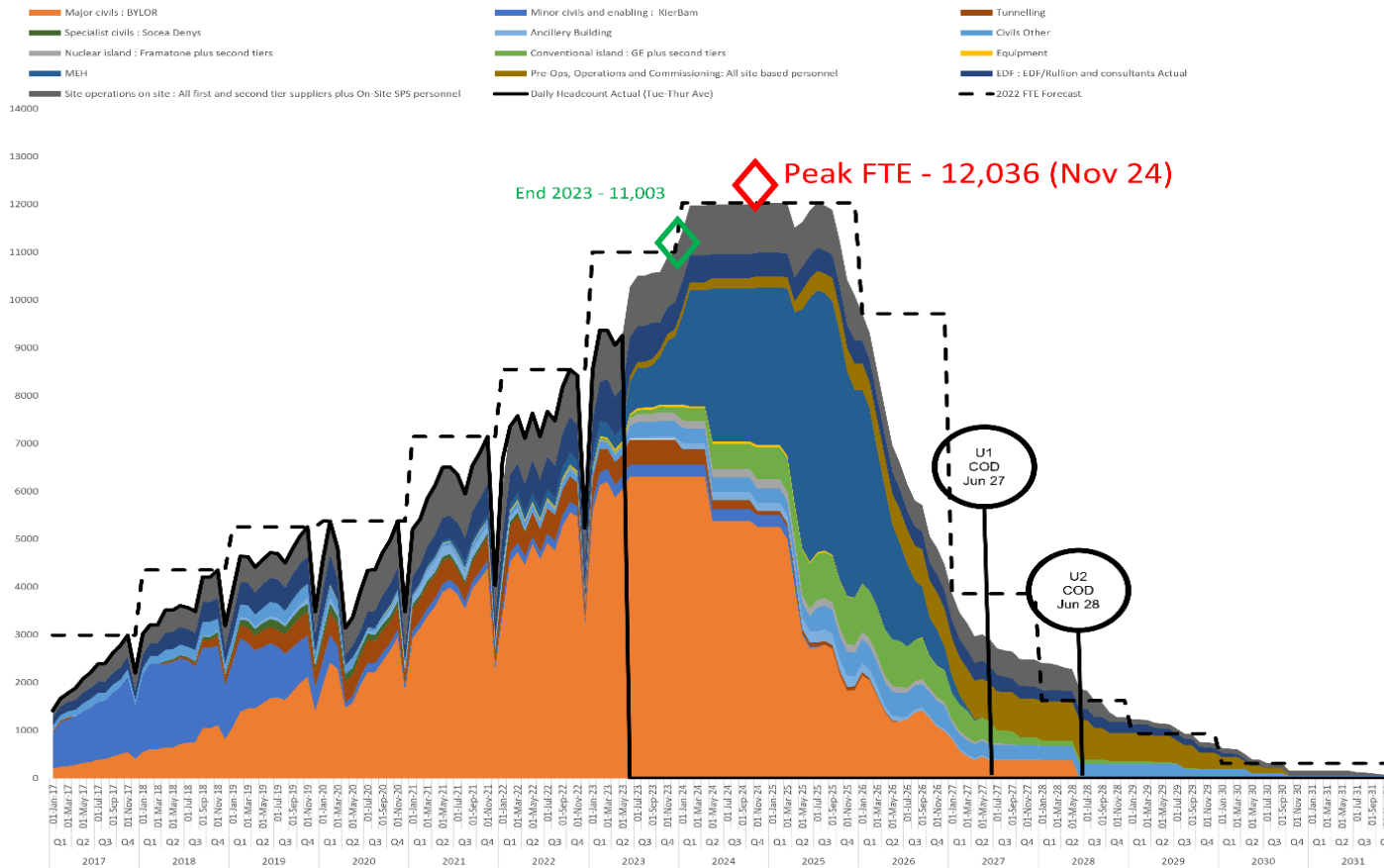


Figure 4–1: Updated Workforce Profile July 2023²⁰

²⁰ MEH is an acronym for Mechanical, Electrical and Heating, and SPS is an acronym for Somerset Passenger Solutions. BYLOR, Socea Denys, Framatone, KierBam and GE are the main subcontractors for Hinkley Point C.

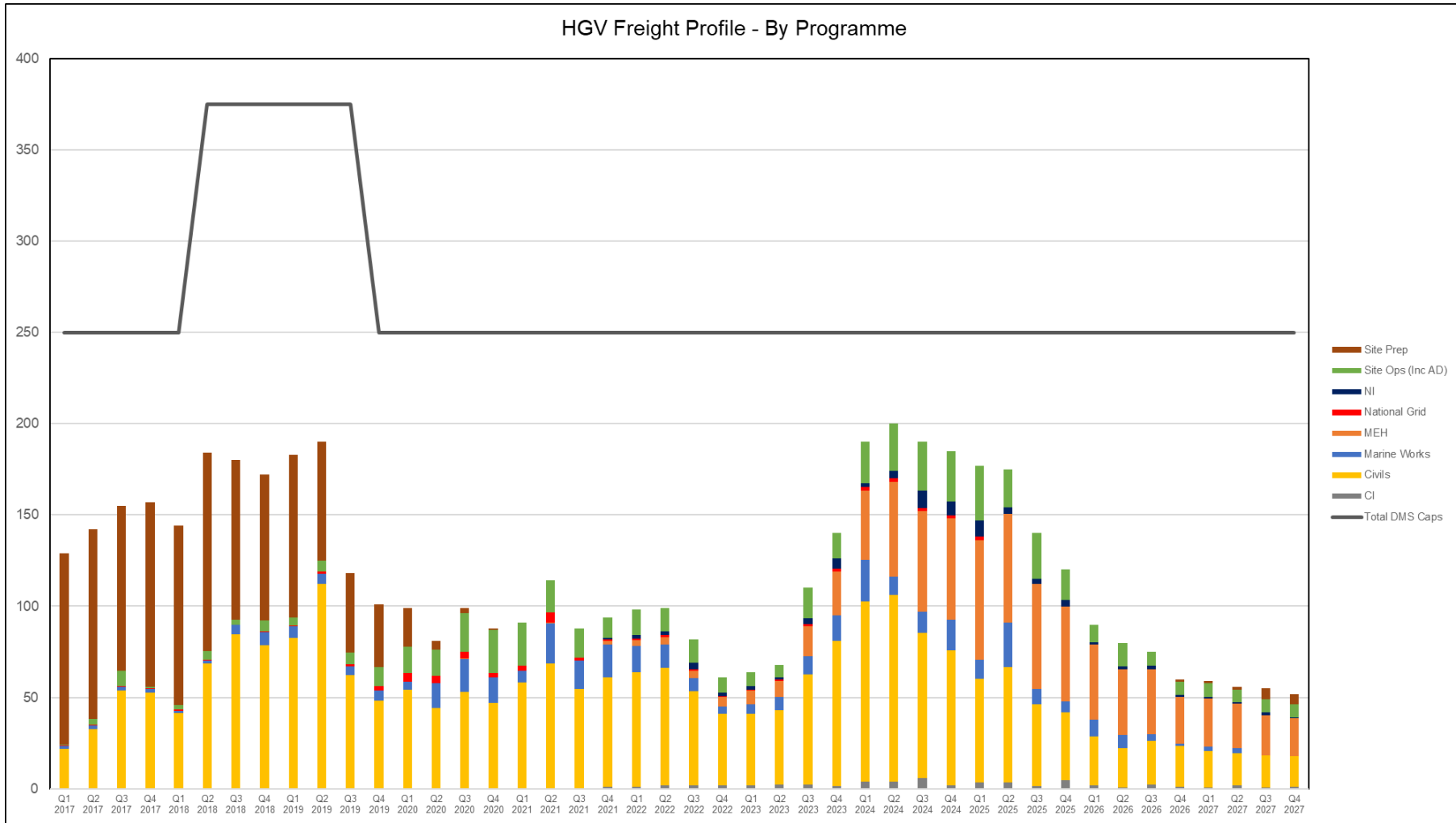


Figure 4–2: Updated Construction HGV Profile June 2023

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4.10 Assessment of Changes in Traffic Flows

- 4.10.1 This section assesses the predicted construction HGV flows and construction workforce as a total with the inclusion of the proposed changes on-site.
- 4.10.2 The change in workforce and HGV traffic flows – factoring in the proposed changes on-site – would not result in any new or materially different likely significant transport effects. This is because the daily HGV movements do not exceed the agreed caps outlined in the DCO application, and any reductions will be used for other construction activities.
- 4.10.3 Similarly, any increase in construction activity will necessarily be offset by a reduction in construction activity elsewhere on site.
- 4.10.4 The updated construction HGV profile demonstrates that the level of construction HGV traffic does not exceed the HGV movement caps for hourly, maximum weekday, and average daily traffic as defined in the approved CTMP.
- 4.10.5 This includes the construction period when the proposed changes will be constructed. Furthermore, it demonstrates that daily movement caps for HGVs will not be exceeded during the remainder of the construction programme that might be affected by the proposed changes set out in **Table 4-2**.
- 4.10.6 The predicted workforce for the remainder of the programme will not exceed 12,040 (rounded) which is the basis of the Second Workforce Uplift.
- 4.10.7 The new workforce peak is expected to occur in November 2024, whilst around 12,000 personnel are anticipated to be on site throughout 2024 to early 2025. The increased workforce is largely managed through the park and ride services which have a modal share target of 87 % in the DCO.
- 4.10.8 Similarly, the level of construction HGV traffic will not exceed the permitted caps previously consented.
- 4.10.9 The suite of approved construction management plans is implemented so that the contractor adjusts its programme and delivery scheduling to stay within the permitted caps on total daily construction workforce and daily HGV caps (average daily traffic and maximum weekday). The quarterly monitoring has demonstrated that this has been achieved in 2023 Q2 and previous quarters.
- 4.10.10 The TRG receives reports to demonstrate that the contractor is implementing the CWTP, CTMP and TIMP satisfactorily and in accordance with these plans.

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- 4.10.11 All reports and minutes of TRG meetings are publicly available online²¹.
- 4.10.12 On the basis of the information set out in this chapter, it is considered that the Hinkley Point C Project, as changed by the proposed changes, will not result in any new or materially different likely significant Transport effects from those assessed in the original ES.

4.11 Summary

- 4.11.1 **Section 4.8** has shown that the mitigation measures set out in the original DCO application have been successfully implemented through CTMP, CWTP and TIMP. This demonstrates that the peak construction traffic used in the original DCO TA has not changed.
- 4.11.2 **Sections 4.9** and **4.10** demonstrate that the Hinkley Point C Project, as changed by the proposed changes described in **Table 4-2**, will not result in any new or materially different likely significant Transport effects since all construction activity is limited by the permitted caps approved within the DCO. The permitted HGV caps are a constraint on the programme, and if construction activities are delayed due to the proposed changes, there is sufficient headroom in the permitted HGV caps in the

subsequent quarters to allow the activities to take place later without any impact on the overall completion date for Hinkley Point C Project.

- 4.11.3 The predicted construction workforce and HGV traffic will not exceed the permitted movements caps for the construction period that includes the proposed changes on-site.
- 4.11.4 This clearly demonstrates that there will be no material change in the total number of workforce on-site and the daily HGV movements on the external road network due to the proposed changes.

4.12 Next Steps

- 4.12.1 The assessment outlined in this chapter for the proposed changes on-site will be consulted on with relevant stakeholders, including the TRG, with the objective to agree that a detailed assessment of Transport impacts related to the proposed changes on-site can be scoped out of the updated EIA.

²¹ Somerset Council (2023) Transport Review Group [\[Online\]](#) Accessed 20 December 2023.

5. MARINE ECOLOGY AND WATER QUALITY

5.1 Introduction

5.1.1 As part of this PEIR, an interim assessment has been undertaken which considers how the proposed changes on-site may have the potential to affect the marine ecology, including indirectly through changes to marine water quality. The findings of the interim assessment are presented within this chapter. The final assessment, to be presented within the ES, will take account of the sensitivity of the receptors as well as the degree of change predicted to occur from the proposed changes, to be informed by a greater level of data analysis, including consideration of potential effects on marine ecology and water quality with and without the proposed changes on-site. For the purposes of this assessment, the removal of the requirement to install an AFD as part of the CWS is the primary proposed change that has been considered, in accordance with the Scoping Opinion, which confirmed that the ISFS (which includes the relocation and renaming of the Access Control Building associated with it), meteorological mast, Hinkley Point Substation and sluice gate storage structures could be scoped out. This chapter sets out preliminary information in relation to the subject of marine ecology and water quality, which is

available from previous studies, as well as the scoping exercise for the proposed changes.

5.1.2 This chapter draws upon an updated evidence base, comprising existing datasets, and a second year's worth of Comprehensive Impingement Monitoring Programme ('CIMP2') data (2021-22), as well as two additional years of Routine Impingement Monitoring Programme ('RIMP') data (2018 and 2019), to augment the existing data sources.

5.2 Engagement

5.2.1 There has been targeted engagement by NNB in relation to the potential scale of effects on fish populations as a result of not installing an AFD as part of the CWS, and the type / scale of compensatory measures to be implemented under the HRA regime.

5.2.2 This has included extensive engagement with the relevant statutory nature conservation bodies ('SNCBs') in respect of potential compensatory habitat measures. More details on these measures are provided in Table 4-1 of Section 4.1 entitled Previous consultation and engagement of the HRA Report.

5.2.3 Full details of this engagement are provided in Section 4 of the Shadow Habitats Regulations Assessment

Evidence Report – Pre-Application Consultation Version ('HRA Report').

5.3 The Wider Consenting Context

5.3.1 As described within **Volume 1 Chapter 1 Section 1.4**, the requirement to install an AFD as part of the CWS was replicated within both the WDA Permit and Marine Licence. A variation to amend the Marine Licence will be prepared and submitted in due course. An application to vary the WDA Permit was submitted in February 2019, and a decision was made in September 2022, with the Secretary of State for Defra refusing the variation. The WDA Permit was however subsequently varied, as outlined within **Volume 1 Chapter 1 Section 1.4**, to remove the requirement to install the AFD.

5.4 Scoping

5.4.1 A Scoping Opinion was received from the Planning Inspectorate on 3 May 2022, including several comments raised specifically in relation to marine ecology and marine water quality. A full, detailed response to all comments received has been provided within **Section 2.3**. Comments relating to marine ecology and water quality are presented in **Table 5-1**.

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Table 5-1: Comments relating to marine ecology and marine water quality received as part of the Scoping Opinion

Consultee / ID	Ref in Scoping Report	Comment	Response
Planning Inspectorate / 2.1.4	2.1.35 - 2.1.37 2.1.58 - 2.1.60 2.1.66 - 2.1.68 2.1.74 - 2.1.76 2.1.87	Re: Alternatives <i>'The Scoping Report summarises the alternatives that have been considered in relation to each of the Proposed Changes. The ES should include a section on the alternatives which have been considered for each of the Proposed Changes and not just the Acoustic Fish Deterrent (AFD). Where supporting evidence has been relied on (such as the AFD Optioneering Report) this should be included in annexes to the ES. In relation to an AFD, the section on alternatives should address the potential use of Remotely Operated Vehicles (ROV) during maintenance and provide a justification as to why use of ROV is not considered to be a feasible alternative.'</i>	This PEIR includes a section on the alternatives considered for each of the proposed changes in Volume 1 Chapter 2 . The HRA Report published for consultation alongside this PEIR includes details which set out the latest supporting evidence and information regarding alternatives and the use of ROVs. The relevant elements of the AFD Optioneering Report have been considered within the HRA Report including paragraphs 3.2.19, 3.2.20 and Section 10 rather than provided as a standalone document.
Planning Inspectorate / 3.1.1	Table 8-1	Re: Impacts on the ISFS, Meteorological Mast, Hinkley Point Substation and Sluice Gate Storage Structures. <i>'The Inspectorate agrees that these matters can be scoped out of the assessment as there are unlikely to be pathways which could give rise to significant effects on marine ecological receptors'</i>	Noted. Effects on marine ecological receptors from these elements of the proposed changes are not considered further within this assessment.
Planning Inspectorate / 3.1.2	5.5.10 & Table 9.2	Re: Marine planning policy. <i>'As the ES is intended to consider effects on the fish populations within the Severn Estuary, it should also take the requirements of the Welsh National Marine Plan into account.'</i>	Noted. The Welsh National Marine Plan has been reviewed and taken into account within this interim assessment as appropriate, with particular reference to: - ECON General Policy - ENV General Policy

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Consultee / ID	Ref in Scoping Report	Comment	Response
			<ul style="list-style-type: none"> - SCI General Policy - Sector policies related to energy and fisheries. These policies will also be considered within the ES.
Planning Inspectorate / 3.1.3	9.3.1	Re: Guidance to be relied on. <i>'It is noted that the assessment of effects on marine ecology will be based on the 2018 guidance from the Chartered Institute of Ecology and Environmental Management (CIEEM). The Scoping Report states that the CIEEM guidance notes the importance of professional judgement. Where professional judgement is used in the assessments, the ES must clearly explain the criteria and/or reasoning which supports that professional judgement.'</i>	Noted. The assessment methodology is presented in Sections 5.6 to 5.8 of this chapter. Throughout the assessment, where professional judgement is applied, this is highlighted, along with appropriate justification for any decisions made.
Planning Inspectorate / 3.1.4	9.4.4	Re: Study area for marine mammals. <i>'The Scoping Report states that the study area currently mirrors that for fish populations but may be extended if a potential effect pathway is identified. The ES must either address any potential effects on the harbour porpoise population of the Bristol Channel (including effects on the Bristol Channel Approaches Special Area of Conservation (SAC)) or explain why such effects would not arise. The study areas for fish, bird and marine mammals should be agreed with the relevant stakeholders wherever possible.'</i>	Potential indirect effects on marine mammal populations have been considered within the interim assessment and will continue to be so as the assessment progresses. Specific consideration of the Bristol Channel Approaches SAC is provided within the HRA Report (Section 9.14) for consultation, published alongside this PEIR; however, designated sites are also included as a receptor within this interim assessment. To date, there has been no specific engagement with stakeholders regarding the study areas presented within this interim assessment, and also proposed for inclusion within the ES.

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Consultee / ID	Ref in Scoping Report	Comment	Response
Planning Inspectorate / 3.1.5	9.5.12-14	<p>Re: Current and future baseline.</p> <p><i>'The Scoping Report states that no additional baseline surveys are proposed and instead the data supporting the previous ES and subsequent studies will be relied on, despite the statements in paragraph 9.5.13 that long-term monitoring has shown shifts in the fish assemblage in the vicinity of Hinkley Point. The reports in Appendix B of the Scoping Report appear to largely rely on the data collected during the Comprehensive Impingement Monitoring Programme (CIMP) in 2009/10. The Inspectorate is concerned that this data is now at least 12 years old and questions whether it still reflects the situation at Hinkley Point. The ES should either contain an updated baseline or, where possible, demonstrate agreement with relevant stakeholders (particularly the Marine Management Organisation (MMO), the Environment Agency (EA) and Natural England (NE)) that the baseline data used in the Appendix B reports is appropriate for the assessment. The updated baseline should also include any new designated sites, (including Marine Conservation Zones) within the zone of influence of the Proposed Development.'</i></p>	<p>Further fish impingement studies have been completed, at Hinkley Point B, including the additional RIMP and CIMP data, outlined above. These data have now been analysed, shared with the relevant stakeholders, and its results factored into this interim assessment and in the HRA Report.</p> <p>The EIA will also consider potential pathways of effect to any new designated sites in the vicinity of the works, including MCZs, based on appropriate Zones of Influence ('Zol').</p>
Planning Inspectorate / 3.1.6	Table 9-3	<p>Re: Likely significant effects.</p> <p><i>'The potential for LSE from fish impingement is only flagged in relation to effects on water quality and not on the fish population itself. The ES should present an assessment of the effects on relevant fish populations.'</i></p>	<p>This interim assessment includes a detailed review of the evidence base to inform the assessment, including the most recent impingement data collected at Hinkley Point B, which has been used to inform an assessment of potential effects on fish populations, and associated, indirect effects on predator species. The interim assessment is set out</p>

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Consultee / ID	Ref in Scoping Report	Comment	Response
			in this chapter. This will be built-on and developed within the ES.
Planning Inspectorate / 3.1.7	9.8	Re: Assessment methodology. <i>'The Scoping Report does not state this explicitly, but it appears that the assessments in the ES will rely on the various studies contained in Appendix B. The Inspectorate notes that these studies were completed between 2018 2020. The ES should include a justification as to why the methodologies used in these assessments are still considered to be appropriate. The ES should demonstrate that the methods used to undertake the assessment have been agreed with the relevant stakeholders where possible. In the event that such agreement is not forthcoming, the ES should include separate assessments using the Applicant's preferred method as well as that recommended by stakeholders.'</i>	Additional impingement surveys have been undertaken, the results of which form the basis of this interim assessment report. The final reporting of the ongoing data analysis includes a full description and justification of the methodology used, which will be presented in the ES. An overview of this methodology is presented within Section 5.8 of this chapter. To date, there has been no specific engagement with stakeholders regarding the study areas presented within this interim assessment, and also proposed for inclusion within the ES.
Planning Inspectorate / 3.3.14	Table 7-1 (Original ES Chapter 18)	Re: Marine water and sediment quality <i>'The Inspectorate notes the concerns of the Marine Management Organisation (MMO) that changes in the quantity of dead fish discharged could affect marine water quality (see Appendix 2 of this report). The Inspectorate does not agree that this matter can be scoped out of further assessment. Accordingly, the ES should include an assessment of the effects arising from discharge of dead fish or evidence demonstrating the absence of an LSE and agreement with the relevant stakeholders.'</i>	Potential effects on marine water quality are considered within the PEIR and will be considered in the ES, drawing primarily on the findings of TR515: <i>Water quality effects of the fish recovery and return system</i> (Cefas, 2020). Results were updated to include the refinements described above and incorporate the CIMP2 data.
Environment Agency		Re: Proposed removal of the AFD	Noted. This interim assessment applies the Environment Agency's methodology. This will

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Consultee / ID	Ref in Scoping Report	Comment	Response
		<i>'In the recent appeal to vary the Operational Water Discharge Activity permit for Hinkley Point C we have commented extensively on the scoping/ methodology of impact studies carried out by the applicant. A large proportion of these comments also apply to the scope and methodology for information relating to the EIA process. Please see the attached the Agency's closing statement to this appeal. For more detail, please see appeal information can be found under reference APP/EPR/573. We look forward to working with the applicant to address our concerns.'</i>	continue to be the case during ongoing analysis of the emerging database, with full details provided within the ES.
Marine Management Organisation	5.5.10	Re: Marine Policy <i>'Due to the potential impacts to the marine environment from the removal of the AFD, the MMO consider that regard should be given to the Welsh National Marine Plan.'</i>	Noted. The Welsh National Marine Plan has been given due consideration within the assessment process and will be discussed in detail in the ES.
Marine Management Organisation	Table 7.1	Re: Marine water and sediment quality <i>'The MMO do not consider that marine water and sediment quality should be scoped out at this stage. As noted in section 9.4.5 of the EIA Scoping Report, changes in the quantity of dead fish discharged could have implications for marine water quality which require further assessment.'</i>	Noted; see the response to comment 3.3.14.
Planning Inspectorate	Table 7.1	<i>'The Inspectorate agrees that the Proposed Changes would be unlikely to give rise to new or additional LSE to terrestrial plants, habitats, invertebrates and birds using terrestrial and intertidal habitats and these matters can be scoped out of further assessment. In relation to piscivorous birds, the Scoping Report seeks to scope these</i>	An interim assessment of the potential effects on piscivorous birds is presented in this chapter.

Consultee / ID	Ref in Scoping Report	Comment	Response
		<i>species out of further assessment on the grounds that the additional entrainment or impingement of fish without the AFD would affect less than 0.1% of fish stocks. As noted in section 3.1 of this report, the Inspectorate has raised queries about the assessment of effects on fish populations. It is therefore premature to exclude this matter from further assessment. Accordingly, the ES should include an assessment of this matter or evidence demonstrating the absence of an LSE and agreement with the relevant stakeholders that they agree with this approach.'</i>	
Marine Management Organisation	7.4.1	Re: Climate change <i>'The MMO note that the applicant is scoping out climate change from the updated EIA, and would like clarification on whether climate change will be taken into account in the assessment of the significance of effects on marine ecology receptors?'</i>	The potential effects of climate change have been addressed from the perspective of inclusion in the future baseline as part of the ongoing assessment.
Marine Management Organisation	Table 8.1	Re: Marine water quality, Table 8.1 of the Scoping Report <i>'The MMO suggest marine water quality should be scoped in, as per comment on Table 7.1 of the EIA Scoping Report.'</i>	Noted; see the response to comment 3.3.14.
Marine Management Organisation	Table 9.1	Re: Marine policy <i>'The MMO would like to highlight that the Marine and Coastal Access Act (2009) is also relevant to the consideration of potential effects on Marine Conservation Zones (MCZ).'</i>	Noted. MCZs have been considered within this interim assessment as appropriate. In addition, they will be the focus of a targeted MCZ Screening Assessment, to be provided with any future Marine Licence application submitted in association with the proposed change to the CWS of Hinkley Point C.

Consultee / ID	Ref in Scoping Report	Comment	Response
Marine Management Organisation	Table 9.1	Re: Water Framework Directive <i>'The MMO recommend the Water Framework Regulations should be included within this table.'</i>	Noted. WFD water bodies have been considered as receptors within this interim assessment as appropriate. In addition, they will be the focus of a WFD Assessment, to be provided with any future Marine Licence application submitted in association with the proposed change to the CWS of Hinkley Point C.
Marine Management Organisation	Table 9.1	Re: Marine strategy <i>'The table should refer to the 'Marine Strategy' rather than the 'Marine Strategy Framework Directive'.'</i>	Noted. This has been corrected in this interim assessment and will be captured in the ES.
Marine Management Organisation	Table 9.2	Re: Marine policy <i>'The MMO suggest that the Welsh National Marine Plan is also included here, for the reason noted in paragraph 2.1 of this response.'</i>	Noted; see the response to comment 3.1.2.
Marine Management Organisation	Section 9.8	<i>'This section provides little detail on the proposed assessment methodology for marine ecology receptors. The MMO recommend that evidence available from the detailed assessment for the Water Discharge Activity permit application may be suitable to inform the EIA.'</i>	Additional information on the methodology for impact assessment has been included within this interim assessment and will be captured in the ES. Throughout the assessment process, where appropriate, information and assessments from the WDA Permit application have been reviewed and incorporated for consistency.
Marine Management Organisation	Section 9.8	Re: Marine water quality <i>'The section provides no information on how the marine water quality assessment will be carried out. The MMO recommend that previous detailed assessments that have been carried out for the project, that the evidence available from the assessment may be suitable to inform the EIA.'</i>	Noted; see the response to comment 3.3.14.

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Consultee / ID	Ref in Scoping Report	Comment	Response
Marine Management Organisation	Section 11.1.6	Re: Appropriate assessment <i>'The MMO would expect the Environmental Statement to be supported by various additional assessments, including an MCZ assessment, Habitats Regulation Assessment, Waste Framework Directive Assessment, Marine Plan Assessments (for both the English Southwest Marine Plan and Welsh National Marine Plan), as well as a Water Framework Regulations Assessment (PINS Advice Note 18) and a Marine Strategy Assessment.'</i>	A separate HRA Report has been prepared and published for consultation alongside the PEIR. The findings of the HRA process are taken into account within the PEIR and will be included in the ES. Consideration of MCZs and WFD waterbodies is also presented within the PEIR. Full assessments for these sites will be provided alongside the ES. These detailed assessments will also accompany any subsequent Marine Licence application / variation associated with the proposed changes.
Natural England Table 7-1		Re: Marine birds <i>'The applicant's remarks on potential impacts on fish-eating (piscivorous) birds, which may be caused by not installing an AFD, appear to scope out this aspect from the EIA. However, potential impacts on seabirds should be considered under "Marine Ecology" not "Terrestrial Ecology and Ornithology", which is confirmed in Section 8 (Page 88) of the report. We assume that the updated ES will include an analysis, as should the new HRA, which is required under Regulation 63 of the Habitats Regulations 2017 (as amended).'</i>	Potential indirect effects on piscivorous birds are considered within this interim assessment. They are also considered within the HRA Report (Sections 9.6.36 et seq (lesser black backed gull) and 9.13).
Natural England		Re: New information <i>'It is important that if new evidence or new analyses of existing data that may inform our understanding of potential impacts on marine fish, marine mammals and seabirds arising from not installing an AFD have become available since the public inquiry, then such information should be included in the updated Marine Ecology chapter of the ES and</i>	Noted. Additional impingement surveys have been undertaken at the Hinkley Point B site as described above; analysis and interpretation of these data is captured within this PEIR. Additional information and analysis will be presented within the ES; where applicable, this will be highlighted as such.

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Consultee / ID	Ref in Scoping Report	Comment	Response
		<i>the new HRA to be prepared to inform this application. It would be helpful that if any information presented in the ES and HRA submitted to the Environmental Permit public inquiry in June 2021 has been revised subsequently in the new documentation submitted to inform the application for a material change to the DCO, it is flagged clearly to aid consultees in reviewing the material. If no changes have been made subsequent to the June 2021 public inquiry, then this should be stated.'</i>	
North Somerset Council		Re: Designated sites <i>'The North Somerset Council Ecology team believe that the removal of the AFD will be detrimental to the European Protected site and therefore recommend that a marine specialist is consulted, and that suitable mitigation is provided that will offset the detrimental impact prior to the determination of this application.'</i>	Full consideration of potential effects on European and Ramsar designated sites is provided within the HRA Report, published alongside this PEIR. However, designated sites have also been considered as receptors within this interim assessment.
Somerset West and Taunton Council		Re: Fish fatality <i>'In terms of specifics, it is recommended that the likely significant effects associated with Marine Ecology should also pick up the potential for fish fatalities as a result of not having the AFD system in place. We are concerned about the possibility for any fish affected by this proposed change to be killed or injured by the water-cooling operation and possibly washed up onto shore, having an impact on our marine and shoreline environment and the tourism sector at Minehead, Watchet and the other smaller seaside/riverside locations. On this basis,</i>	Potential effects of the release of dead fish have been considered within this interim assessment, drawing primarily on the findings of TR515: <i>Water quality effects of the fish recovery and return system</i> (Cefas, 2020), but updated with the findings of CIMP2. Within the ES, the fate of dead fish will include review of new impingement data, updating the findings of TR515 described above.

Consultee / ID	Ref in Scoping Report	Comment	Response
		<p><i>we would be pleased to hear how EDF Energy intend to manage this issue to avoid this scenario and ensure that they would be able to respond immediately, if there were to be any such occurrences. I think it would be appropriate to address this matter in any formal submission, otherwise it would be an issue that the Council would have to raise as part of its official response to the formally submitted application for the material change. This is an issue that has been raised by the LPA with the Applicant before.'</i></p>	

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5.5 Baseline

- 5.5.1 This section presents an overview of the existing marine ecological and water quality baselines, with particular focus on the fish populations, seabirds, waterfowl, and marine mammals, to set the entrapment assessment related to the proposed changes into context.
- 5.5.2 For fish populations, this section is intended in particular to provide an overview of the Bridgwater Bay fish community and includes a summary of RIMP data from 1981 to 2017, and CIMP1 and 2 data from 2009/10 and 2021/2022 respectively; These data have been used to inform this interim assessment.
- 5.5.3 For seabirds, waterfowl and marine mammals, a summary of the original baseline as presented within the original ES, reviewed within the current context where more recent data is available (e.g., through project-specific surveys or literature review), has been provided below; Chapters 19 and 20 of the original ES should be referred to for full details (links to these documents are provided in **Table 1-2 of Volume 1 Chapter 1**). Marine water quality data is presented, with additional detail contained within Chapter 18 of the original ES.

5.5.4 Within each receptor group, an original, current, and future baseline situation has been considered. These comprise:

- Original baseline: This has been summarised from the original ES, describing the baseline as it stood at the time of the original DCO application in 2011 (having been informed by extensive surveys and studies prior to this).
- Current baseline: This comprises the original baseline updated to incorporate the changes approved through the four DCO non-material changes and the relevant planning consents obtained under the Town and Country Planning Act 1990 since the original baseline was prepared, as well as other relevant changes to the baseline including elements of the Hinkley Point C Project that have already been constructed. It has been compiled drawing on both targeted surveys and studies associated with the Hinkley Point C Project, additional impingement surveys at Hinkley Point B, as well as a desk-based literature review.
- Future baseline: This is the current baseline updated to take into account changes to the baseline that are expected to have been made by the time Hinkley Point C is operational (assumed to be 2027), including as a result of the currently consented Hinkley Point C Project in the absence of the

proposed changes that will be the subject of the proposed material change DCO application.

Surrounding physical conditions

Original / Current baseline

5.5.5 With regards to the physical conditions of the Severn Estuary, there have been no substantial changes between the original baseline, and the current situation. Therefore, the conditions in these two baselines have not been separately described. Whilst it is acknowledged that there have been construction activities within the marine environment associated with the Hinkley Point C CWS, these are not at a scale to have had a significant effect at the estuary level.

5.5.6 The Severn Estuary is Britain's second largest estuary, and the largest coastal plain estuary in the UK, with the overall area of the European and international conservation designations being around 740 km², of which approximately two thirds comprise subtidal habitats, and one third being intertidal habitats (including mud, sand, saltmarsh, and rocky shores)²². It is ecologically appropriate to consider the Severn Estuary

and the Inner Bristol Channel as one unit due to the connectivity between the two marine / estuarine areas, and the associated movement of material and organisms between and within them. It has an exceptional tidal range of up to 13.2 m (classifying the Estuary as macro-tidal), resulting in strong currents of up to 1.5 metres/second ('m/s'), approximately 3.5 miles/hour ('mph') at mid-tide, which cause large quantities of sediment to be suspended, greatly limiting light penetration through the water column. This tidal range is also responsible for the large intertidal areas. Periods of slack water are short; typically, of 30 minutes duration at high and low water.

5.5.7 Hinkley Point is at the western end of Bridgwater Bay, on the southern shore of the Estuary, near the mouth of the River Parrett. The Hinkley Point C intakes would be located at the western end of the 48 km² Steart and Berrow intertidal flats, approximately 3.3 km offshore, north-north-west of the Hinkley Point C site.

5.5.8 The bedrock of Hinkley Point comprises predominantly a sequence of mudstone and limestone units. Offshore, the sublittoral substrate is highly mobile, nearly liquid mud with some areas of sand waves and reefs of

²² Brew, D (2015) Morphological characterisation of the Severn Estuary and Solway Firth. Report PB2693 for Natural England.

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agglomerated Sabellaria worm tubes. The intertidal area largely comprises wave-cut platforms, loose boulders, and gravel, with small areas of sandy mud in the very low shore area.

- 5.5.9 Primary production in the Severn Estuary/Inner Bristol Channel is largely from dissolved organic matter from riverine sources or from microphytobenthos on the mudflats. There is negligible phytoplankton production due to the very low light penetration levels associated with high levels of turbidity, with phytoplankton productivity being much higher in the deeper waters of the Outer Bristol Channel where turbidity is lower and light penetration greater. The common shrimp (*Crangon crangon*) is a primary food resource for fish and is available all year round. Sand gobies fulfil a similar trophic role but are much less abundant.

Future baseline

- 5.5.10 Given the temporal proximity between the current baseline, as described immediately above, and the future baseline described in **paragraph 5.5.4** above, and the nature of physical conditions described, substantial changes in the baseline (for example through climate change) are not anticipated.

Marine water quality

Original / Current baseline

- 5.5.11 With regards to marine water quality of the Severn Estuary, there have been no substantial changes between the original baseline, and the current situation. Therefore, the conditions in these two baselines have not been separately described.
- 5.5.12 The full suite of marine water quality parameters and accompanying analysis is presented within Chapter 18 of the original ES (see **Table 1-2** of **Volume 1 Chapter 1**). The original 2011 DCO baseline was established through collection of marine water quality samples (collected seasonally throughout 2009, and supported by additional surveys in 2010), modelling of the thermal plume of Hinkley Point B, review of scientific literature and previous marine water quality assessments, and consultation with relevant statutory bodies, primarily the Environment Agency, Natural England, Natural Resources Wales ('NRW') and the Marine Management Organisation. Although no further Hinkley Point C Project-specific water quality data has been collected in relation to Hinkley Point C, water quality monitoring has been undertaken in relation to the decommissioning process of Hinkley Point B. Due to the proximity of the sites, this data is considered appropriate context, and has

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been summarised here. Further details on marine water quality will be reported within the ES.

5.5.13 Historically, the Severn Estuary has received substantial loadings of contaminants from sewage and industry along its banks and river catchments. These are variable in nature, but have included metals, organo-metals, hydrocarbons, nutrients, mineral acids, solvents, biocides, fungicides, polychlorinated biphenyls ('PCBs'), pesticides and radionuclides. However, reporting of water quality has shown a decreasing trend for many water quality parameters, including dissolved metals.

5.5.14 A key driver influencing water quality regulation and management in the UK is the Water Framework Directive ('WFD'); the two WFD water bodies of relevance to Hinkley Point C are the Bridgwater Bay coastal WFD water body (ID: GB670807410000) and the Parrett transitional WFD water body (ID: GB540805210900). Bridgwater Bay water body is at moderate ecological status, due to moderate status for biological elements and nitrogen, with all other supporting elements at high status. The Parrett is at moderate ecological potential, as a result of a lack of complete implementation of mitigation measures, with other supporting elements being at good or high status.

5.5.15 Key findings of the marine water quality monitoring conducted at Hinkley Point B during 2021 and 2022 included:

- Concentrations of suspended sediment ranged from 66 mg/l (spring 2021) to 181 mg/l (winter 2022). Such high levels of suspended sediment results in low levels of water transparency, reducing light penetration and limiting primary productivity.
- Salinity values recorded ranged from 26.2 (winter 2022) to 27.9 (summer 2021) (compared to a value of 35 for 'full strength' seawater). This is as expected for an estuary with strong freshwater influences, e.g., from the River Severn.

5.5.16 In the original ES (see **Table 1-2** of **Volume 1 Chapter 1**), when values inshore and offshore were compared, a high degree of homogeneity was noted, likely associated with the high tidal velocities creating well-mixed water conditions. Greater variability was exhibited between neap and spring tides.

5.5.17 Additional desk-based data and assessment of dead and moribund biota discharge from the FRR are reported in TR515: *Water quality effects of the fish recovery and return system* (Cefas, 2020). This, and the preliminary findings from analysis of recent impingement data, will be used to inform the ongoing EIA and ES.

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5.5.18 Although not a primary focus of the ongoing assessment, marine sediment quality is closely linked to marine water quality. There has been substantial monitoring (including physico-chemical and radiological analysis) of sediment quality in the vicinity of the CWS, as part of the previous Marine Licence variations. Specifically in relation to marine sediment sampling, these variations have been associated with the disposal of dredged material around the marine infrastructure locations, with analysis of material to confirm that it was appropriate to be disposed of within the identified, licenced disposal grounds. Analysis of the material against Cefas' Guideline Action Levels for the disposal of dredged material found that levels of determinands were broadly comparable with those of the wider estuarine area, and suitable for disposal. Further variations on the Marine Licence have been associated with minor changes to construction methods, volumes of material etc., and have had no material effect on the baseline, or the ongoing consideration of the removal of the requirement to install an AFD as part of the CWS. Data collected to inform the variations and their accompanying environmental assessments will be incorporated into the ongoing assessment, and presented within the ES, as appropriate.

Future baseline

5.5.19 Given the temporal proximity between the current baseline, as described immediately above, and the future baseline described in **paragraph 5.5.4** above, and the nature of water quality conditions described, substantial changes in the baseline (for example through climate change) are not anticipated.

Fish populations

Original Baseline

5.5.20 A detailed description of the fish of the Severn Estuary / Inner Bristol Channel at the time of carrying out the DCO HRA was presented within Chapter 19 of the original ES (see **Table 1-2 of Volume 1 Chapter 1**). That baseline drew on two primary datasets for evaluation of impingement: the Routine Impingement Monitoring Programme ('RIMP'), conducted at Hinkley Point B from 1981, and the BEEMS Comprehensive Impingement Monitoring Data ('CIMP'), conducted at Hinkley Point B in 2009/10. At the time of the original ES, this was the only CIMP dataset; however, as described above, subsequent additional impingement monitoring was completed at Hinkley Point B in 2021/22. Therefore, the CIMP dataset from the original ES is referred to as 'CIMP1', with the second CIMP dataset now being referred to as 'CIMP2', where the distinction between the datasets is required.

- 5.5.21 In addition, an extensive desk-based study was undertaken, looking at the numerous studies which had been conducted examining fish within the Severn Estuary and the Bristol Channel.
- 5.5.22 Impingement data collected at Hinkley Point B since 1981 through monthly sampling recorded 83 estuarine and marine fish species from the surveys' commencement at the point of submission of the original ES (see **Table 1-2 of Volume 1 Chapter 1**). Between 1981 and 2010, the number of species observed in a given RIMP year ranges from 28 – 47, with an average of 38. In the more intensive CIMP1 sampling programme in 2009-2010 the number of species observed in the annual sample record was 64.
- 5.5.23 The ten most abundant species recorded within impingement monitoring were sprat (*Sprattus sprattus*), whiting (*Merlangius merlangus*), sand goby (*Pomatoschistus minutus*), poor cod (*Trisopterus minutus*), Dover sole (*Solea solea*), bib (pout) (*Trisopterus luscus*), common sea snail (*Liparis liparis*), European sea bass (*Dicentrarchus labrax*), European flounder (*Platichthys flesus*) and dab (*Limanda limanda*).
- 5.5.24 The broader fish community of the Severn Estuary and Bristol Channel was noted as having a similar species composition to that of other estuaries and coastal regions in south-west England, and Europe as a whole, comprising approximately 80 species²³. The most common species were sprat and whiting, present in numbers an order of magnitude higher than the next most abundant species, namely poor cod, sand goby, sea snail, bib (pout) and Dover sole.
- 5.5.25 Numbers of individual fish present in the Severn Estuary, indicated by captures at Hinkley Point B, showed a clear seasonal pattern with lowest numbers present in April and May rising steadily through the summer and autumn to a peak in December, where numbers decline in January, February, and March.
- 5.5.26 Ten marine species found within the area were UK BAP species: Atlantic cod (*Gadus morhua*), Atlantic herring (*Clupea harengus*), European plaice (*Pleuronectes platessa*), Dover sole, whiting, blue whiting (*Micromesistius poutassou*), hake (*Merluccius merluccius*), horse mackerel (*Trachurus trachurus*), ling (*Molva molva*) and saithe (*Pollachius virens*).

²³ Franco, A., Elliott, M., Franzoi, P. and Torricelli P., 2008. Life strategies of fishes in European estuaries: the functional guild approach. MEPS, 354:pp. 219-228.

5.5.27 Seven diadromous fish species are known to migrate through the Severn Estuary; Atlantic salmon (*Salmo salar*), twaite shad (*Alosa fallax*), allis shad (*A. alosa*), river lamprey (*Lampetra fluviatilis*), sea lamprey (*Petromyzon marinus*), sea trout (*Salmo trutta*) and European eel (*Anguilla anguilla*).

5.5.28 Most of the diadromous species were rarely recorded in the baseline data set. Only 8 Atlantic salmon, 9 river lamprey and 2 sea lamprey were recorded in the RIMP prior to 2013, and no allis shad or sea trout were recorded. In CIMP1, two allis shad were recorded, and no Atlantic salmon were present in the core CIMP1 sampling period, although two individuals were recorded in samples in February and March 2010. No sea trout were recorded in CIMP1. Higher numbers of juvenile twaite shad were impinged at Hinkley Point with annual catches ranging from fewer than ten individuals to over 100 in the RIMP. Numbers of twaite shad impinged at Hinkley Point tended to peak in July and August.

5.5.29 The Severn Estuary and its rivers constitute the largest European eel fishery in the UK; comprising 95 % of all glass eels (juveniles migrating towards freshwater) caught in England and Wales. RIMP data indicated a decline in the number of European eels impinged at Hinkley Point B through the time series. Data from CIMP1 were used as the baseline for adult eel impingement. Glass eels are vulnerable to entrainment as they migrate

from the marine environment to freshwater rivers and estuaries. Information of the relative distribution and abundance of glass eels at Hinkley Point C relative to Hinkley Point B was determined from a dedicated glass eel survey carried out in January-February 2012. Results from the survey suggested that glass eels were more abundant close to the south shore (near the Hinkley Point B intake location) and in the surface layers.

5.5.30 Ichthyoplankton (fish eggs and larvae) are susceptible to entrainment by Hinkley Point C. The baseline for entrainment in the original ES was determined using data from five monthly surveys undertaken between February and June 2010. A total of 29 sites were sampled in each survey, using a Gulf VII high-speed plankton sampler. These surveys were used to provide information on the seasonality and abundance of fish eggs and larvae and were specifically designed to cover the spawning periods of most fish species in the Bristol Channel. During this period the abundance of 18 taxonomic groups were identified, including the eggs of nine fish taxa and larvae of 16 species or taxonomic groups.

Current Baseline

5.5.31 With regards to the fish impingement data collected at Hinkley Point B, the original data has been augmented as appropriate, taking into account the CIMP2 of 2021-

22, as well as two additional years of RIMP data, from 2018 and 2019.

5.5.32 The RIMP detected 90 fish species at Hinkley Point B between 1981-2019, with about 38 species sampled in each year. The CIMP2 data from 2021/2022 recorded 62 species of fish at Hinkley Point B.

5.5.33 For many species the seasonal patterns correspond with those reported in the original baseline. Sprat and whiting are the species with the greatest abundance in the CIMP and RIMP datasets. Whiting abundance in the RIMP was typically low between April-June, peaking in winter. Similarly, sprat abundance peaked in the RIMP in January and December, with low abundance throughout the spring and summer (Henderson and Bird, 2010), a situation also reflected in the CIMP. Dab are another species that were impinged most frequently in winter and nearly absent over the summer months. Other species are most commonly impinged in summer, including juvenile Atlantic cod, Dover Sole and flounder.

5.5.34 Of the Annex II species of conservation importance for the Severn Estuary/ Bristol Channel, there were no occurrences of river lamprey, sea lamprey, Atlantic salmon or Allis shad observed in the CIMP2. However, one sea lamprey was recorded in additional data collected in March 2022 when a bulk sample was unable to take place. A higher number of juvenile twaite shad

were recorded in CIMP2 compared to CIMP1. The RIMP data collected since the baseline included two additional Atlantic salmon (in 2018) and one sea trout (in 2017), and no additional river lamprey, sea lamprey or allis shad. Nearly 600 twaite shad were recorded at variable rates throughout the RIMP time series. Whilst there is a high degree of variability in impingement rates, these peaked in 1990. Twaite shad were the most commonly impinged Annex II species in the RIMP. The current RIMP baseline for Annex II species includes ten Atlantic salmon, nine river lampreys, two sea lampreys and one sea trout from the 39-year period. For many species the seasonal patterns correspond with those reported in the original baseline.

5.5.35 Additional glass eel surveys were carried out in February/March 2013 and April 2013 to augment the survey carried out in January-February 2012. The surveys yielded over 2,500 glass eels from the flood tide when individuals would be expected to be in the water column. Analysis of the data indicated that glass eel density was higher in February/march than in April, suggesting seasonal changes in abundance. Data on the density of glass eels within the samples collected at the Hinkley Point C intake locations was used as the basis of estimates of glass eel entrainment.

5.5.36 The species present, their relative abundance and the role they play in the estuarine system varies. Species can

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be grouped functionally (which defines the overall ecological use of an estuary by a given species) or assigned to a feeding guild that describes their diet and feeding preference (Elliott et al., 2007; Franco et al., 2008). However, it should be noted that assignment to feeding guilds is based on the adult life history stage, and many species exhibit a shift in diet as they grow. The functional and feeding guilds assigned to the key species identified for assessment of entrapment impacts at Hinkley Point C are given in **Table 5-2**.

5.5.37 The structure of the estuarine fish community, and the relative abundance, is seasonally dynamic and subject to interannual variability, resulting from variation in recruitment and environmental factors (Claridge et al., 1986). Historical impingement data for abundant species indicates very high levels of interannual variability for species such as Atlantic cod, bib and Atlantic herring. Other species such as whiting and flounder exhibit lower variability. The dynamic structure of the community suggests the system is not in equilibrium (Henderson and Bird, 2010). This inherent variation in species composition as well as the plasticity in feeding behaviour and prey selectivity should be considered when assessing the potential effects of Hinkley Point C on the fish species of the Severn Estuary.

Table 5-2: Functional and feeding guilds. WDA Permit Inquiry species in bold.

Species	Functional guild	Adult feeding guild
Sprat	Marine seasonal	Zooplankton
Whiting	Marine juvenile	fish/nekton
Dover sole	Marine juvenile	benthos
Atlantic cod	Marine juvenile	fish/nekton
Thin-lipped grey	diadromous	detritus/ microphytes
European flounder	estuarine	benthos
Five-bearded rockling	Marine seasonal	benthos
Atlantic herring	Marine juvenile	zooplankton
Sand goby	estuarine	benthos
Poor cod	Marine adventitious	benthos
Common sea snail	estuarine	benthos
Bib (pout)	Marine juvenile	benthos
European sea bass	Marine juvenile	fish/nekton
European plaice	Marine juvenile	benthos
Twaite shad	diadromous	zooplankton
European eel	diadromous	fish/nekton
Blue whiting	Marine adventitious	fish/nekton
Allis shad	diadromous	zooplankton
Atlantic salmon	diadromous	fish/nekton
Sea trout	diadromous	fish/nekton
Conger eel	Marine adventitious	fish/nekton
Lesser spotted dogfish	Marine adventitious	fish/nekton
Thornback ray	Marine adventitious	benthos
Sea lamprey	diadromous	fish/nekton

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Species	Functional guild	Adult feeding guild
River lamprey	diadromous	fish/nekton
Brown shrimp	-	-

Future baseline

- 5.5.38 Given the temporal proximity between the current baseline and the future baseline (defined in **paragraph 5.5.4** above), it is not considered there will be any substantial changes between the current and future baselines. Therefore, the current baseline description represents a reasonable future baseline for the start of operations. This is due to long-term changes in the baseline (for example through climate change) not being anticipated by the start of operations and differences in the baseline in any given year would be subject to interannual variability rather than longer term trends. This interannual variability in the relative abundance of the fish species in the Severn Estuary/ Inner Bristol Channel is driven by changes in recruitment events and environmental factors.
- 5.5.39 As a result of the long-term operation of the station an overview of the potential implications of climate change

on the fish species of the Estuary is described below. Another factor that influences the relative abundance of fish species in the Severn Estuary/ Inner Bristol Channel is fishing practices and intensity.

- 5.5.40 Mean sea temperatures around the UK and Ireland have been warming at between 0.2 and 0.6 °C decade⁻¹ over the past 30 years. Projected future changes in the temperature and chemistry of marine waters around the UK and Ireland are having, and will continue to have, effects on the phenology (timing of lifecycle events), productivity and distribution of marine fish and shellfish²⁴. Perry et al. (2005)²⁵ described that distributions of both exploited and non-exploited North Sea fishes have responded to recent increases in sea temperature, with nearly two-thirds of species shifting in mean latitude or depth or both over 25 years. They found that species with shifting distributions have faster life cycles and smaller body sizes than non-shifting species and that the differential change between species could have consequences for predator-prey relationships. For species that shifted, the mean shift was 99 km

²⁴ Heath, M.R., Neat, F.C., Pinnegar, J.K., Read, D.G., Sims, D.W., Wright, P.J., 2012. Review of climate change impacts on marine fish and shellfish around the UK and Ireland. *Aquat. Conserv.* 22, 337–367.

²⁵ Perry, A.L., Low, P.J., Ellis, J.R., Reynolds, J.D., 2005. Climate Change and Distribution Shifts in Marine Fishes. *Science* (80-.). 308, 1912–1915.

northwards in 25 y. Dulvy et al. (2008)²⁶ found that the North Sea winter bottom temperature had increased by 1.6 °C over 25 years and that during this period, the whole demersal fish assemblage deepened by ~3.6 m decade⁻¹. Simpson et al., (2011)²⁷ found that most common northeast Atlantic fishes are responding significantly to warming with:

- Three times as many more species are increasing in abundance with warming rather than declining.
- Local communities are being reorganized despite decadal stability in species composition.
- Species range shifts are likely to have smaller ecological impacts than modification of local communities.

5.5.41 However, the effects of climate change on fish communities are hard to predict with accuracy because behaviour, genetic adaptation, habitat dependency and the impacts of fishing on species result in complex responses (Heath et al., 2012)²⁸. As some past studies

have not accounted for population structure and geographic attachment, distinguishing between other drivers and climate-induced effects on fish distributions is challenging. Petitgas et al., (2013)²⁹ considered that the key issue for the significance of climate change impact on fishes is habitat availability and connectivity between lifecycle stages with climate driven changes in larval dispersion being a major unknown. They considered that there was a significant risk for species with strict connectivity between spawning and nursery grounds.

5.5.42 Investigating the first 25 years of the Hinkley Point impingement dataset, Henderson (2007)³⁰ noted periods of change in the fish community, linked to temperature, salinity and the North Atlantic Oscillation ('NAO'). For example, in the late 1980s, a change in the northeastern plankton community resulted in a change in the relative abundances of the Bristol Channel fish community, and in the early 1990s a change in seawater temperatures was correlated with the disappearance of cold water species. Continuous increases in species richness and

²⁶ Dulvy, N.K., Rogers, S.I., Jennings, S., Stelzenmuller, V., Dye, S., Skjoldal, H.R., 2008. Climate change and deepening of the North Sea fish assemblage: a biotic indicator of warming seas. *J. Appl. Ecol.* 45, 1029–1039.

²⁷ Simpson, S.D., Jennings, S., Johnson, M.P., Blanchard, J.L., Schon, P.-J., Sims, D.W., Genner, M.J., 2011. Continental Shelf-Wide Response of a Fish Assemblage to Rapid Warming of the Sea. *Curr. Biol.* 21, 1565–1570.

²⁸ Heath, M.R., Neat, F.C., Pinnegar, J.K., Read, D.G., Sims, D.W., Wright, P.J., 2012. Review of climate change impacts on marine fish and shellfish around the UK and Ireland. *Aquat. Conserv.* 22, 337–367.

²⁹ Petitgas, P., Rijnsdorp, A.D., Dickey-Collas, M., Engelhard, G.H., Peck, M.A., Pinnegar, J.K., Drinkwater, K., Huret, M., Nash, R.D.M., 2013. Impacts of climate change on the complex life cycles of fish. *Fish. Oceanogr.* 22, 121–139.

³⁰ Henderson, P.A., 2007. Discrete and continuous change in the fish community of the Bristol Channel in response to climate change. *J. Mar. Biol. Assoc. UK* 87, 589–598.

the annual number of fish caught each year were also observed during the 25-year period. Henderson and Bird (2010)³¹ reported inter-annual fluctuations in the abundance of many species. For example, the abundance of European sea bass and Dover sole was noted to increase during warm years, while the abundance of common sea snail was noted to decline with increasing water temperature.

5.5.43 Many recent studies have characterised shifts in the distribution of fish and shellfish around the UK and Ireland that correlate with observed climate change, with decreases in cold water species such as the Atlantic wolffish *Anarhichas lupus* in the southern North Sea. In addition, juvenile recruitment of several species such as Atlantic cod, Atlantic herring and whiting in the Bristol Channel/Celtic Sea in 2020 and 2021 was lower than the average over the period 1980-2010. However, increases in the abundance of warm water fish species such as trigger fish, *Balistes caprisacus*, gilthead bream *Sparus auratus* and comber *Serranus cabrilla*, and cephalopods such as *Loligo forbesii* and *L. vulgaris* have also been observed in UK waters. Other models investigating the potential change in the distribution of small pelagic fish species suggest that the environmental suitability for

Atlantic horse mackerel *Trachurus trachurus* and sprat may decrease around the British Isles, but suitability for sardine, anchovy, Mediterranean horse mackerel *T. mediterraneus* and bogue *Boops boops* may increase, especially in the North Sea.

5.5.44 Some of the key observed trends in the Bristol Channel and Severn Estuary are likely to continue and are summarised below:

- Relative changes in species abundance with growing numbers of species that favour warmer water (in winter, in summer or both) and reducing abundance of species near to their southern latitudinal boundary. Henderson and Bird (2010)³¹ reported an increasing number of ‘tourist’ species resulting in an increase in the monthly number of species recorded in the RIMP at Hinkley Point B between 1981 and 2008.
- Effects on the phenology of some species (e.g., timing of the arrival of new recruits or migrations) and changes in migration patterns as some estuarine habitats become more or less suitable for each species and/or their prey.

³¹ Henderson, P.A., Bird, D.J., 2010. Fish and macro-crustacean communities and their dynamics in the Severn Estuary. Mar. Pollut. Bull. 61, 100–114.

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- The presence of large numbers of juvenile species in the estuary is dependent upon the connectivity between spawning locations further offshore to the west of Hinkley Point and their nursery grounds in the Severn Estuary. Some species have a lower tolerance to changes in winter temperatures than to summer temperatures and it is possible that higher winter temperatures will mean that some species may have to abandon fidelity to long established spawning locations which could produce a rapid reduction in the numbers of recruits to the estuary. Conversely, spawning of species favouring warmer temperatures may become more prevalent, with greater numbers of juveniles recruiting to the estuary.

Marine ornithology

- 5.5.45 Overwintering and migratory wildfowl and waders, which are not piscivorous, have not been assessed further. In line with the Scoping Opinion, an assessment of Terrestrial Ecology and Ornithology has been scoped out of further assessment for the proposed changes on-site, and an assessment of fish-eating (piscivorous) birds has been included within this chapter.
- 5.5.46 For the purposes of this section on the marine ornithology baseline, focus has been on predominantly piscivorous bird species in the Severn Estuary / Inner Bristol Channel

(and in particular the marine and estuarine areas to the east of Hartland Point and Carmarthen Bay, referred to hereafter as the 'study area'), drawing on existing data sources to understand the potential level at which such bird species could be present in the vicinity of the Project. Where applicable, this has drawn on known foraging ranges, and populations within nearby colonies / designated sites.

Original Baseline

- 5.5.47 The original ES (see **Table 1-2 of Volume 1 Chapter 1**) baseline information from 2011/2013 provided limited information on predominantly piscivorous birds. The information instead focused on waders and waterfowl (winter and passage birds) associated with Severn Estuary SPA/Ramsar sites. The primary effects assessed in 2011/13 considered disturbance of waders and waterfowl on intertidal/mudflats and terrestrial habitat.
- 5.5.48 Gulls (black headed and herring, both piscivorous species) were considered in the original ES in relation to human disturbance (construction activities) but no assessment relating to prey availability was undertaken (at that time an AFD was intended to be fitted). It was also noted that there was (at the time) insufficient information available on the functional response in black-headed and herring gull to allow incorporation in the MORPH - a

trophic model of bird predator - prey dynamics, therefore detailed modelling was not undertaken.

Current Baseline

5.5.49 In order to consider the current distribution and density of predominantly piscivorous bird species within the study area, a review of available datasets has been undertaken to determine whether highly mobile species associated with local or more distant European sites are likely to occur within the study area. This has included the following sources:

- JNCC Seabird 2000 survey (Mitchell et al 2004) and subsequent census counts;
- DEFRA Project MB0126³² risk assessment of seabird bycatch in UK Waters (which includes predicted densities of key species on a 3km x 3km grid basis using a combination of boat and aerial survey data); and

- Predicted and observed foraging ranges for seabirds as detailed in Thaxter et al (2012)³³ and Woodward et al (2019)³⁴.

5.5.50 The distribution and foraging range data from the above three sources have been used to consider where breeding and wintering predominantly piscivorous birds (which are likely to be associated with European sites) occur and whether this includes the study area (and so potentially in the vicinity of the Project). For the purposes of this PEIR, this has focused on the marine and estuarine areas to the east of Hartland Point and Carmarthen Bay. The following species accounts provide an overview of the key predominantly piscivorous species with the potential to be in the vicinity of the Project.

Lesser black-backed gull

5.5.51 Lesser black-backed gull are listed under Criterion 6 of the Severn Estuary Ramsar site designation for the Severn Estuary as the site regularly supports 1 % of the individuals in a biogeographical breeding population.

³² Department for Environment, Food & Rural Affairs (2017) ArcGIS layers accompanying report Risk assessment of seabird bycatch in UK waters - MB0126. Available online at: <https://environment.data.gov.uk/dataset/db447840-e7ed-40d7-8cc9-e0c4f1ea6857> Accessed 17/11/2023.

³³ Thaxter, Chris & Lascelles, Ben & Sugar, Kate & Cook, Aonghais & Roos, Staffan & Bolton, Mark & Langston, R. & Burton, Niall. (2012). Seabird foraging ranges as a preliminary tool for

identifying candidate Marine Protected Areas. Biological Conservation. 156. 10.1016/j.biocon.2011.12.009.

³⁴ Woodward, I., Thaxter, C.B., Owen, E. & Cook, A.S.C.P. 2019. Desk-based revision of seabird foraging ranges used for HRA screening, Report of work carried out by the British Trust for Ornithology on behalf of NIRAS and The Crown Estate, ISBN 978-1-912642-12-0.

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5.5.52 A key location for lesser black-backed gull in the vicinity of the study area is Flat Holm, one of the species' largest breeding colonies in the UK. In the JNCC Seabird 2000 survey (Mitchell et al 2004³⁵) Flat Holm was recorded as supporting 3,309 nests, showing a significant increase in numbers between 1985-88 and 1998-2002. Flat Holm is located >18km from the Hinkley Point C site. However lesser black-backed gulls have been regularly recorded as part of the ongoing site surveys and utilise mudflat and estuarine habitats associated with the River Parrett, Steart Marshes and wider Bridgwater Bay area.

5.5.53 Lesser black-backed gull are a highly mobile species and have a mean maximum foraging range of 127 km – 141 km which could lead to birds associated with other European Sites (such as Skomer and Skokholm SPA) foraging within the inner Bristol Channel/Severn Estuary. However, the predicted density of this species is predicted to be relatively uniform and low with no obvious concentrations outside of the known breeding colony (and areas immediately adjacent).

Manx shearwater

5.5.54 Manx shearwater are highly mobile and can forage for extended periods during the breeding season over large distances. The mean maximum foraging range is >1,000 km. Birds from Skomer, Skokholm and the Seas off Pembrokeshire SPA, off the Pembrokeshire coast, feed primarily to the west of the UK with predicted densities highlighting large offshore areas to the west of Wales. Manx shearwater are rarely recorded in the inner Severn Estuary.

Gannet

5.5.55 Gannets are a designated feature of the Grassholm SPA, off the south-west coast of Wales, with 33,000 pairs in the breeding season making up 12.5 % of the breeding North Atlantic population (count as at 1994/5). This is the only gannet colony in Wales, although occasionally single pairs have set-up territories elsewhere without colonies becoming established. Changes in the size of the Grassholm gannetry have been documented since its foundation around 1820. In 2009, using high resolution digital images, 39,282 apparently-occupied sites³⁶ ('AOS') were recorded – making it the third largest

³⁵ Mitchell, P.I., Newton, S.F., Ratcliffe, N. & Dunn, T.E. 2004. Seabird Populations of Britain and Ireland, JNCC, Peterborough, ISBN 0 7136 6901 2.

³⁶ An apparently active site occupied by a bird, pair of birds, or with eggs or chicks present.

gannetry in the UK and Ireland. The most recent survey in 2015 counted 36,011 AOS.

- 5.5.56 Gannets are highly mobile and forage both near to their nesting sites but also further out to sea. Birds that are feeding young have been recorded searching for food up to 320 km from their nest, although there can be significant variation in this, up to double the distance; generally, foraging can be within less than 150 km. Birds from Grassholm have been GPS tagged and tracked foraging primarily north, north east, south and south west of Grassholm in 2012 with none of a sample of 43 tagged birds recorded within the inner Severn Estuary³⁷.

Atlantic puffin

- 5.5.57 Puffins are a highly mobile species, with a foraging range varying between colonies and seasonally, although the mean range is 61.3 km, with a mean maximum recorded foraging range of between 105.4 km and 137.1 km. Their prey is smaller schooling fish, particularly sandeels and they fish in inshore and offshore waters. There is some evidence to indicate a strong association with tidal fronts.
- 5.5.58 Primarily a marine species, the predicted distribution of Atlantic puffin during the breeding season is centred

around the breeding colony at Skomer, off the Pembrokeshire coast, therefore outside the study area. The study area lies approximately 150 km from Skomer Island well over 100 km from the colony suggesting that Puffins from the designated site would rarely use the area for foraging.

Guillemot

- 5.5.59 Guillemots are a highly mobile species with mean and mean maximum foraging ranges between 33.16-37.8 km and 73.2 and 84.2 km respectively.
- 5.5.60 The study area lies c. 150 km from Skomer Island (the nearest colony to the study area) suggesting that Guillemots would rarely enter the area, staying much closer to the colony on Skomer and foraging out in deeper waters.

Razorbill

- 5.5.61 Razorbills are considered a coastal species rather than pelagic, and birds tend to be concentrated within 10 km of the shore. Razorbill have mean and mean maximum foraging ranges between 23.7 km-61.3 km and 84.2 km 73.2 km respectively.

³⁷ RSPB (2013) Gannet tracking on Grassholm. [\[Online\]](#). Accessed 20 December 2023.

5.5.62 The study area lies c. 150 km from Skomer Island (the nearest breeding colony), suggesting that Razorbills would rarely enter the inner Severn Estuary, staying much closer to the colony on Skomer and remains concentrated within a 10 km – 40 km radius.

Black-legged kittiwake

5.5.63 There are an estimated 3,188 pairs of black-legged kittiwake nest sites in the wider Dyfed area and 1,204 nest sites in Devon (though this includes sites on the southern coast). The most recent census results from Skomer recorded 1,439 nest sites (2021).

5.5.64 Black-legged Kittiwakes have a mean maximum foraging range between 60 km and 156 km and are a primarily marine gull species which forage in the marine environment. Whilst observations during ornithological surveys show the species does occasionally occur within the Inner Bristol Channel and Severn Estuary during periods of poor weather, and therefore may occur within the study area the predicted distribution of black-legged kittiwake during the breeding season is highest immediately adjacent to breeding areas such as Skomer, Skokholm (off the Pembrokeshire coast) and the north Devon Coast.

Northern fulmar

5.5.65 Northern fulmars are a highly mobile seabird with mean maximum foraging ranges between 400 km and 542 km. Predicted densities for this species as presented in the DEFRA Project MB0126 show a low and uniform density of Fulmar within the inner Bristol Channel and Severn Estuary, with greater densities in waters to the west of the Welsh coast. As a primarily marine species, they are less common in the inner Bristol Channel and Severn Estuary.

5.5.66 There are Fulmar breeding colonies within the Bristol Channel, widespread along the Pembrokeshire and Ceridigion coast but the species does not occur in internationally or nationally important numbers at Skomer, Skokholm and the Seas off Pembrokeshire SPA.

Common scoter

5.5.67 Wintering common scoter in the UK typically gather in large flocks in shallow offshore areas, feeding in areas with sandy seabed where they can feed on small fish, sand eels, mussels, and bivalves. Their distribution within the Bristol Channel and inner Severn Estuary is largely constrained to Carmarthen Bay, however occasional small flocks or individual birds may occur in the wider area. Monitoring of shelduck and waterfowl associated with Hinkley Point C has recorded very small numbers of

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Common Scoter within the study area, however these are not regular or common sightings.

Other species and locations

5.5.68 Other piscivorous species include breeding species such as sandwich tern, common tern, little tern, and Mediterranean gull. European sites for these species are located along the southern coast of England and the north Wales coast. These species are more range restricted during the breeding period with mean maximum distances of <34 km. Therefore, it is not anticipated that these species would occur in significant numbers in within the inner Bristol Channel and Severn Estuary.

5.5.69 Wintering species, such as red-throated diver, which are associated with the Northern Cardigan Bay SPA behave in a similar manner to common scoter, gathering in localised locations. Small numbers of red-throated diver (and other diver species) do occur within the Severn Estuary / Inner Bristol Channel, however these are typically individual and transient individuals.

Future Baseline

5.5.70 Given the temporal proximity between the current baseline (as described immediately above) and the future baseline (defined in **paragraph 5.5.4** above), it is not

considered that there will be any substantial changes between the current and future baselines. Therefore, the current baseline description represents a reasonable future baseline for the start of operation. This is due to substantial changes to the baseline (for example, through climate change), not being anticipated by the start of operations.

5.5.71 On a longer-term basis, across the life-cycle of the Project, the distribution of marine birds will be affected by a range of factors, including increasing sea temperatures and inter-annual variability of both their own numbers and that of prey resources. Changes in seawater temperature may result in: shifts in species' geographic ranges; reduction / movement of suitable habitats; changes in dietary composition; and increased disease prevalence.

Marine mammals

Original baseline

5.5.72 Eighteen species of cetacean have been recorded in the Severn Estuary and Bristol Channel since 1990. Of these, the following five species have either been noted as being present at any time of the year, or recorded annually as seasonal visitors within the Bristol Channel

(Reid *et al*, 2003³⁸; Baines and Evans, 2012³⁹): harbour porpoise (*Phocoena phocoena*), Risso's dolphin (*Grampus griseus*), common dolphin (*Delphinus delphis*), bottlenose dolphin (*Tursiops truncatus*) and minke whale (*Balaenoptera acutorastrata*)^{4,5}. Occasional sightings and strandings of other cetaceans such as the long-finned pilot whale (*Globicephala melas*), fin whale (*Balaenoptera physalus*) and killer whale (*Orcinus orca*) have been recorded.

- 5.5.73 A desk-study review of available data on marine mammals within the Severn Estuary and Bristol Channel was conducted to inform the original ES (see **Table 1-2 of Volume 1 Chapter 1**). Following the publication of guidance from the Joint Nature Conservation Committee ('JNCC')⁴⁰, a network of acoustic sensors was also deployed offshore.
- 5.5.74 A study of the Welsh shore of the Bristol Channel (around the Gower Peninsula and Swansea Bay) during the early 2000s documented regular occurrences of the harbour

porpoise (*Phocoena phocoena*), as well as occasional sightings of the common dolphin (*Delphinus delphis*)⁴¹.

- 5.5.75 Aside from this study, there was little available information regarding cetacean activity in the areas of the Inner Bristol Channel and Severn Estuary, although common dolphin, bottlenose (*Tursiops truncatus*) and Risso's dolphins (*Grampus griseus*), as well as grey seals (*Halichoerus grypus*) had been recorded in the wider Bristol Channel area in the past⁴².
- 5.5.76 The BEEMS programme initiated an acoustic monitoring programme to assess cetacean usage in relation to potential Hinkley Point C construction impacts with recording devices deployed at two locations around the proposed temporary jetty and the cooling water intake and outfall structures, and a further three locations on a depth transect from the front of the station around 25 km westwards into the Bristol Channel. These record cetacean 'clicks' (the vocalisations used as a means of navigation and prey location). The devices were placed in situ in early 2011.

³⁸ Reid, J.B., Evans, P.G.H. & Northridge, S.P. 2003. Atlas of Cetacean distribution in north-west European waters, JNCC, Peterborough, ISBN 1 86107 550 2.

³⁹ Baines, Mick & Evans, Peter. (2012). Atlas of the Marine Mammals of Wales. 10.13140/RG.2.1.5141.6802.

⁴⁰ Joint Nature Conservation Committee. Statutory nature conservation agency protocol for minimising the risk of disturbance and injury to marine mammals from piling noise, 2000.

⁴¹ Watkins, H. and R. Colley. Harbour porpoise, *Phocoena phocoena* occurrence: Carmarthen Bay - Gower Peninsula - Swansea Bay. CCW Species Challenge Fund Report, Gower Marine Mammals Project: 98,2004.

⁴² DECC / Severn Tidal Power. SEA Environmental Report. Parsons Brinkerhoff Ltd and Black and Veach Ltd for DECC. May 2010.

- 5.5.77 As a result of this harbour porpoise were located at each of the five locations and initial inspection of data on dolphin clicks suggests that they were also present in the area.
- 5.5.78 The harbour porpoise is the most common recorded cetacean in the Bristol Channel. A resident population of harbour porpoise is present in the central and outer Bristol Channel using the area around Carmarthen Bay and around the Gower Peninsula in Swansea Bay, Wales. The area has been designated as the Bristol Channel Approaches SAC for harbour porpoise as a qualifying feature. Individuals are also known to enter the estuaries that communicate with the Bristol Channel (e.g. the Parrett) on isolated rare occasions.
- 5.5.79 Although, as described above, the bottlenose dolphin is present in the Inner Bristol Channel it is generally considered an infrequent visitor⁴³.
- 5.5.80 Grey seals (*Halichoerus grypus*) have been regularly observed in the Outer and Central Bristol Channel, although usually in small numbers. Grey seal sightings have been widespread in previous years in the Bristol

Channel, with no evidence of clustering at any particular location. In general, grey seal sightings in the Severn Estuary are infrequent compared to areas within the Bristol Channel and there are no recorded haul out sites. Around Britain and Ireland, harbour seals (*Phoca vitulina*) haul out on tidally exposed areas of rock, sandbanks, or mud.⁴⁴ Between 2014 and 2016, no harbour seals were recorded at haul-out sites in south-west England and only five were recorded in Wales. Occasional vagrants have been observed in the wider area over the last decade, but there is no evidence of significant resident populations.

Current baseline

- 5.5.81 Since the original ES was completed (see **Table 1-2 of Volume 1 Chapter 1**), a range of further surveys and studies have been undertaken into the marine mammal populations of the Severn Estuary and Inner Bristol Channel, including by the Somerset Sea Watch Surveys, which were completed between 2014 and 2018 at different locations along the Somerset coast⁴⁵. These surveys recorded bottlenose dolphin, common dolphin (*Tursiops truncatus*), harbour porpoise, and grey seal.

⁴³ Atlantic Array Offshore Wind Farm Draft Environmental Statement Volume 3: Annex 9.1: Marine Mammals. Channel Energy Limited, 2012.

⁴⁴ Offshore Energy SEA (2009), Chapter A3a.7 Marine and other Mammals [\[Online\]](#). Accessed 20 December 2023.

⁴⁵ The Wildlife Trust Somerset (2020) Somerset Sea Watching. [\[Online\]](#). Accessed 20 December 2023.

- 5.5.82 Cardigan Bay Special Area of Conservation ('SAC'), approximately 43 km from the Project, is one of the two main recognised bottlenose dolphin populations in Britain. A summer mark-recapture estimated a range of 152–342 individuals, with the latest estimate (2015) being 222 individuals (95 % Confidence Interval (CI): 184–300 individuals).⁴⁶
- 5.5.83 For common dolphin, only casual sightings have been recorded, with a range of sighting densities of 0.1-0.49 animals/km during the summer and autumn seasons.
- 5.5.84 As noted above, harbour porpoise is still the most commonly recorded cetacean in the Bristol Channel, and within UK waters as a whole⁴⁷. As a qualifying feature of Bristol Channel Approaches SAC, which is the closest European site to the development with harbour porpoise as a qualifying feature, marine monitoring programmes are carried out, with the last results from year 2016, with an estimated density ranging between 0-0,25 animals per km² for the Bristol Channel area⁴⁸.
- 5.5.85 Other cetacean species found within the Bristol Channel, but infrequently recorded due to their preference for deep offshore waters include Risso's dolphin, long-finned Pilot Whale (*Globicephala melas*) and fin whale (*Balaenoptera physalus*).
- 5.5.86 Of the two most common seal species in UK waters, the grey seal is still the most frequently observed within the vicinity of the Project. The closest European site to the development (102 km) is Lundy SAC, with a permanent Grey seal population of 70 individuals⁴⁹. The species is most seen during Spring and Summer season. According to the Pembrokeshire Marine SAC (120 km distance from the development) condition assessment, the grey seal population is in favourable condition, as the pupping sites have been maintained for over a decade⁵⁰.
- Future baseline**
- 5.5.87 Given the temporal proximity between the current baseline and the future baseline (defined in

⁴⁶ Evans, P.G.H. and Waggitt, J.J. (2023). Modelled Distribution and Abundance of Cetaceans and Seabirds in Wales and Surrounding Waters. NRW Evidence Report, Report No: 646, 354 pp. Natural Resources Wales, Bangor.

⁴⁷ Jenkins, R.E., Brown, R.D.H., Phillips, M.R. (2009) Harbour porpoise (*Phocoena phocoena*) conservation management: A dimensional approach. [Online]. Accessed 20 December 2023.

⁴⁸ Lacey, C. et al. (2022) Modelled density surfaces of cetaceans in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys. [Online]. Accessed 20 December 2023.

⁴⁹ Joint Nature Conservation Committee (JNCC) (2015) Lundy, Special Area of Conservation. [Online]. Accessed 20 December 2023.

⁵⁰ Natural Resources Wales, (2018). Pembrokeshire Marine / Sir Benfro Forol Special Area of Conservation: Indicative site level feature condition assessments 2018. NRW Evidence Report Series, Report No: 233, 67pp, NRW, Bangor.

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paragraph 5.5.4 above), it is not considered there will be any substantial changes between the current and future baselines. Therefore, the current baseline description represents a reasonable future baseline for the start of operations. This is due to long-term changes in the baseline (for example through climate change) not being anticipated by the start of operations and differences in the baseline in any given year would be subject to interannual variability rather than longer term trends.

5.5.88 On a longer-term basis, across the life-cycle of the Project, and as previously noted, mean sea temperatures around the UK and Ireland have been warming at between 0.2 and 0.6 °C per decade over the past 30 years. Projected future changes in the sea temperature around the British Isles will continue to have effects on the distribution and breeding status of marine mammals.

5.5.89 As part of the Marine Climate Change Impacts Partnership ('MCCIP') 'rolling evidence' programme, an updated review of the current and future impacts of climate change on UK marine mammals has recently

been published⁵¹. The review states that the main impacts of climate change on marine mammals are:

- geographic range shifts;
- reduction in suitable habitats;
- food web alterations; and
- increased prevalence of disease.

5.5.90 The proportion of recorded strandings of warm water adapted species e.g. common dolphin and striped dolphin (*Stenella coeruleoalba*) has increased over time, while that of cold water adapted species such as Atlantic white-sided (*Lagenorhynchus acutus*) and white-beaked dolphins (*L. albirostris*) has decreased in these same northern regions.

5.5.91 The semi-resident bottlenose dolphin population previously observed on the southern coasts of Devon and Cornwall may now be extending throughout the English Channel, with sightings recorded from the Bristol Channel and as far east as Sussex (Duncan, 2021)⁵².

5.5.92 However, because the southern UK is already within the established range of warmer water species, a northward

⁵¹ Martin, E., Banga, R. and Taylor, N.L. (2023). Climate change impacts on marine mammals around the UK and Ireland. MCCIP Science Review 2023, 22pp. [\[Online\]](#). Accessed 20 December 2023.

⁵² Duncan, S. (2021) Is conservation management fit for purpose: a case study using a small coastal resident bottlenose dolphin (*Tursiops truncatus*) population. MSc Thesis, University of Plymouth

shift in range may not be reflected in a change to the distribution of populations of some species in the Bristol Channel.

5.5.93 These observed shifts in marine mammal distribution are considered to represent a functional response to distribution shifts in their cold-blooded prey which are more sensitive to environmental changes such as increased sea surface temperatures and decreased salinity. This may affect, for example, harbour porpoise that rely heavily on sandeels for prey. The key timings in the sandeel lifecycle are linked to the seasonal cycle of copepod production which in turn rely on phytoplankton blooms. With the timing of peaks in copepod abundance shifting, sandeel lifecycles no longer correlate as effectively and recruitment has subsequently declined (van Deurs et al., 2009)⁵³. Ultimately, changes to marine mammal distributions and behaviours may occur if they are required to switch prey or foraging strategies.

5.5.94 However, JNCC has highlighted the wide range of anthropogenic pressures acting on marine mammals and the difficulty determining causal relationships. They conclude that:

“More long-term species monitoring, and a better understanding of cumulative impacts and bottom-up effects are needed to improve confidence in the impacts of climate change on marine mammals and what could happen in the future”.

Designated sites

5.5.95 Consideration of the following relevant marine designated sites is provided within this pre-application consultation and further consideration of them will also be provided in supporting assessments to the ES:

- Special Areas of Conservation ('SAC'), Special Protection Areas ('SPA'), Ramsar Sites: Full consideration of these sites is presented within the HRA Report. It is noted that SSSIs do not exist in the marine environment, and are therefore not considered within this interim assessment.
- Waterbodies designated under the Water Framework Directive ('WFD'): WFD waterbodies will be considered within the WFD Compliance Assessment, to be submitted with the proposed material change application.

⁵³ van Deurs, M., van Hal, R., Tomczak, M.T., Jónasdóttir, S.H. and Dolmer, P. (2009) Recruitment of lesser sandeel *Ammodytes marinus* in relation to density dependence and zooplankton composition. Marine Ecology Progress Series, 381, 249-258.

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- Marine Conservation Zones ('MCZ'): A dedicated MCZ assessment will be undertaken as part of any Marine Licence processes undertaken for the Project.

5.5.96 A summary of the key designated sites in the immediate proximity to the Project is provided here. An overview of potential effects on the sites in the first bullet point above is also included within the HRA Report, as described above.

European Sites

5.5.97 For the purposes of this interim assessment, the focus has been on those designated sites in the closest proximity to the Project including those considered relevant to the proposed compensatory measures package. These sites have also been a focus of the HRA Report.

Severn Estuary SAC

5.5.98 The Severn Estuary SAC covers an area of approximately 73,715 ha, extending along the River Severn up to Frampton on Severn and covers the estuary out into Bridgwater Bay. The tidal range in the Severn Estuary is one of the highest in the world and the scouring of the seabed and strong tidal streams result in natural erosion of the habitats and the presence of high sediment

loads. Two thirds of the site is composed of subtidal habitats and one third of intertidal habitats.

5.5.99 The qualifying features of the Severn Estuary SAC are:

- Estuaries;
- Mudflats and sandflats not covered by seawater at low tide;
- Atlantic salt meadows (*Glauco-Puccinellietalia maritima*);
- Sandbanks which are slightly covered by sea water all the time;
- Reefs;
- Sea lamprey;
- River lamprey; and
- Twaite shad.

Severn Estuary SPA

5.5.100 The Severn Estuary SPA covers an area 24,487.91 ha and includes areas of the intertidal in a zone along the south coast of the mid estuary and the entirety of the upper Severn estuary where extensive mud flats are exposed at low tide. The SPA also includes terrestrial land along the coast (above mean high water), much of which is agricultural but has a function in supporting the birds that are the qualifying interest features of the site.

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5.5.101 The qualifying features of the Severn Estuary SPA are:

- Bewick's swan (*Cygnus columbianus bewickii*) (non-breeding);
- Greater white-fronted goose (*Anser albifrons albifrons*) (non-breeding);
- Dunlin (*Calidris alpina alpina*) (non-breeding);
- Common Redshank (*Tringa tetanus*) (non-breeding);
- Common Shelduck (*Tadorna tadorna*) (non-breeding);
- Gadwall (*Anas strepera*) (non-breeding); and
- Waterbird assemblage.

Severn Estuary Ramsar Site

5.5.102 The Severn Estuary Ramsar site covers an area of 16,492 ha wetland. There is substantial overlap between the qualifying features of the Severn Estuary SAC and the Ramsar site even though the area of the estuarine ecosystem designated as Ramsar site is smaller than that of the Severn Estuary SAC as the Ramsar site is restricted to the terrestrial and intertidal area and excludes all subtidal areas.

5.5.103 The Severn Estuary Ramsar Site is designated due to the following criteria:

- Criterion 1: immense tidal range (second-largest in the world);
- Criterion 3: unusual estuarine communities (i.e. reduced diversity);
- Criterion 4: migratory fish assemblage (consisting of Salmon (*Salmo salar*), sea trout (*S. trutta*), sea lamprey (*Petromyzon marinus*), river lamprey (*Lampetra fluviatilis*), Allis shad (*Alosa alosa*), twaite shad (*A. fallax*) and European eel (*Anguilla etanus*));
- Criterion 5: a wintering waterfowl assemblages of international importance with peak counts in winter of 70,919 waterfowl;
- Criterion 6: regularly supports more than 1 % of the individuals in a population of Bewick's swan (*Cygnus columbianus*), European white-fronted goose (*etanus albifrons albifrons*), dunlin (*Calidris alpina alpina*), redshank (*Tringa etanus tetanus*), shelduck (*Tadorna tadorna*) and gadwall (*Anas strepera strepera*), as well as ringed plover (*Charadrius hiaticula*), teal (*Anas crecca*), pintail (*Anas acuta*) and lesser black-backed gull (*Larus fuscus*); and
- Criterion 8: wetland habitat is an important source of food and nursery ground for fish species, such as allis shad (*A. alosa*) and twaite shad (*A. fallax*).

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River Usk SAC

5.5.104 The River Usk SAC in south Wales protects a medium-sized catchment (the SAC covering 967.97 ha), important for its populations of a number of migratory fish species due to the good quality habitat present within the river. Flowing through the city of Newport and exiting into the Severn Estuary, the Usk flows over predominantly Devonian Old Red Sandstone, resulting in waters that are generally well buffered against acidity. The geology also results in a generally low to moderate nutrient status.

5.5.105 The qualifying features of the River Usk SAC are:

- Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation;
- Sea lamprey;
- Brook lamprey;
- River lamprey;
- Twaite shad;
- Atlantic salmon;
- Bullhead;
- Otter; and
- Allis shad.

River Wye SAC

5.5.106 The River Wye, on the English-Welsh border, is noted for populations of migratory fish. It has relatively good water quality, adequate flows through a largely unobstructed main channel, and a wide range of aquatic habitats to support the fish populations it contains.

5.5.107 The qualifying features of the River Wye SAC are:

- Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation;
- Transition mires and quaking bogs;
- White-clawed (or Atlantic stream) crayfish;
- Sea lamprey;
- Brook lamprey;
- River lamprey;
- Twaite shad;
- Atlantic salmon;
- Bullhead;
- Otter; and
- Allis shad.

River Towy SAC

5.5.108 The River Towy SAC is designated primarily for its large spawning population of twaite shad, and for being one of the best rivers in Wales for otter. The twaite shad population of the River Towy is considered to be self-sustaining, with spawning sites occurring throughout the lower reaches of the river. Both water quality and quantity are considered adequate to maintain the population, with the only potential obstruction to migratory routes along the river being the weir at Manorafon, which may form an obstacle during low flow conditions.

5.5.109 The qualifying features of the River Towy SAC are:

- Twaite shad;
- Otter;
- Sea lamprey;
- Brook lamprey;
- River lamprey;
- Allis shad; and
- Bullhead.

WFD Waterbodies

Parrett WFD Waterbody: GB540805210900

5.5.110 The Parrett WFD Waterbody covers a total area of 7,084 ha, and is classed as a 'heavily modified' waterbody. With an ecological status of 'Moderate' and a chemical status of 'Fail', the waterbody has an overall status of 'Moderate' with a target status of 'Good' by 2027. Higher sensitivity habitats within the waterbody include polychaete reef and saltmarsh, as well as the following lower sensitivity habitats: cobbles, gravels and shingle; intertidal soft sediment; rocky shore; and subtidal soft sediments.

Huntspill WFD Waterbody: GB108052021210

5.5.111 With a catchment area of 3,038 ha, the Huntspill WFD waterbody has an overall classification of 'Moderate' ecological status, as at 2022 (no data is currently available for 2023). In 2019, it reported a 'Fail' overall chemical status (an assessment of this was not required in 2022). The waterbody is upstream of the Parrett waterbody.

Marine Conservation Zones

Bideford to Foreland Point MCZ

5.5.112 The Bideford to Foreland Point MCZ is located off the coast of north Devon, covering an area of 104 km². The

[edfenergy.com](https://www.edfenergy.com)

site includes a range of habitats, including intertidal sandy beaches, and subtidal rocky habitats. The general management approach for all features, as listed below, is to maintain them in favourable condition, with the exception of subtidal sand, and spiny lobster, the approaches for which is to recover to favourable condition.

5.5.113 The protected features of the Bideford to Foreland Point MCZ are:

- Low energy intertidal rock;
- Moderate energy intertidal rock;
- High energy intertidal rock;
- Intertidal coarse sediment;
- Intertidal mixed sediments;
- Intertidal sand and muddy sand;
- Intertidal underboulder communities;
- Littoral chalk communities;
- Low energy infralittoral rock;
- Moderate energy infralittoral rock;
- High energy infralittoral rock;
- Moderate energy circalittoral rock;
- High energy circalittoral rock;

- Subtidal coarse sediment;
- Subtidal mixed sediments;
- Subtidal sand;
- Fragile sponge & anthozoan communities on subtidal rocky habitats;
- Honeycomb worm (*Sabellaria alveolata*) reefs;
- Pink sea-fan (*Eunicella verrucosa*); and
- Spiny lobster (*Palinurus elephas*).

Morte Platform MCZ

5.5.114 Morte Platform MCZ is an inshore site in the Western Channel and Celtic Sea region, approximately 5 km off the north Devon coast, and covering approximately 25 km². The general management approach for all features is to recover the features to a favourable condition.

5.5.115 The protected features of the Morte Platform MCZ are:

- High energy circalittoral rock;
- Moderate energy circalittoral rock; and
- Subtidal coarse sediment.

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5.6 Assessment Methodology

Selection of key taxa for Hinkley Point C impingement assessment

5.6.1 For the purposes of this PEIR, a total of 25 fish species (plus brown shrimp) were identified for detailed impingement analysis, with the findings of this to feed into the subsequent impact assessment, using criteria focusing on socio-economic value, conservation importance, and ecological importance. This list is shown in **Table 5-3**. These species, including those afforded specific protection within relevant designated sites (see above), and those considered representative of the wider fish community within the Severn Estuary, will be considered within the EIA, and findings reported in the ES. The basis of this selection is as follows:

- Ecological importance: Abundant species that may play an important trophic role within the ecosystem. Species selected on the basis of their ecological importance contribute to the top 95 % of numbers impinged during impingement monitoring.
- Conservation importance: Impinged species included within the list of "Section 41 Priority Species" of the Natural Environment and Rural Communities ('NERC') Act 2006 are considered further. Species include: Allis shad, twaite shad, European eel,

Atlantic herring, Atlantic cod, whiting, blue whiting, European plaice, Dover sole, Atlantic salmon, sea trout, river lamprey and sea lamprey.

- Socio-economic importance / value: Species of commercial value landed in the area off Hinkley Point that were abundant in impingement sampling were included. European sea bass and thornback ray were also added post-granting of the original DCO due to the locally important recreational fisheries for both species and the recent international decline in the European sea bass population.

5.6.2 This list of 25 fish plus brown shrimp is considered representative of the Severn Estuary fish community susceptible to entrapment at Hinkley Point, based on the following:

- The 25 fish species represent 99.0 % and 98.8 % of the total numbers of fish impinged and recorded during CIMP1 and CIMP2, respectively.
- The 25 fish species represent 99.7 % and 98.3 % of impingement biomass in CIMP1 and CIMP2, respectively.
- All of the conservation species designated as Annex II qualifying features and Ramsar Criterion 4 migratory species are included, as are the commonly impinged species relevant to Section 41 of the NERC Act 2006.

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- The list contains examples from all functional marine/estuarine guilds (freshwater species are not included, which, as would be expected, are rarely impinged at Hinkley Point B).
- The list includes examples from all feeding guilds and habitat groups.
- The list contains all the indicator species impinged at Hinkley Point that are assessed in the WFD “fish” biological quality element in transitional waters.

5.6.3 Two additional species, conger eel and lesser spotted dogfish, were selected as being of potential ecological importance based on their contribution to the impinged biomass. While neither species is numerically abundant in the CIMP datasets, conger eel was ranked fourth and first by weight in CIMP1 and CIMP2, respectively, while lesser spotted dogfish ranked ninth in both datasets.

Table 5-3: Species that will be assessed in the proposed DCO material change application, and their reason for selection. For the functional guilds: MS = Marine seasonal; MJ = Marine juvenile; CA = Diadromous; ER = Estuarine resident; MA = Marine adventitious. For the feeding guilds: Z = Zooplankton feeding; P = Piscivorous feeding; B = Benthic invertebrate feeding; D = Detritus feeding.

Species	Scientific name	Ecological	Conservation	Socio-economic	Functional guild	Feeding guild
Sprat	<i>Sprattus sprattus</i>	Top 95% in CIMP1 & 2			MS	Z
Whiting	<i>Merlangius merlangus</i>	Top 95% in CIMP1 & 2	CIMP1 & 2		MJ	P
Dover sole	<i>Solea solea</i>	Top 95% in CIMP1 & 2	CIMP1 & 2	CIMP1 & 2	MJ	B
Atlantic cod	<i>Gadus morhua</i>	>1% in CIMP1	CIMP1 & 2	CIMP1 & 2	MJ	P
Thin-lipped grey mullet	<i>Chelon ramada</i>	Top 95% in CIMP1 & 2			CA	D
European flounder	<i>Platichthys flesus</i>	>1% in CIMP1 & 2			ER	B
Five-bearded rockling	<i>Ciliata mustela</i>	Top 95% in CIMP1 & 2			MS	B
Atlantic herring	<i>Clupea harengus</i>	Top 95% in CIMP1 & 2	CIMP1 & 2		MJ	Z
Sand goby	<i>Pomatoschistus spp.</i>	Top 95% in CIMP1 & 2			ER	B
Poor cod	<i>Trisopterus minutus</i>	>1% in CIMP2			MA	B
Common sea snail	<i>Liparis liparis</i>	>1% in CIMP2			ER	B
Bib (pout)	<i>Trisopterus luscus</i>	>1% in CIMP2			MJ	B
European sea bass	<i>Dicentrarchus labrax</i>	Top 95% in CIMP1 & 2		CIMP1 & 2	MJ	P
European plaice	<i>Pleuronectes platessa</i>		CIMP1 & 2		MJ	B
Thornback ray	<i>Raja clavata</i>		CIMP1 & 2	CIMP1 & 2	MA	B
Twaite shad	<i>Alosa fallax</i>		CIMP1 & 2		CA	Z
European eel	<i>Anquilla anquilla</i>		CIMP1 & 2		CA	P
Blue whiting	<i>Micromesistius poutassou</i>		CIMP1 & 2		NA	NA
Sea lamprey	<i>Petromyzon marinus</i>		CIMP1		CA	P
River lamprey	<i>Lampetra fluviatalis</i>		CIMP1		CA	P
Allis shad	<i>Alosa alosa</i>		CIMP1		CA	Z

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Species	Scientific name	Ecological	Conservation	Socio-economic	Functional guild	Feeding guild
Atlantic salmon	<i>Salmo salar</i>		RIMP data set		CA	P
Sea trout	<i>Salmo trutta</i>		RIMP data set only		CA	P
Conger eel	<i>Conger conger</i>	Ranked 4th & 1st for biomass in CIMP1 & 2, respectively			MA	P
Lesser spotted dogfish	<i>Scyliorhinus canicula</i>	Ranked 9th for biomass in CIMP1 and CIMP2.			MA	P
Brown shrimp	<i>Crangon crangon</i>	CIMP1 & 2: most commonly impinged invertebrate (along with ghost shrimp <i>Pasiphaea sivado</i> in CIMP2.			-	-

5.7 General EIA Approach

- 5.7.1 The evaluation of significance has been carried out in line with the methodology described within **Volume 1 Chapter 4**.
- 5.7.2 As with the original EIA and original ES (see **Table 1-2 of Volume 1 Chapter 1**), the effect assessment has been based on a clear approach to the assessment of significance, and in particular, the potential significance of predicted effects has been determined by reference to relevant criteria for the Aspects being considered. The

significance of any effect is determined with reference to the magnitude of the potential impact, the value and/or sensitivity of the receptor, the likelihood of the impact occurring, its duration, and the extent to which it is reversible. Where appropriate, for example where there is uncertainty regarding particular values for any criteria, professional judgement has been applied. This draws upon the wider context of potential effects, additional literature, and other relevant examples of similar effects and/or impact assessments.

- 5.7.3 In order to provide a consistent and comparable approach to that applied for the original EIA and original ES, the

same terminology / criteria have been adopted, and have been assessed against an Impact Assessment Matrix, as presented in **Table 5-6**. As described above, the evidence base to inform the determination of magnitude and sensitivity has evolved since the original assessment; therefore, this interim assessment is further augmented by the analysis of recently collected data at Hinkley Point B.

Magnitude

5.7.4 The magnitude of a potential impact refers to the extent of change, defined in terms of the area affected, the duration, the likelihood of occurrence and reversibility. **Table 5-4** outlines the standard definitions in terms of magnitude of impact in relation to marine ecology and water quality.

Table 5-4: Criteria for determining magnitude of impacts for marine ecology and marine water quality

Magnitude of impact	Criteria
High	<p>The quality and availability of habitats, species or waterbodies are degraded to the extent that locally rare populations and habitats are destroyed, and protected species and habitats experience widespread change, such that the integrity of the ecosystem and the conservation status of a designation may be compromised.</p> <p>Activities predicted to occur and affect receptors continuously over the long-term, and during sensitive life stages. Recovery, if it occurs, would be expected to be long-term, i.e. over ten years following the cessation of activity.</p> <p>Impacts not limited to areas within and adjacent to the development.</p>
Medium	<p>The quality and availability of habitats, species or waterbodies are degraded to the extent that the population or habitat experiences reduction in number or range.</p> <p>Activities predicted to occur and affect receptors regularly and intermittently, over the medium to short-term, and during sensitive life stages. Recovery expected to be medium-term timescales, i.e. five to ten years following cessation of activity.</p> <p>Impacts largely limited to the areas within and adjacent to the development.</p>
Low	<p>The quality and availability of habitats, species or waterbodies experience some limited degradation. Disturbance to population size and occupied area within the range of natural variability.</p>

Magnitude of impact	Criteria
	Activities predicted to occur intermittently and irregularly over the medium to short-term. Recovery expected to be short-term, i.e., one to five years following cessation of activity. Impacts limited to the area within the development.
Very low	Although there may be some impacts on individuals, it is considered that the quality and availability of habitats, species or waterbodies would experience little or no degradation. Any disturbance would be in the range of natural variability. Activities predicted to occur occasionally and for a short period. Recovery expected to be relatively rapid, i.e., less than approximately one year following cessation of activity. Impacts limited to the area within the development.

Value and sensitivity of receptor

5.7.5 The value of a receptor is determined based on geographical context and nature designations, for example, the conservation or commercial status of a fish species potentially affected by changes to the project design, and the conservation status of those species which might be indirectly affected. **Table 5-5** presents the criteria to be used.

Table 5-5: Criteria for determining receptor value and sensitivity for marine ecology and marine water quality

Sensitivity of receptor	Criteria
High	<i>Value</i> Feature/receptor possesses key characteristics which contribute considerably to the distinctiveness, rarity, and character of the site/receptor, e.g., designated features of international / national designation / importance, such as SAC, Site of Special Scientific Interest ('SSSI'), Ramsar and/or Special Protection Area ('SPA'). Feature/receptor possesses important biodiversity, social/community value and/or economic value. Feature/receptor is rarely sighted. <i>Sensitivity</i> Receptor populations are identified as having very low capacity to adapt to, or recover from, proposed form of change, i.e., population is highly sensitive to change.
Medium	<i>Value</i> Feature/receptor possesses key characteristics which contribute considerably to the distinctiveness, rarity and character of the site/receptor, e.g., designated features of regional / county designation / importance, e.g. within a Biodiversity Action Plan, or a feature of a Nature Reserve. Feature/receptor possesses moderate biodiversity, social/community value and/or economic value. Feature/receptor is occasionally sighted.

Sensitivity of receptor	Criteria
	<p><i>Sensitivity</i></p> <p>Receptor is identified as having low capacity to accommodate proposed form of change, i.e., is moderately sensitive.</p>
Low	<p><i>Value</i></p> <p>Feature/receptor only possesses characteristics which are of district or local importance. Feature/receptor not designated or only designated at the district or local level, e.g., Local Nature Reserve ('LNR').</p> <p>Feature/receptor possesses some biodiversity, social/community value or economic value.</p> <p>Feature/receptor is relatively common.</p> <p><i>Sensitivity</i></p> <p>Feature/receptor is identified as having tolerance to changes within the range of natural variation, i.e. is only slightly sensitive.</p>
Very low	<p><i>Value</i></p> <p>Feature/receptor characteristics do not make a contribution to the character or distinctiveness locally. Feature/receptor not designated.</p> <p>Feature/receptor possesses low biodiversity, social/community value and/or economic value.</p> <p>Feature/receptor is abundant.</p> <p><i>Sensitivity</i></p> <p>Feature/receptor identified as being generally tolerant of the proposed change, i.e., of low sensitivity.</p>

Significance

- 5.7.6 The significance of any potential effect is judged on the relationship between the magnitude of impact and the assessed value/sensitivity of the receptor.
- 5.7.7 A significance matrix is often used to guide the determination of whether an effect is considered to be significant or not (see **Table 5-6**). Effects that fall within the moderate or major ratings are usually considered to be significant. Where professional judgement is used in the assessments presented in this PEIR, and subsequently in the ES, the criteria and/or reasoning which supports that professional judgement will be clearly explained, in line with the Scoping Opinion (ID 3.1.3).

Table 5-6: Significance Matrix

Magnitude	Value and sensitivity of receptor			
	Very low	Low	Medium	High
Very low	Negligible	Negligible	Minor	Minor
Low	Negligible	Minor	Minor	Moderate
Medium	Minor	Minor	Moderate	Major
High	Minor	Moderate	Major	Major

5.8 Fish Entrapment Assessment Methodology

- 5.8.1 The methodology for the entrapment (meaning impingement and entrainment) assessment is summarised below. Further details are provided in the HRA Report. An updated HRA Report, further supported by detailed technical reports, will be provided to support the proposed DCO material change application.
- 5.8.2 Impingement represents the primary impact pathway for most of the fish species and life-history stages present at Hinkley Point. Smaller life history stages (such as eggs, larvae, juveniles, and for some small-bodied species, adult fish) may be entrained. Collectively, these impacts are known as entrapment. Impingement assessments are based on data collected from sampling conducted at Hinkley Point B. Data from the sampling programme, collectively known as the CIMP, has been used to predict the unmitigated numbers of individuals that would be impinged by Hinkley Point B.
- 5.8.3 To estimate mitigated impingement by Hinkley Point C (in the absence of an AFD), factors have first been applied to raise the estimated unmitigated numbers impinged at Hinkley Point B to predicted unmitigated numbers impinged by Hinkley Point C. Additional factors have been applied to account for the embedded Hinkley Point C

mitigations, namely the capped head intake design and the FRR system. Predicted losses are assessed in two ways, firstly population level effects convert losses of predominantly juvenile fish into equivalent adults that can be contextualised relative to the adult population estimate. In addition, for the typical fish species assemblage of the Estuaries qualifying habitat feature of the Severn Estuary SAC, direct numerical/biomass losses of fish from the typical fish species assemblage and their feeding/functional roles are considered as part of the assemblage assessment. The following text in this Section explains the first “population level effect” methodology. At the end of the fish methodology description, the approach to the additional methodology for the typical fish species assemblage of the Severn Estuary is briefly explained.

Assessment of Fish Population Level Effects

- 5.8.4 To determine population level effects for individual species, factors have been developed in consultation with the Environment Agency to convert the numbers of the predominantly juvenile impinged fish to equivalent adults allowing losses to be contextualised relative to the adult population. Where relevant, the numbers of adults that are predicted to be impinged by Hinkley Point C have been converted to a biomass of impinged adults. The steps are further summarised in **Figure 5-1**. The methodology adopted to assess the population level effect is the same as that used by the Environment Agency in their

Appropriate Assessment and favoured by the Planning Inspector at the WDA Permit inquiry. More specifically, the methods used by the Environment Agency to convert predominantly juvenile fish into equivalent adults, and the scale of the spawning population against which equivalent adult losses are contextualised have been replicated here.

5.8.5 Entrainment assessments are based on data from ichthyoplankton surveys and, for European eel, on data from dedicated glass eel surveys. As with predictions of impingement, the number of larvae and juveniles that would be entrained or that will be impinged on a 5 mm mesh by Hinkley Point C has been converted to an equivalent number and biomass of lost adults.

5.8.6 The number of adults lost by impingement and entrainment has been summed to give the predicted entrapment losses, either by number or by weight.

5.8.7 Two different methods have been used to assess the entrapment effects of Hinkley Point C (without the AFD), based on whether there are population data available for individual species of fish. Information from both the quantitative and qualitative assessments for individual fish species have been used to qualitatively assess the effects on the Severn Estuary SAC Estuaries qualifying habitat feature, which incorporates a typical fish species assemblage:

- Quantitative assessments: For fish species where data are available on the population size (either biomass (e.g., as Spawning Stock Biomass ('SSB') which is an estimation of the biomass of reproductively mature adults or reported landings for commercial species) or the number of adult spawners), a quantitative assessment has been carried out. This includes marine fish species that are commercially exploited and the Habitat Directive Annex II species.
- Qualitative assessments: For fish species where no estimate of the population size is available (generally marine species that are not commercially exploited), a quantitative assessment cannot be made. In this case, losses have been assessed qualitatively, by comparing entrapment losses against trends in the RIMP or based on species life history and ecology.

5.8.8 The following subsections summarise each step in the process of estimating annual fish entrapment from the operation of Hinkley Point C without use of an AFD.

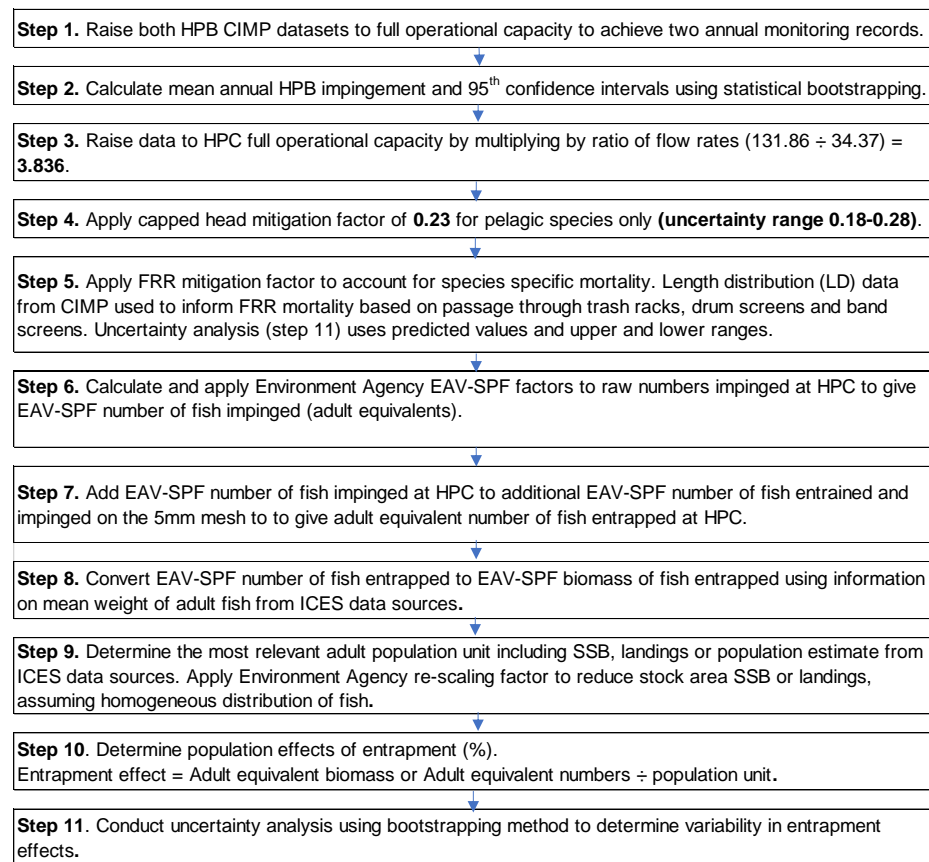


Figure 5-1 An overview of the fish entrapment calculation, in line with Environment Agency methods

5.8.9 As explained above, fish entrapment effects of Hinkley Point C have been assessed based on CIMP and RIMP datasets, and on data from offshore plankton and glass eel surveys.

Steps 1-3: Estimating Unmitigated Impingement at Hinkley Point C

5.8.10 The first step in the assessment process is to determine the number of fish, by species, that would be impinged by Hinkley Point C. Data from the CIMP were used to estimate the annual unmitigated numbers of fish that would be impinged by Hinkley Point B annually and to predict the unmitigated number of fish that would be impinged by Hinkley Point C.

5.8.11 The CIMP data comprises CIMP1 and CIMP2, two annual datasets of impingement monitoring at Hinkley Point B, which form the basis of impingement predictions at Hinkley Point C. Within the calculations, each CIMP dataset was treated separately so variation in impingement rates for different fish species and relative effects at the population level could be assessed against two points in time. When losses are contextualised against the population, CIMP1 was assessed against the original baseline, considering any updates to population data. CIMP2 was assessed against the current baseline.

5.8.12 For both CIMP datasets, the sample target was to collect 40 x 24-h samples over the course of a year. Each 24-hour sample consists of:

- six samples of one hour each during daylight hours; and
- one 18-h bulk sample set overnight.

5.8.13 During the CIMP, impinged fish and invertebrates were collected from all operational drum screens. All fish from each sample were sorted to the highest taxonomic resolution. The total number and weight of each species was recorded and the length of individuals to the nearest half cm below was measured (i.e., a fish measuring between 3.0 cm – 3.4 cm would be recorded as 3 cm). In some instances, a sub-sample was required if impingement rates were high. For subsequent analysis, all individuals in a length class were assigned to the mid-point of that length class, ensuring the assessments were not underestimating the effects (as the distribution of individuals in a length class will generally be weighted to the smaller individuals).

5.8.14 The details of the surveys were as follows:

- CIMP1:
 - Core period ran from 24 February 2009 to 29 January 2010; and

- 40 sample visits / 10 per quarter, sampling dates were randomly selected, within operational constraints.

- CIMP2:

- Core period ran from 15 June 2021 to 16 June 2022; and
- 35 sample visits, spread across all quarters, sampling dates were randomly selected within operational constraints.

5.8.15 The volume of water abstracted by Hinkley Point B, and the volume screened by each drum screen, varies depending on the number of screens and pumps in operation. Raw sample data were raised to estimate impingement for Hinkley Point B at full operational capacity (Step 1 of **Figure 5-1**). Therefore, impingement rates represent the scenario of the Hinkley Point B station running at full operational capacity throughout the year. This provides initial precaution in the impingement estimates for Hinkley Point C, as neither station is likely to operate at full capacity for the whole year.

5.8.16 The full operational capacity of Hinkley Point B was defined as 34.37 cumecs and included the main cooling water and reactor cooling water both of which are filtered through the screening systems.

5.8.17 Once the data for each sample trip was raised to full operational capacity, a statistical bootstrapping approach was applied to estimate mean annual impingement at Hinkley Point B for each CIMP data series separately (Step 2 of **Figure 5-1**). This approach iterates the existing samples with replacement 10,000 times thereby mimicking a higher frequency of repeated sampling than can be achieved experimentally. Confidence intervals were derived from the bootstrap distribution of the resulting sums. The confidence intervals represent 95 % of the data. Thus, the lower confidence interval represents the 2.5 percentile value whilst the upper confidence interval represents the 97.5 percentile value.

5.8.18 Finally, the mean annual impingement rates for Hinkley Point B were raised to give annual impingement rates for Hinkley Point C at full operational capacity (Step 3 of **Figure 5-1**). Scaling of impingement rates at Hinkley Point B to predict impingement at Hinkley Point C assumes that the density of fish at the location of both intakes is approximately equal and that there is a linear relationship between abstraction volume and impingement. At full operational capacity the abstraction rate by Hinkley Point C is defined in the assessments as 131.86 cumecs at mean sea level. Therefore, a scaling factor of 3.836 (131.86/34.37) was applied to mean impingement rates at Hinkley Point B for all fish species.

Steps 4-5: Application of Mitigation Factors to Hinkley Point C Impingement Estimates

5.8.19 The Hinkley Point C impingement assessment considers the following embedded mitigation measures:

- Low Velocity Side Entry ('LVSE') intakes: The LVSE intake heads at Hinkley Point C have been designed to reduce impingement rates by reducing per unit of water abstracted relative to the Hinkley Point B heads. However, in the absence of an AFD providing a deterrent cue there is uncertainty over the effectiveness of the reduced cross-sectional intercept area and reduced intake velocities of the LVSE. As a result of the uncertainty, the assessments undertaken pursuant to this report assume no mitigation benefit of the LVSE beyond that of the capped head cap, below. As such a factor of 1.0 is applied to the LVSE when scaling fish impingement rates from Hinkley Point B impingement monitoring to estimate Hinkley Point C impingement rates. The application of a factor of 1.0 is consistent with the position of both NNB and the Environment Agency during the WDA Permit Inquiry.
- Capped head mitigation: The LVSE intake heads are designed to minimise vertical draw of water down into the aperture by means of a capped head design. Pelagic species are less able to swim against vertical currents than horizontal ones. The intake cap reduces the vertical current of the seawater and therefore

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reduces the impingement of pelagic fish species by the Hinkley Point C cooling water intake. The intake velocity cap factor is a multiplier that represents the number of fish that are expected to be impinged by an intake with a cap as opposed to an open intake (Step 4 of **Figure 5-1**). During the WDA Permit Inquiry, the intake velocity cap factors were agreed for the species relevant to the inquiry process. The Environment Agency proposed a factor of 0.23 (uncertainty range 0.18 - 0.28) for pelagic Allis shad, twaite shad and Atlantic herring. Atlantic salmon also had the same application factor based on the understanding that adult salmon, kelts and smolts migrate close to the sea surface. The cap factor has also been applied to pelagic sprat. All other species are assumed to have no benefit from the velocity capped head design⁵⁴. The application of a capped head factor for pelagic species only is considered precautionary. This is because a review of the evidence for head designs undertaken by the Environment Agency concluded that capped heads afford a “higher level of protection for pelagic species than for benthic and proximo-benthic species”. The literature cited therein includes a review by the New York State Department of

Environmental Conservation that suggests capped heads reduce catches of all species by around 76 % (+/- 14.7 %) and benthic-dominated catches by 57 %. Whilst the Environment Agency (2020) report identifies flaws in some of the studies reviewed, applying no mitigation factor for demersal and epibenthic species is still considered precautionary.

- Fish Recovery and Return system ('FRR'): The FRR system is a large filtration system, designed to remove biota and debris from the cooling water prior to passage through the power station. The FRR has been carefully designed to allow robust species to be returned alive to Bridgwater Bay. Fish retained on the drum or band screens FRR system will be recovered through a dedicated FRR system and returned to Bridgwater Bay, rather than passing through the power station condensers with the main cooling water flow. Whilst the FRR system is designed to reduce fish mortality, not all fish returned will survive. FRR mortality is based on passage through the trash racks, drum screens and band screens and is informed by the length distribution of each impinged species. The level of FRR mortality is species-specific, and ranges between 1 for 100 % mortality, and 0 for 100 %

⁵⁴ For calculations of FRR biomass, additional species (sand smelt *Atherina boyeri*, anchovy *Engraulis encrasicolus*, horse mackerel *Trachurus trachurus*, garfish *Belone belone*, and pilchard *Sardina pilchardus*) are also assumed to benefit from the capped head design.

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survival (see below). The Environment Agency predicted FRR efficiency, and range of efficiency values has been applied within the uncertainty analysis, below.

- For each species in turn, the relevant mitigation factors were applied to the estimated (unmitigated) number fish that would be impinged at Hinkley Point C, by multiplication (Step 5 of **Figure 5-1**).

Table 5-7 FRR (value and uncertainty range), capped head and LVSE mitigation factors applied to fish and brown shrimp impinged at Hinkley Point C. WDA Permit Inquiry species are shown in bold.

Species	Predicted FRR mortality	Predicted capped head effect	Predicted LVSE effect
Twaite shad	1 (0.9552-1)	0.23	1
Atlantic salmon	1 (0.9697-1)	0.23	1
Allis shad	1	0.23	1
River lamprey	0.2 (0.109-0.2)	1	1
Sea lamprey	0.4071 (0.3397-0.4071)		1
European eel	0.2 (0.109-0.2)	1	1
Sea trout	1	1	1

Species	Predicted FRR mortality	Predicted capped head effect	Predicted LVSE effect
Atlantic cod	0.5626 (0.1812-0.5626)	1	1
Atlantic herring	1 (0.8999-1)	0.23	1
Whiting	0.5516 (0.4081-1)	1	1
European sea bass	0.6081 (0.3008-0.953)	1	1
Sprat	1 (0.9545-1)	0.23	1
Dover sole	0.2 (0.0535-0.2)	1	1
European plaice	0.2 (0.018-0.2)	1	1
Thornback ray	0.545 (0.4085-0.545)	1	1
Blue whiting	0.6614 (0.5531-0.6614)	1	1
Thin-lipped grey mullet	1 (0.545-1)	1	1
European flounder	0.2 (0.109-0.2)	1	1
Five-bearded rockling	0.2 (0.2-0.545)	1	1
Sand goby (<i>Pomatoschistus</i> spp.)	0.2 (0.2-0.545)	1	1

Species	Predicted FRR mortality	Predicted capped head effect	Predicted LVSE effect
Poor cod	1 (0.545-1)	1	1
Bib	1 (0.545-1)	1	1
Common sea snail	0.545 (0.545-1)	1	1
Conger eel	0.545	1	1
Lesser spotted dogfish	0.5	1	1
Brown shrimp	0.2	1	1

Step 6: Calculation of Adult Equivalent Impingement Losses (application of EAV-SPF factors)

5.8.20 For many fish species, entrapment affects the juvenile part of a population because it is that part that is particularly vulnerable due to their presence in inshore nursery areas and poorer swimming capability than adult fish. Most species of fish have dramatically different reproductive strategies to mammals and birds. Adults congregate at spawning sites, where a mature fish female can produce thousands to millions of eggs. The proportion of eggs that hatch into larvae, and of larvae that survive to become juveniles, will vary considerably from year to year and from species to species. For long-term population persistence, one for one replacement is required on average. On

average, as one adult fish dies, a new fish should join the spawning population to replace it. Fish early life-history stages have very high mortality rates and individuals have a very low probability of becoming an adult. Therefore, the loss of one juvenile fish does not equate to the loss of one adult. A method is therefore required to place the losses of entrapped juveniles into the context of lost adults.

5.8.21 Equivalent Adult Value ('EAV') converts the impingement losses of mostly juvenile fish into an annual rate of loss of fish that are maturing, and joining the adult, spawning populations. This step is required due to the predominantly juvenile nature of the impinged fish; if it was mostly adult fish being impinged, the step would not be required. A method of calculating EAV factors was developed by Cefas that is based on growth and natural mortality of an impinged species and on the concept that a small juvenile fish has a lower probability of surviving to maturity than a larger individual of the same species that is closer to maturity. The method gives a factor that represents how close to maturity the impinged fish are, based on the measured length distribution. A factor close to 1 indicates that most fish are close to maturity, and a factor close to zero indicates that most of the fish are small juveniles with a low probability of survival to maturity. The method uses the collated length distribution of fish sampled during impingement sampling, making the factors specific to CIMP1 and CIMP2, and reflecting species-specific year-

class strength and environmental factors that may affect early growth.

5.8.22 The Environment Agency further developed the Cefas method to include fish that would spawn multiple times, giving the total number of potential spawners that would have been alive at maturity, and in each subsequent year, had they not been impinged. Because of this extension, the Environment Agency EAV-SPF factor is always larger for a given species than the Cefas EAV factor and can exceed 1.

5.8.23 In addition, neither method includes the effects of fishing mortality, which can be high for some commercially exploited fish species, even at younger ages.

5.8.24 The exclusion of fishing mortality means that more fish are predicted to survive to maturity than would occur if some were fished. As some fish species are exploited in targeted fisheries or caught as bycatch, the application of the Environment Agency EAV-SPF extension excluding fishing mortality gives estimates of the equivalent numbers of adults lost to impingement that are precautionary. The Environment Agency EAV-SPF extension exacerbates the precaution of excluding fishing mortality ('F') as F typically increases with age in exploited stocks. In the Inspector's Report for the WDA Permit inquiry (at paragraph IR11.74), the Planning Inspector concluded that "*The project will extend for 60 years, nonetheless, under the current*

environmental conditions and the stock strength of the relevant species, it is undoubtedly precautionary, but in my view necessary, to assume zero F'. In respect of the WDA Permit inquiry outcome, F is not calculated within the assessment. However, to illustrate the level of precaution assessments can be undertaken with F included, based on the assumption that F in the Environment Agency re-scaled International Council for Exploration of the Sea ('ICES') stock areas is consistent with that across the ICES stock area. In the case of species such as European sea bass and Atlantic cod, accounting for F results in approximate 30 %-70 % reductions in the EAV-SPF factor, and thereby the predicted population level effects of Hinkley Point C.

5.8.25 For each species in turn, the mitigated number of fish that would be impinged by Hinkley Point C is multiplied by the relevant Environment Agency EAV-SPF factor to give the Environment Agency EAV-SPF equivalent number of adults that would be impinged by Hinkley Point C (Step 6 of **Figure 5-1**). For species where an Environment Agency EAV-SPF could not be calculated due to a lack of available biological data, a precautionary value of 1 was applied, i.e., it assumes that all impinged fish would have gone on to become mature adults. Because the length distributions and some biological parameters of fish impinged during CIMP1 and CIMP2 were different, separate Environment Agency EAV-SPF factors were calculated for the two years of impingement numbers (**Table 5-8** below).

Step 7: Entrainment Losses

- 5.8.26 Entrainment primarily impacts the early life-history stages of fish including eggs, larvae, and post-larvae. For some species, juveniles and even adults may be susceptible to entrainment. Although entrainment may be minor when compared with impingement, losses due to entrainment form part of the station's overall entrapment effect.
- 5.8.27 Estimates of entrainment were based on data from offshore plankton surveys carried out between February and May 2010 and were obtained by scaling the volumetric density of the eggs and larvae in the samples to the volume of water that would be abstracted by Hinkley Point C. Species for which the numbers of entrained larvae and juveniles were estimated were sprat, Dover sole, Atlantic herring, European sea bass and European plaice. The final estimates were used in the original DCO application and were not revised as part of the WDA Permit variation application.
- 5.8.28 In their 2020 Appropriate Assessment, the Environment Agency used the estimates of entrainment from the original DCO application in their entrapment assessments. The Environment Agency also sought to estimate the additional impingement that would occur on the Hinkley Point C drum and band screens fitted with a 5mm mesh instead of a 10mm mesh at Hinkley Point B. These fish would otherwise have been entrained at Hinkley Point B. The number of larvae that were predicted to be entrained were apportioned into two entrainment fractions - those that would be impinged on a 5mm mesh instead of being entrained, and those that would still be entrained through a 5mm mesh.
- 5.8.29 For each species and entrainment fraction, the numbers of individuals were converted to equivalent adults using similar methods used for impingement, i.e., the numbers were multiplied by an entrainment mortality factor and by an EAV-SPF factor, calculated by the Environment Agency. However, it is noted that for some species the EAV-SPF values applied by the Environment Agency are high, suggesting a higher than anticipated probability of survival for the larvae and juveniles. The resulting estimates of numbers of adults lost to entrainment were included in their Environment Agency entrapment assessments by adding the equivalent number of entrained adults to the equivalent number of impinged adults (Step 7 of **Figure 5-1**). The estimates of equivalent adults lost due to entrainment and impingement on the 5mm mesh at Hinkley Point C, derived by the Environment Agency are applied here.
- 5.8.30 To estimate the entrainment of the juvenile glass eel stages of European eels, three dedicated glass eel surveys were commissioned by NNB and carried out by Cefas in the Severn Estuary in January-February 2012 and by Cefas in collaboration with the Environment Agency in

January-February 2013 and April 2013. In their 2020 Appropriate Assessment, the Environment Agency applied the mean density of eels in samples collected at the site of the Hinkley Point C intakes to estimate the number of glass eels that would be abstracted by Hinkley Point C annually. An entrainment mortality factor was applied to estimate the number of glass eels that would be lost due to entrainment.

5.8.31 Predicting missing size fractions is uncertain and alternative methods may be applied. However, based on the precautionary assumptions regarding the length distribution of the ichthyoplankton and the conservative EAV-SPF values applied, the current entrapment assessments used the Environment Agency estimates of entrained and additionally impinged individuals with a 5 mm mesh for predicting population level effects.

Step 8: Conversion of Entrapped Adult Numbers to Adult Biomass

5.8.32 For many of the key species, annual losses are compared with the biomass of the spawning population (ICES SSB estimates) or the weight of recorded commercial landings. For these species, the Environment Agency EAV-SPF numbers have been converted to Environment Agency EAV-SPF biomass to enable a like-for-like comparison.

5.8.33 The EAV-SPF biomass is calculated by multiplying the Environment Agency EAV-SPF number (of first-time

spawners) by the mean individual adult weight of fish in the spawning population (all spawners) (Step 8 of **Figure 5-1**). The mean adult weight is a weighted average based on the mean weight of all spawners in each age class and the number of spawners in each age class. This will result in a higher, and thus more conservative, EAV-SPF biomass estimate for repeat spawning species because the mean individual weight of first-time spawners will be lower than the mean weight of all spawners which include older and larger individuals. This is a further precautionary aspect to the methodology.

5.8.34 Where Environment Agency EAV-SPF numbers are compared to adult population sizes in numbers (river lamprey, sea lamprey, Allis shad, twaite had, Atlantic salmon, and sea trout) or there is no population comparator and the assessment is based on RIMP trend analysis, no attempt is made to convert Environment Agency EAV-SPF numbers to EAV-SPF biomass. Because the mean weight of individuals in each age class is different, depending on environmental factors and year class strength, the calculated mean spawner weight was different in 2009 (CIMP1) and 2021 (CIMP2).

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Table 5-8 Environment Agency EAV-SPF factors and mean spawner weights applied to key taxa. WDA Permit inquiry species are shown in bold.

Species	EAV-SPF factor		Mean spawner weight		Comment
	CIMP1	CIMP2	CIMP1	CIMP2	
Twaite shad	0.0982	0.0351	NA	NA	-
Atlantic salmon	0.21	0.502	NA	NA	No salmon recorded in CIMP2. EAV factors are based on the RIMP and CIMP1 data.
Allis shad	0.663	NA	NA	NA	No Allis shad recorded in CIMP2. The EAV-SPF factor has increased compared to the value used in the WDA Permit Inquiry, due to the application of a revised calculation method similar to that used for all other species.
River lamprey	1	NA	NA	NA	Lampreys are semelparous (spawn once then die). An EAV of 1 represents the theoretical maximum assuming all impinged fish would survive to contribute to the spawning population. No lamprey were recorded in the 2021/22 CIMP, but one sea lamprey was caught in samples outside of the core CIMP2 period.
Sea lamprey	1	NA	NA	NA	
European eel	1	1	0.329		Eels are semelparous (spawn once then die). An EAV of 1 represents the theoretical maximum assuming all impinged fish would survive to contribute to the spawning population.
Sea trout	1	NA	NA	NA	No sea trout recorded in CIMP2.
Atlantic cod	0.214	0.221	4.739	2.54	-
Atlantic herring	1.272	0.228	0.065	0.084	
Whiting	0.938	0.615	0.298	0.158	

Species	EAV-SPF factor		Mean spawner weight		Comment
	CIMP1	CIMP2	CIMP1	CIMP2	
European sea bass	0.489	0.397	1.124	1.204	
Sprat	1.55	0.535	0.0155	0.009	
Dover sole	1.075	1.227	0.353	0.223	
European plaice	0.672	1.255	0.32	0.228	
Thornback ray	0.526	0.581	3.28	2.693	
Blue whiting*	0.938	0.615	0.298	0.315	
Thin-lipped grey mullet	1	1	-	-	An EAV is given, but assessments are based on RIMP trends.
European flounder	1	1	-	-	
Five-bearded rockling	1	1	-	-	
Sand goby (<i>Pomatoschistus spp.</i>)	1	1	-	-	
Poor cod	1	1	-	-	
Bib	1	1	-	-	
Common sea snail	1	1	-	-	
Conger eel			-	-	
Lesser spotted dogfish			-	-	
Brown shrimp	1	1	0.00149	0.00149	

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Steps 9-10: Spawning Populations

- 5.8.35 The next stage of the assessment determines an appropriate adult population for each species (Step 9 of **Figure 5-1**) and contextualises entrapment losses as a percentage of this value (Step 10 of **Figure 5-1**).
- 5.8.36 For Annex II Habitat Directive fish species, losses as adult equivalent numbers were contextualised relative to the number of adults in the population, given as a percentage. For river lamprey and sea lamprey, and sea trout, the estimates of adult population sizes used by the Environment Agency in their 2020 Appropriate Assessment for the WDA Permit inquiry were applied. For European eels, the most recent estimates of silver eel escapement biomass (an estimate of the spawning population size) were used to contextualise losses. For twaite shad and Allis shad, a model of adult population numbers developed by APEM Ltd. and used by the Environment Agency in their Appropriate Assessment and the WDA Permit Inquiry was revised and applied.
- 5.8.37 For commercially exploited species, entrapment losses as adult equivalent biomass were contextualised relative to the SSB or reported commercial landings, given as a percentage. ICES provides full analytical stock assessments for many marine species, particularly those of commercial importance. For these data rich species,
- stocks are defined based on a species' life history, spawning, and feeding migrations, fishing effort and catches and the practicalities of assessment and management. The stock areas, which usually span one or more ICES Areas or Subdivisions are regularly reviewed during benchmark assessments to incorporate new knowledge and are updated where appropriate. In their annual assessments, ICES compare the current stock SSB to biomass reference points to provide advice on the status and opportunities for sustainable exploitation of the stock.
- 5.8.38 For the updated impingement assessments to support the WDA Permit variation application, the ICES stock areas and their relevant SSBs were used to contextualise losses of whiting, Dover sole, Atlantic cod, European sea bass, European plaice, and blue whiting. For thornback ray and Atlantic herring where no SSB estimate was available, losses were contextualised against the landings of the relevant stocks.
- 5.8.39 In their 2020 Appropriate Assessment for the WDA Permit inquiry, the Environment Agency reviewed the use of the ICES stocks, and concluded that for several species, the stocks spanned areas that were too large to reflect local impacts on entrapped species in the context of their Appropriate Assessment. For each of these species therefore, the Environment Agency proposed revised areas, each of which was geographically smaller

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than the area spanned by the ICES stock. For each species, the estimated ICES SSB or landings value from its respective ICES stock assessment was reduced by the ratio of the area spanned by the ICES stock area and the smaller area proposed by the Environment Agency, under the assumption that the distribution of fish was equal throughout any stock area. During the WDA Permit inquiry, although the Planning Inspector favoured the Environment Agency re-scaled areas for Atlantic cod, Atlantic herring, whiting and European sea bass over the ICES areas, he also concluded that these would likely represent the upper level of likely impact, providing precaution in the assessments for these species. For all species for which SSBs or landings estimates are available, the re-scaled Environment Agency areas were used to contextualise the entrapment losses, in line with the Planning Inspector's conclusions. The SSBs and landings values were revised from those used in the Environment Agency's 2020 Appropriate Assessment based on more recent stock assessment outputs (which may change the historic perception of stock dynamics). In addition, following a change to the assessment process for European plaice, losses for this species were contextualised against landings and not SSB, making the assessment more precautionary.

Step 11: Uncertainty Analysis

- 5.8.40 The final stage of the entrapment assessments is to determine the level of confidence in the calculated entrapment effects. The confidence of entrapment predictions is determined by the underlying assumptions used to parameterise the assessment. For many input parameters, a lower and upper value can be estimated, giving a range of parameter estimates around the mean value used. Parameters for which variability around the parameter value was calculated include the estimated numbers of fish impinged at Hinkley Point B, the effectiveness of the FRR and capped head mitigation, and the predicted EAV-SPF factors for some species (Atlantic salmon, and entrained sprat, Atlantic herring, and European plaice), and the range in estimates of the relevant population comparator. Each of these parameters has an associated probability density function that determines how the variability around the mean value is distributed, which is based on the way in which the parameter was calculated.
- 5.8.41 For each species, uncertainty analysis was undertaken whereby the total entrapment effect was re-calculated many times, using the bootstrapping statistical methods described in the sections above. In each iteration of the entrapment calculation, the input value for each parameter was randomly selected from all possible values within the lower and upper range. The entrapment

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calculation was repeated 100,000 times, each giving a value of % effect for the given population, and from these values, the mean and the confidence intervals were calculated. The confidence intervals represent 95 % of the data. Thus, the lower confidence interval represents the 2.5 percentile value whilst the upper confidence interval represents the 97.5 percentile value.

- 5.8.42 This provides an estimate of the mean entrapment effect, along with the associated uncertainty based on the uncertainties in all parameters.
- 5.8.43 In this interim assessment, in line with the HRA Report for consultation, the given entrapment mean values (%) may be below the predicted impingement effects values (%). This is because the impingement results use the predicted values for each parameter to calculate a single value, whilst the entrapment effects include the uncertainty analyses and the variation in input parameters. Therefore, it is possible to have lower predicted rates of entrapment for species with low entrapment predictions relative to the variation in the other input parameters. This is particularly the case when the applied FRR mortality terms used are the maximum in the uncertainty range e.g., lamprey species.

The RIMP Dataset

- 5.8.44 The RIMP collected impingement data from Hinkley Point B over the period 1981-2019. Sampling consisted of 6 x 1-hour samples of the drum screen backwash channels each month. During each sampling visit, two of the four drum screen backwash channels were sampled. As with the CIMP sampling, the 6 hours of sampling was raised to the estimated number of fish impinged during a 24-h period, by first multiplying the number of fish in the samples by 2 (to account for the number of drum screens sampled), and then by 4 (to raise the data to 24 hours sampled). A full year of RIMP sampling consisted of 12 x 24-h samples.
- 5.8.45 Sampling was always conducted on the same state of the tide. Although not as intense as the CIMP, RIMP sampling provides a valuable long-term data set that can be used to provide insight into the population dynamics of the fish species present in the Hinkley Point B area.
- 5.8.46 Trends analysis was undertaken for all species using a non-parametric Mann-Kendall ('MK') statistic to evaluate trends. Briefly, for a particular species, the analysis looks at all pairs of counts (numbers of fish per 24-h sample chronologically through the sampling time series) and gives each pair a score. If the second number is larger than the first then the pair scores a 1, if the second number is smaller than the first then the pair scores a -1.

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If the number of fish is the same between paired samples, then the score is 0. The Mann-Kendall statistic is the sum of all these scores. An increasing series would have a positive score and a decreasing series would have a negative score. This statistic only measures trends in an average sense over the whole range of years and detects generally increasing positive or negative trends. If there is a perfect increasing series, then the statistic will have value +1; if there is a perfect decreasing series then the statistic will have value -1.

5.8.47 The analysis was further extended to account for the existence of different distributions in fish populations in different months of the year by implementing the Seasonal Kendall Test ('SKT') for trends. This test is insensitive to seasonality in the data and is conducted by computing the MK test separately for each month. The SKT is not able to tease out more subtle situations where, for example, the trend increases and then decreases, and it is important to consider the outputted values in conjunction with plots of the data (numbers of fish). RIMP data were also used to analyse long term trends in the abundance of fish impinged at Hinkley Point B. Trends for individual species were used to qualitatively assess entrainment impacts for species where no population comparator was available to quantitatively contextualise losses.

5.8.48 Furthermore, no Atlantic salmon were recorded in the core CIMP datasets, although two individuals were recorded in samples in February and March 2010, outside of the core CIMP1 period. Predictions of the number of Atlantic salmon impinged annually could not be calculated using the CIMP data. In their 2020 Appropriate Assessment, the Environment Agency used the long-term RIMP dataset to calculate the mean number of fish impinged annually. Although the sampling intensity of the RIMP is less than that of the CIMP, RIMP samples are available since 1981. For their analysis, the Environment Agency calculated the mean daily number of salmon caught in the RIMP and raised this to an annual number impinged. Following the WDA Permit inquiry additional RIMP data for 2018 and 2019 were available. The annual number of Atlantic salmon impinged was updated, with agreement from the Environment Agency, using the additional RIMP data and the data from both CIMPs, using the Environment Agency methods.

Assumptions, Limitations, and Precaution in the Impingement Assessment

5.8.49 The data used to predict impingement rates at Hinkley Point C has been collected from the adjacent Hinkley Point B station during its operational lifetime, with entrainment predictions informed by ichthyoplankton surveys and dedicated glass eel surveys. The Hinkley Point B and Hinkley Point C intakes are in different

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locations, approximately 2.5 km apart. Whilst the Hinkley Point B monitoring provides a powerful tool for Hinkley Point C predictions, differences between the impingement rates between Hinkley Point B and Hinkley Point C would be expected because of the intake designs and distribution and behaviour of fish relative to the heads. These considerations are factored into the assessment of effects for each species.

5.8.50 Impingement predictions for Hinkley Point C are bound by the limitations and assumptions of sampling and are subject to variation due to natural variation in relative abundance and distribution of species within the assemblage and the contribution of stochasticity⁵⁵ to the probability of encounters of species with the intake, as recorded in sampling programme.

5.8.51 The results of the quantitative assessments of proportional losses of fish relative to population comparators should be interpreted in relation to the uncertainties in the data and relative to the degree of precaution in the assessment approach.

5.8.52 Uncertainty analysis was undertaken to incorporate, where possible, known uncertainties in the assessment inputs.

5.8.53 NNB will undertake operational monitoring of Hinkley Point C to quantify impingement rates and verify predictions. Impingement monitoring is anticipated to form part of the Adaptive Monitoring and Management Plan ('AMMP').

Reasons why the Entrapment Assessment is Precautionary

5.8.54 There are several reasons why the entrapment assessment for this interim assessment (in line with the HRA Report for consultation) is precautionary:

5.8.55 Intake design. The Hinkley Point C intake apertures would be 1.5 – 3.5 m above the seabed and have been designed to reduce the entrapment of benthic species. The benefits afforded to benthic species by raising the heads from the seabed is not accounted for in the assessment, providing a degree of precaution for those species. No additional benefit is assumed in the current

⁵⁵ Stochastic events related to the randomness of factors influencing sampling. Sampling may be influenced by species behaviour shaping local abundance or environmental stochastic events such as storm events that may alter the distribution of species.

- assessment from the other design features (reduced cross-sectional intercept and reduced intake velocities).
- 5.8.56 Raising the Hinkley Point B data to full operational capacity. Impingement rates represent the scenario of both stations running at full operational capacity throughout the year. As this is unlikely (e.g., reduced capacity during periods of outage), this provides initial precaution for estimates of Hinkley Point C.
- 5.8.57 Capped head mitigation is applied to Allis shad, twaite shad, Atlantic herring, Atlantic salmon, and sprat only, which are all pelagic species. An Environment Agency review of head designs concluded that capped head may also provide some protection for benthic and other demersal species. However, the degree to which a capped head provides this additional protection is uncertain, and therefore no additional protection for these species is assumed.
- 5.8.58 The mean weight of a mature fish is calculated using the weight of all spawners in the stock. However, the mean individual weight of first-time spawners will be lower than the mean weight of all spawners which include older and larger individuals. The use of a larger mean weight to convert equivalent adult numbers to equivalent adult weight gives rise to an overestimate of the percentage entrapment loss when compared against the population comparator.
- 5.8.59 In the calculation of the Environment Agency EAV-SPF values, all fish within a length class were assigned to the mid-point of the length class. This ensures that the assessments do not underestimate the effects (as the distribution of individuals in a length class will generally be weighted to the smaller individuals).
- 5.8.60 For species where an EAV-SPF factor could not be calculated due to a lack of biological data (such as sea lamprey, river lamprey and sand goby *Pomatoschistus sp.*), a precautionary value of 1 was applied. This assumes that all impinged individuals would survive to maturity, irrespective of their size or age and is therefore more precautionary.
- 5.8.61 The applied Environment Agency EAV-SPF values exclude fishing mortality. This implies that more fish would survive to maturity than is the case, giving rise to a higher (and more precautionary) EAV-SPF factor. Whilst the Planning Inspector concluded that this was a necessary position, for some commercially exploited species such as European sea bass and Atlantic cod, the exclusion of fishing mortality from the EAV-SPF calculation has a large bearing on the predicted effects of Hinkley Point C.
- 5.8.62 The Planning Inspector concluded that the re-scaled stock areas that have been applied to Atlantic cod, whiting and European sea bass were likely too restrictive,

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giving rise to upper values of population effects. The re-scaled stock area defined by the Environment Agency have been used here.

- 5.8.63 For Atlantic herring, European plaice and thornback ray, entrapment losses were compared to commercial landings, which represent only a portion of the spawning population, making the entrapment assessment for these species more conservative.
- 5.8.64 For many species, particularly those that are commercially exploited, the predicted population level effects from CIMP1 were higher than the predicted CIMP2 effects. However, the effect for each species was drawn from both datasets and considered in the assessment.. This difference between the two CIMP datasets further highlights natural variability in species abundance in the Bridgwater Bay area.

Consideration of the Wider Severn Estuary Fish Community

- 5.8.65 The fish species community within the Severn Estuary (including the ‘typical fish species assemblage’ of the Estuaries qualifying habitat of the Severn Estuary SAC) is highly dynamic, comprising over 100 species that use the estuary for a variety of purposes including feeding, spawning, nursery areas and as a migration route. Some fish species spend their whole lives within the estuary

environment, while other species are more transitory, and use the estuary for one or more functions depending on their life history stage.

- 5.8.66 Drawing on the approaches applied by the Environment Agency in their 2020 Appropriate Assessment, the potential for impingement of fish to adversely affect the wider fish populations by affecting the structure and function (including typical species) of the Estuaries habitat feature has been considered in relation to the rates of variability in rates of entrapment, the feeding and functional guilds of species entrapped, and information on natural variability and dietary composition of these species.
- 5.8.67 Further details of this approach are presented within Chapter 6 of the HRA Report that has been provided as part of the materials to inform the consultation process.

5.9 Likely Significant Effects

- 5.9.1 The potential likely significant effects associated with marine ecology and water quality as a result of the proposed changes are outlined in **Table 5-9**, with additional narrative provided below.

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Table 5-9: Potential likely significant effects associated with marine ecology and water quality as a result of the Project as changed by the proposed changes on-site

Change	Receptor	Potential for Likely Significant Effect(s) of the Project as changed
Removal of the requirement to install an AFD	Fish species of the Severn Estuary / Inner Bristol Channel, including species of conservation interest	Direct effect due to fish entrapment.
	Piscivorous fish species	Indirect effect from potential changes to prey resources (fish) and associated foraging success.
	Piscivorous seabird species	Indirect effect from potential changes to prey resources (fish) and associated foraging success.
	Marine mammal species	Indirect effect from potential changes to prey resources (fish) and associated foraging success.
	Marine water and sediment quality	Altered marine water quality due to fish impingement / release of dead / moribund fish through FRR. Possible organic enrichment of marine sediment from deposition of dead material.
	European designated sites (SAC / SPA / Ramsar Sites)	Direct effects due to entrapment on: fish qualifying species, fish species assemblage species (Ramsar), qualifying habitat feature (where including a typical fish species assemblage). Indirect effects on qualifying piscivorous seabird species, waterfowl species assemblage and marine mammal qualifying species from potential changes to prey resources and associated foraging success.
	WFD waterbodies	Indirect effects through changes to fish populations.
	Marine Conservation Zones	Indirect effects through altered water quality due to potential fish impingement / release of dead / moribund fish through FRR. Possible organic enrichment of sediment from deposition of dead material.
ISFS, including changes to Access Control Building	All marine ecological receptors / marine water quality	No pathway to marine environment, so no likely significant effects identified; not considered further within this assessment.

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Change	Receptor	Potential for Likely Significant Effect(s) of the Project as changed
Meteorological Mast	All marine ecological receptors / marine water quality	No pathway to marine environment, so no likely significant effects identified; not considered further within this assessment.
Hinkley Point Substation	All marine ecological receptors / marine water quality	No pathway to marine environment, so no likely significant effects identified; not considered further within this assessment.
Sluice Gate Storage Structures	All marine ecological receptors / marine water quality	No pathway to marine environment, so no likely significant effects identified; not considered further within this assessment.

Likely significant effects on fish species

Entrapment Assessment Results

5.9.2 As described above, extensive work has been undertaken into the potential entrapment of fish species as a result of cooling water abstraction at Hinkley Point C (without an AFD). This has focused on the 25 fish species and brown shrimp, identified as outlined within **Section 5.6**. Two additional species, conger eel and lesser spotted dogfish were selected as being of potential ecological importance based on their contribution to the impinged biomass. While neither species is numerically abundant in the CIMP datasets, conger eel was ranked fourth and first by weight in CIMP1 and CIMP2, respectively, while lesser spotted dogfish ranked ninth in both datasets.

5.9.3 **Table 5-10** presents the revised Hinkley Point C entrapment assessment results, incorporating mitigation (in the form of a capped head LVSE and the FRR system), but excluding an AFD, based on CIMP1 and CIMP2 data.

5.9.4 Pelagic species are less able to swim against vertical currents than horizontal ones. An intake cap reduces the vertical current and therefore reduces the impingement of pelagic species. This can be represented by a multiplier applied the number of fish that are expected to be impinged in an intake with a cap as opposed to an open intake. The cap factor has been applied here to pelagic sprat, with the precautionary assumption that other key species would not benefit significantly from the velocity capped head design.

5.9.5 **Table 5-11** subsequently presents predictions of entrapment effects against the relevant population, noting the mean population effect, and lower-95 % and upper-95 % population effect, for wider context. The table also presents the predicted population effect for each species considered, against the relevant re-scaled population estimate (whether by weight or numbers).

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Table 5-10: Mitigated adult equivalent mean number and weight (kg) of fish impinged at Hinkley Point C (without AFD) in CIMP1 and CIMP2. For simplicity, only the mean impingement numbers and weights are given. Also given are the estimated adult equivalent (EAV-SPF) numbers of fish entrained or additional fish retained on a 5mm mesh from the Environment Agency Appropriate Assessment. WDA Permit Inquiry species are shown in bold.

Species	Mitigations			CIMP1		CIMP2		Entrainment – EAV-SPF numbers	Impingement on a 5mm mesh – EAV-SPF numbers
	Capped head	LVSE	FRR mortality	Mitigated EAV-SPF number	Mitigated EAV-SPF weight (kg)	Mitigated EAV-SPF number	Mitigated EAV-SPF weight (kg)		
Twaiite shad	0.23	1	1	48	NA	103	NA	-	-
Atlantic salmon	0.23	1	1	12*	NA	22*	NA	-	-
Allis shad	0.23	1	1	11	NA	NA	NA	-	-
River lamprey	1	1	0.2	14	NA	-	NA	-	-
Sea lamprey	1	1	0.4071	70	NA	-	NA	-	-
European eel	1	1	0.2	220	72	108	36	1,581,697 (glass eel) [‡]	-
Sea trout	1	1	1	8*	NA	-	NA	-	-
Atlantic cod	1	1	0.5626	37,994	180,052	3,346	8,500	-	-
Atlantic herring	0.23	1	1	31,805	2,067	92,601	7,778	267	49,090
Whiting	1	1	0.5516	1,008,748	300,607	143,522	22,676	-	-
European sea bass	1	1	0.6081	8,823	9,917	2,735	3,293	-	651
Sprat	0.23	1	1	1,298,028	20,119	219,866	1,979	124,500	1,376,618
Dover sole	1	1	0.2	98,368	34,724	96,285	21,472	-	1,299
European plaice	1	1	0.2	562	180	1,492	340	15	11,609
Thornback ray	1	1	0.545	734	2,407	646	1,740	-	-
Blue whiting	1	1	0.6614	671	200	98	31	-	-
Thin-lipped grey mullet	1	1	1	215,568	NA	137,567	NA	-	-

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Species	Mitigations			CIMP1		CIMP2		Entrainment – EAV-SPF numbers	Impingement on a 5mm mesh – EAV-SPF numbers
	Capped head	LVSE	FRR mortality	Mitigated EAV-SPF number	Mitigated EAV-SPF weight (kg)	Mitigated EAV-SPF number	Mitigated EAV-SPF weight (kg)		
European flounder	1	1	0.2	36,028	NA	12,030	NA	-	-
Five-bearded rockling	1	1	0.2	25,004	NA	32,785	NA	-	-
Sand goby (<i>Pomatoschistus</i> spp.)	1	1	0.2	13,333	NA	81,550	NA	-	-
Poor cod	1	1	1	10,071	NA	185,583	NA	-	-
Bib	1	1	1	7,097	NA	118,792	NA	-	-
Common sea snail	1	1	0.545	15,719	NA	68,898	NA	-	-
Conger eel	1	1	0.545	2,538	NA	4,278	NA	-	-
Lesser-spotted dogfish	1	1	0.545	2,507	NA	1,547	NA	-	-

*For Atlantic salmon, the number of adults given for CIMP1 is the number calculated by the Environment Agency and used in the WDA Permit inquiry, based on analysis of RIMP data from 1997-2017. The value given for CIMP2 was updated using RIMP data from 1997-2019 and CIMP1 and CIMP2 data, using the Environment Agency method.

†For sea trout, no benefit is assumed for the capped head design.

#For European eel, the number of entrained glass eels is the raw number that would be abstracted, based on eel densities from the surveys. Accounting for entrainment survival results in an entrained estimate of 538,410 glass eels (approximately 180 kg).

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Table 5-11 Predictions of mean, lower and upper 95 % entrapment effects of Hinkley Point C (without AFD) on selected fish species populations of the Severn Estuary SAC.

Species	Dataset	Re-scaled population estimate (weight or numbers)	EA-WDA Permit Inquiry or EA-AA predicted population effects (%)	Current assessment entrapment mean population effect (%)	Current assessment entrapment Lower 95%-Upper 95% population effect (%)
Atlantic cod	CIMP1	1,195t	15.7	10.03	3.12%-23.56
Atlantic cod	CIMP2	278t		2.09	0.76%-4.37
Atlantic herring	CIMP1 (landings)	157t	4.0	2.99	2.37%-3.90
Atlantic herring	CIMP2 (landings)	23t		48.36	29.74%-80.66
Atlantic herring *	CIMP1 (PELTIC biomass)	1,723t		0.12	0.01%-0.51
Atlantic herring *	CIMP2 (PELTIC biomass)	2,198t		0.18	0.02%-0.69
Whiting	CIMP1	2,917t	6.5	7.05	7.05%-21.29
Whiting	CIMP2	1,840t		1.61	0.70%-3.09
European sea bass	CIMP1	650t	2.1	1.70	0.85%-2.78
European sea bass	CIMP2	368t		1.18	0.51%-2.39
Sprat †	CIMP1 (PELTIC SSB)	7,704t	0.7	0.54	0.40%-0.76
Sprat †	CIMP2 (PELTIC SSB)	3,348t		0.42	0.38%-0.48
Sprat †	CIMP1 (PELTIC biomass)	21,422t		0.10	0.05%-0.18
Sprat †	CIMP2 (PELTIC biomass)	129,060t		0.003	0.002%-0.004
Dover sole	CIMP1	884t	7.4	2.53	0.94%-5.08
Dover sole	CIMP2	1,716t		0.81	0.27%-1.77
European plaice	CIMP1	308t	0.4	0.57	0.14%-1.04
European plaice	CIMP2	240t		0.57	0.15%-1.03
Thornback ray	CIMP1	122t	3.21	1.73	0.97%-2.84

Species	Dataset	Re-scaled population estimate (weight or numbers)	EA-WDA Permit Inquiry or EA-AA predicted population effects (%)	Current assessment entrapment mean population effect (%)	Current assessment entrapment Lower 95%-Upper 95% population effect (%)
Thornback ray	CIMP2	157t		0.97	0.30%-2.37
Blue whiting	CIMP1	509,095t	0.00	<0.001	<0.001%-<0.001
Blue whiting	CIMP2	868,406t		<0.001	<<0.001%-0.001
Allis shad	CIMP1	<u>1,083</u>	0.6	1.48	0.29%-6.24
Allis shad	CIMP2		NA	NA	NA
Atlantic salmon	RIMP	<u>17,616</u>	0.07		
Atlantic salmon	RIMP & CIMP	<u>17,616</u>		0.06	<0.01%-0.36
Sea trout	CIMP1	<u>8,750</u>	<0.1	0.1	0.4
Sea trout	CIMP2		NA	NA	NA
European eel	CIMP1 impingement	214t	3.27	2.86	1.32%-7.47
European eel	CIMP1 entrainment	331t			
European eel	CIMP2 impingement	35t		2.91	1.36%-7.50
European eel	CIMP2 entrainment	331t			

Notes:

- With capped head and FRR mitigation measures.
- Fish species populations of the typical fish species assemblage of the Estuaries qualifying habitat feature of the Severn Estuary SAC.
- Values are presented alongside the Environment Agency AA (2020)/WDA Permit inquiry.

‡ The weight of impinged Atlantic herring is compared directly against the estimated biomass for the Bristol Channel based on the PELTIC survey data (PELTIC biomass) in addition to the landings estimate used by the EA in their 2020 AA and at the WDA Permit inquiry.

≠ The weight of impinged sprat is compared directly against the estimated biomass for the Bristol Channel based on the PELTIC survey data (PELTIC biomass) and the impinged EAV weight is compared to the estimated SSB from the same data source (PELTIC SSB).

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Potential effects of climate change on Hinkley Point C entrapment predictions

5.9.6 As described within **Section 5.5**, mean sea temperatures around the UK and Ireland have been warming at between 0.2 and 0.6 °C per decade over the past 30 years. Projected future changes in the temperature and chemistry of marine waters around the UK and Ireland are having, and will continue to have, effects on the phenology (timing of lifecycle events), productivity and distribution of marine fish and shellfish, as well as on swimming efficiencies for some species. At a general level, distributions of both exploited and non-exploited North Sea fish species have responded to these increased sea temperatures, with nearly two-thirds shifting in mean latitude of depth (or both) over 25 years. It has been found that most common north-east Atlantic species are responding significantly to warming with:

- Three times more species increasing in abundance with warming than declining;
- Local communities are being reorganised despite decadal stability in species composition; and
- Species range shifts are likely to have smaller ecological impacts than modification of local communities.

5.9.7 However, effects on climate change on fish communities are hard to predict with accuracy because behaviour, genetic adaptation, habitat dependency and impacts of fishing result in complex responses.

5.9.8 From the RIMP survey at Hinkley Point B it has been possible to observe changes in the Bristol Channel fish community in the 37-year period from 1981 to 2017. Some of the key observed trends in the Bristol Channel and Severn Estuary are likely to continue and are summarised:

- Relative changes in species abundance with growing numbers of species that favour warmer water (in winter, in summer or both) and reducing abundance of species near to their southern latitudinal boundary. Henderson and Bird (2010) reported an increasing number of ‘tourist’ species resulting in an increase in the monthly number of species recorded in the RIMP at HPB between 1981 and 2008.
- Effects on the phenology of some species (e.g., timing of the arrival of new recruits or migrations) and changes in migration patterns as some estuarine habitats become more or less suitable for each species and/or their prey.
- The presence of large numbers of juvenile species in the estuary is dependent upon the connectivity between spawning locations further offshore to the

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west of Hinkley Point and their nursery grounds in the Severn Estuary. Some species have a lower tolerance to changes in winter temperatures than to summer temperatures (Dulvy et al., 2008; Perry et al., 2005) and it is possible that higher winter temperatures will mean that some species may have to abandon fidelity to long established spawning locations which could produce a rapid reduction in the numbers of recruits to the estuary. Conversely, spawning of species favouring warmer temperatures may become more prevalent, with greater numbers of juveniles of warm-affiliated species recruiting to the estuary

Sensitivity / value of selected fish species

5.9.9 Fish species on which detailed impingement assessment was undertaken were selected for three main reasons: their ecological significance, conservation importance, or socio-economic value (**Section 5.6**). In addition to these overarching reasons, however, the sensitivity of individual species will also be kept under review to inform the ongoing EIA. This will include a review of species' presence on conservation species lists (e.g., Species of Principal Importance, International Union for the Conservation of Nature ('IUCN') Red List, or OSPAR Annex V). On this basis, the categorisation of species against the criteria outlined in **Table 5-5** may be revised within the ES.

5.9.10 This interim assessment has considered the sensitivity of the overall community of selected fish species presented in **Table 5-9** and **Table 5-10**.

5.9.11 For the purposes of this interim assessment, a value / sensitivity rating of '**Medium**' has been applied to the overall fish species community of the Severn Estuary.

5.9.12 This conclusion has been reached because, although there are a number of species within the community which are of higher conservation status and/or commercial value, there are others which are of lower status and / or value. Therefore, the overall categorisation given to the community is medium. Species of higher conservation status / commercial value are considered further below in the context of relevant designated sites.

Determination of Magnitude and Significance

5.9.13 For the purposes of this interim assessment, the percentage change against species' populations / biomass has been considered to determine magnitude and, as above, magnitude has been considered in relation to the community of fish species as a whole.

5.9.14 The magnitude of effects is based on the range of mean predicted entrapment effects on individual fish species (**Table 5-11**) (from <0.0001 % for blue whiting, to 48.36 %

for herring [based on CIMP2 landings data]). With regards to the herring value, however, these effects are compared against landings from a small-scale fishery, representing only part of the total Atlantic herring biomass in the Bristol Channel. Contextualising entrapment losses against a small-scale fishery may lead to spurious conclusions on the level of effects in the case that fishery landings are not directly related to the size of the stock. When compared against the biomass of Atlantic herring in the Bristol Channel, as estimated from Cefas PELTIC surveys, entrapment are well below 1 % of the total biomass. However, taking into account purely the information presented above, the overall magnitude of change to the community of fish species of the Severn Estuary is considered to be **very low to medium**. Additional detail on certain individual species is presented within the assessment of potential effects on designated sites, see below.

- 5.9.15 When this magnitude (very low to medium) for the overall community of fish species is combined with the **medium** value / sensitivity identified above for the overall community of fish species, this results in **minor to moderate effects**, with the potential to be considered significant.
- 5.9.16 However, it must also be noted that this conclusion is skewed by a small number of species subject to larger magnitude effects. On this basis, overall, effects are

revised and are considered to be **minor (not significant)** in nature.

- 5.9.17 At this stage, the evaluation of significance is interim only, and will be finalised within the ES.
- 5.9.18 The above findings may be further contextualised and refined as work progresses, with final conclusions to be presented within the ES. This will include, as appropriate, consideration of emerging telemetry data showing movement of Twaite shad within the Severn Estuary and Bridgwater Bay, and consideration of each individual listed species in turn.

Likely significant indirect effects on piscivorous fish species

- 5.9.19 The piscivorous fish species within the Severn Estuary form part of the estuary's overall fish community; therefore, they have also been categorised as being of **medium** value / sensitivity.
- 5.9.20 In terms of magnitude, it is concluded that there would be a **very low** magnitude of change to piscivorous species' prey availability. This is for the following reasons:
- Entrapment during the operation of Hinkley Point C has the potential to indirectly effect integrity of fish species populations through reductions in the availability of prey for piscivorous fish species. This

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is particularly important for conservation dependant species that are qualifying features of designated European or Ramsar sites.

- Both sea and river lamprey begin parasitic feeding of fish hosts once they enter the estuary from their natal rivers. Impingement of potential prey items would occur due to the operation of Hinkley Point C; however, the generalist nature of lamprey feeding is not anticipated to result in discernible reductions in the availability of prey.
- Juvenile elvers and yellow eel stages occur within estuarine waters and feed on a range of invertebrates and small fish. The increasing trend in larger crustaceans (particularly brown and ghost shrimp) and the generalist feeding ecology of eels suggests that prey availability would not be significantly affected by the operation of Hinkley Point C.
- The life stages of Atlantic salmon and sea trout that feed within the estuary are generalists, preying on a variety of crustaceans and forage fish. Whilst numbers of some of the species preyed upon may vary over time for a variety of reasons, the dietary plasticity of Atlantic salmon and sea trout means that any significant effects from reductions in overall prey availability are unlikely.

- Much like the salmonids, twaite and Allis shad feed on a range of fish including the abundant early life stages of sprat, herring and anchovy. Shad also feed on crustaceans at the salt wedge. The generalist nature of their feeding behaviour and abundance of prey items means that any significant effect from reductions in prey availability is not predicted. On this basis, it is concluded that there would be a **very low** magnitude of change to piscivorous species' prey availability.

5.9.21 Therefore, with a **very low** magnitude of change on a **medium** value / sensitivity receptor group, it is considered that effects on piscivorous fish species are **minor (not significant)** in nature.

Likely significant indirect effects on piscivorous birds: seabirds and waterfowl

5.9.22 The pathway of effect from the proposed changes on birds is a secondary or indirect effect arising from potential changes to prey resources (i.e. fish), and associated foraging success for predatory species (in this case, piscivorous birds, i.e. those which are fish-eating, only). The key bird species identified as being potentially affected by the proposed change is lesser black-backed gull, which is both a scavenger and piscivorous. Whilst it is primarily a scavenger, the lesser black-backed gull is also known to eat small-sized fish that predominantly

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swim in the upper pelagic zone, close to the sea surface. Other piscivorous birds identified above do not use the Severn Estuary as optimal feeding habitat and the Hinkley Point C site is at the very edge of their foraging range; the nearest key breeding sites for these species are:

- Grassholm SPA (c173 km from the Hinkley Point C site) for gannet;
- Skomer, Skokholm and Seas off Pembrokeshire SPA (c181 km from the Hinkley Point C site) for Manx shearwater and storm petrel; and
- Saltee Islands SPA (c262 km from the Hinkley Point C site) for fulmar.

5.9.23 For the purposes of this assessment, based on the conservation status of the bird species of interest (i.e. their inclusion as qualifying species of SPA / Ramsar Sites), the piscivorous bird community potentially affected has been assigned an overall **'high'** value / sensitivity rating.

5.9.24 If it were assumed (as a worst case scenario) that the fish population of the Severn Estuary / Inner Bristol Channel is of ecological importance to piscivorous bird species, and that loss of prey species would be of a **medium to high** magnitude of change, this would result in effects categorised as potentially **moderate to major (significant)**. However, the EAV-SPF assessment does

not identify sprat, that is expected to form a significant portion of the diet of piscivorous bird species, as being significantly affected by entrapment (based on the percentage effect in relation to its wider population). Thus, the overall effect on piscivorous birds is likely to be at the lower end of the predicted range.

5.9.25 Furthermore, the Environment Agency's Appropriate Assessment² noted that the lesser black-backed gull, one of the key piscivorous species identified, is omnivorous in habit, scavenging a wide range of food across marine, intertidal, and terrestrial habitats, covering large distances in doing so. Therefore, as the species is not wholly reliant on living fish for their diet, it was predicted by the Environment Agency that there would be little impact on their food availability due to changes in potential impingement levels associated with the Hinkley Point C intake. This was further supported by Hinkley Point C Project-specific survey work from 2008 and 2009, which did not record any of the gulls observed actively fishing, noting that the Severn Estuary is used more for loafing and commuting rather than feeding.

5.9.26 This also applies to the other species recorded offshore of Hinkley Point and in the wider Severn Estuary: gannet, Manx shearwater, storm petrel and fulmar. Although each of these species is known to feed on at least one of the species recorded within the impingement dataset from Hinkley Point B, and therefore would have the potential

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to be affected by changes to these species' abundance or distribution, due to the wide-ranging nature of their diets, it was concluded by the Environment Agency that the Severn Estuary / Inner Bristol Channel does not provide significant ecological support for any of the species.

- 5.9.27 Therefore on the basis that such effects to birds would result in little or no degradation to the feeding success of relevant populations, the magnitude of change is considered **very low**. The **high** sensitivity of the receptor means that resultant impacts are assessed as **minor (not significant)**.

Likely significant indirect effects on marine mammals

- 5.9.28 As with piscivorous birds, fish species form a key component of the diets of the majority of marine mammal species (both cetaceans and pinnipeds); therefore, any development with the potential to affect local fish populations has the capacity to cause indirect effects on marine mammal populations.
- 5.9.29 The Severn Estuary does not support any major resident populations of cetacean or pinniped species, and the species generally have large foraging ranges. The closest designated site for seals is Lundy SAC (102 km from the Hinkley Point C site), and for cetaceans it is the

Bristol Channel SAC (harbour porpoise; 99 km from the Hinkley Point C site). Although seals may use particular areas as regular haul-out or breeding sites, such site fidelity is not generally found in cetacean species, and they tend to forage over much wider areas. Despite this, due to the high levels of conservation protection all marine mammals are afforded by various regimes, a value / sensitivity of **'high'** has been applied for the purposes of this interim assessment.

- 5.9.30 As with piscivorous seabirds, the Environment Agency's 2020 Appropriate Assessment provided further context on the potential effects on marine mammals, based on their wider diet, and use of the Severn Estuary / Inner Bristol Channel. This concluded that the Severn Estuary / Inner Bristol Channel is not of key importance for marine mammal populations. For harbour porpoise, it was noted that the proportion of the wider population frequenting the area would be small. Considered alongside the species' wide foraging range and generalised feeding behaviour, effects would not be significant. The same conclusion was reached for grey seal.
- 5.9.31 On this basis, it is concluded that even when taking into account the higher predicted levels of fish impingement calculated by the EAV-SPF method, there would be a **low to very low** magnitude of change to marine mammal populations. When this is combined with the **high**

sensitivity rating, this results in a **minor (not significant)** effect.

Likely significant effects on marine water and sediment quality / WFD waterbodies

5.9.32 Changes to water quality considered within this PEIR include changes through:

- Release of contaminants; and
- Release of nutrients.

5.9.33 This assessment has focused on potential changes to water quality through the decay of dead or moribund biota released through the FRR system, having passed through the Hinkley Point C CWS. Through the removal of the AFD from the CWS, there is the potential for this material to increase.

5.9.34 Introduction of such material to the marine environment has been considered based on organic matter discharges, with calculations derived for levels of organic carbon, nutrients, oxygen demand, and un-ionised ammonia associated with the decay of discharged dead and moribund biomass. Calculations have been based on the revised CIMP1 and CIMP2 data.

5.9.35 Estimates of dead and moribund biomass were derived from direct weight measurements from CIMP1 and

CIMP2 multiplied up to daily (24 hour) estimates. Daily annual average and quarterly average estimates of impingement weight have been generated by statistical bootstrapping using the observed CIMP data. Calculations were based on all fish species and invertebrates, a refinement on a previous technical report undertaking the same analysis which including only fish. Whilst the impingement values are taken from Hinkley Point B datasets, Hinkley Point C predictions have been made, accounting for the differing, water abstraction volume, intake head design at Hinkley Point C (capped head), and species-specific FRR mortality factors, accounting for the level of biota survival through the FRR system.

5.9.36 To establish levels of organic matter and nutrient loading, the wet weight of discharged dead and moribund biomass was converted to dry weight. Following a review of conversion factors from wet to dry weight applied in previous assessments, new factors for broad taxonomic groups were identified, and the source of conversion factors standardised. For fish, the factors for herring (*Clupea harengus*) were applied to all fish because the factors for herring are slightly higher than average. Therefore, the use of herring conversion values for all fish is considered precautionary.

5.9.37 Detailed methods for calculating levels of organic carbon, nutrients, biological oxygen demand, ammonia and un-

ionised ammonia were presented within BEEMS Technical Report TR515, and results were updated to include the refinements described above and incorporate the CIMP2 data. The total organic carbon input from FRR discharges has been calculated as 46 kg/day, based on CIMP1 data, and 42 kg/day based on the CIMP2 data.

5.9.38 With no formal EQS for organic carbon enrichment, the area in excess of the derived daily benchmark of 0.3 g organic carbon/m²/day is 0.17 km² (CIMP1 data) and 0.15 km² (CIMP2 data). It should be noted that this assessment is conservative as it compares a maximum quarterly U95 CI value to an annual average benchmark.

5.9.39 For nutrients, total nitrogen and phosphorus calculated from the CIMP1 data is 5.1 kg/day and 1.4 kg/day, respectively as an annual U95 CI. From the CIMP2 data the values are 4.4 kg/day and 0.8 kg/day for nitrogen and phosphorus, respectively as an annual U95 CI.

5.9.40 The total biological oxygen demand ('BOD') generated by the decomposition of discharged dead and moribund biota is estimated to be 162 kg/day as an U95 CI in Q4 from the CIMP1 data and 146 kg/day U95 CI in Q3 from the CIMP2 data. This level of BOD leads to an oxygen reduction of between 49 and 54 kg/day which, based on the background oxygen concentration of 5 mg/l would be met by the volume of water in approximately 0.15 ha. The

reaeration area, based on 3.2 gm²/day (Hull, 2016), would be approximately 1.7 ha.

5.9.41 Decaying biomass can also be a source of ammonia, which can be in the form of toxic un-ionised ammonia (NH₃). A single conversion factor of 125 mg of ammonia per kg of wet biomass, derived from cod tissue decay, has been used. This conversion factor is considered precautionary, acknowledging that evidence of ammonia release from biomass decay for most biota is not available.

5.9.42 The proportion of total ammonia in the un-ionised form is dependent on the physico-chemical properties of the water and was calculated based on annual average background conditions (pH 8.06, salinity 31.7 and temperature of 12.55 °C). To assess the inter-related project effects from the thermal plume which will be generated by Hinkley Point C, a 2 °C temperature uplift has also been applied. The estimated amount of ammonia which could be released from decaying biomass is estimated as 43 g/day (CIMP1) or 55 g/day (CIMP2) based on the maximum quarterly U95 CI value. The un-ionised proportion is calculated to be 0.9 g/day and 1.1 g/day respectively for CIMP1 and CIMP2. When accounting for the Hinkley Point C thermal plume the proportion of un-ionised ammonia increases slightly to 1 g/day (CIMP1) and 1.3 g/day (CIMP2). This amount of un-ionised ammonia would dilute to below the EQS within

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an area of 8 – 10 m² of the FRR outfall and represents approximately 0.0005 % of the daily exchange of un-ionised ammonia within the Bridgwater Bay water body.

- 5.9.43 Due to being classed as of moderate status/potential, the Bridgwater Bay and Parrett WFD water bodies are categorised as of **medium** value in terms of sensitivity. However, they are also considered of **high** sensitivity to any changes that might reduce their ability to achieve good status. On this basis, they have been assigned an overall value / sensitivity of **high**.
- 5.9.44 Based on the findings of the water quality monitoring and modelling, it is concluded that the proposed alteration to the cooling water intake would result in changes of a **very low** magnitude.
- 5.9.45 The potential effect on marine water quality and associated WFD water bodies as a result of operating of Hinkley Point C without an AFD on the intake heads is therefore found to be **minor**, and **not significant** in nature.
- 5.9.46 With respect to sediments, the increase in organic carbon input (as described above) may result in localised organic enrichment of the sediment, with attendant issues of sediment quality and secondary effects on benthos.

5.9.47 Sediment quality is not a core component of the WFD classification system. Within the Severn Estuary, the sediment environment is highly dynamic, with strong currents (see **Section 5.5**), and a constantly shifting sediment regime, including extremely high levels of suspended sediment. The sedimentary environment of the Severn Estuary (with the exception of any qualifying habitats of designated sites, which are discussed below) has been categorised as having **very low** value / sensitivity.

5.9.48 Modelling of the dispersal of dead fish as reported in TR479 showed that very little material (0.12 %) would beach, and that any dead fish would be typically scavenged by birds in 1-2 hours leaving a negligible residual of beached material (0.002 %). This suggests the potential for significant nutrient enrichment of the sediment represents a **very low** magnitude of change and consequently a **negligible (not significant)** effect.

Likely significant effects on Nature Conservation Designated Sites

5.9.49 As described within **Section 5.5**, there is the potential for effects to arise on nature conservation designated sites, primarily:

- European sites:
 - Severn Estuary SAC;

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- Severn Estuary SPA;
- Severn Estuary Ramsar Site;
- River Usk SAC;
- River Wye SAC; and
- River Towy SAC.
- Marine Conservation Zones:
 - Bideford to Foreland Point MCZ; and
 - Morte Platform MCZ.

5.9.50 Consideration of potential effects on two WFD waterbodies (Bridgwater Bay and Parrett WFD water bodies) has already been provided above.

5.9.51 A detailed assessment of the potential effects of the Project (including the removal of the requirement to install an AFD, and the suite of proposed compensatory measures) on European and Ramsar designated sites is presented within the HRA Report for Consultation. This includes consideration of each identified pathway of effect, and all designated European and Ramsar site qualifying features (habitats and species) screened into the appropriate assessment.

5.9.52 The HRA Report for Consultation concluded that, for the following European and Ramsar designated sites and qualifying features, the risk of an adverse effect on

integrity could not be excluded beyond reasonable scientific doubt:

- Severn Estuary SAC:
 - Estuaries qualifying habitat; and
 - Twaite shad.
- Severn Estuary Ramsar Site:
 - Criterion 4 assemblage of migratory fish species.
- River Wye SAC:
 - Atlantic salmon;
 - Twaite shad; and
 - Allis shad.
- River Usk SAC:
 - Atlantic salmon; and
 - Twaite shad.

5.9.53 The assessment approach and levels of significance differ between the consideration of effects in HRA and EIA processes, reflecting the different legal frameworks and objectives underlying those processes. This interim assessment nevertheless draws upon the same evidence base as the HRA Report for Consultation.

5.9.54 The following subsections present assessments for each designated site, and its associated qualifying features.

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Based on their internationally designated conservation status, all named qualifying features of the following designated sites have been assigned a value / sensitivity of **high**, unless specifically outlined otherwise below.

Severn Estuary SAC

Qualifying habitats: Excluding Estuaries

5.9.55 For the purposes of this interim assessment, the qualifying habitats of the Severn Estuary SAC have been grouped for discussion, with the exception of the Estuaries qualifying habitat (due to this qualifying habitat including a ‘typical fish species assemblage’, which needs further consideration due to potential effects via entrapment on fish species of the Severn Estuary). These habitats are:

- Mudflats and sandflats not covered by seawater at low tide;
- Atlantic salt meadows (*Glauco-Puccinellietalia maritima*);
- Sandbanks which are slightly covered by sea water all the time; and
- Reefs.

5.9.56 Based on the nature of the Proposed Changes in the marine environment, whilst there is potential for changes

in water quality, based on the findings described above, this is anticipated to result in a **very low** magnitude of change in relation to the qualifying habitats listed above. When this is combined with the high sensitivity / value, the effects are therefore considered to be **minor (not significant)** in nature.

Qualifying habitat: Estuaries

5.9.57 The Estuaries qualifying habitat of the Severn Estuary SAC, in line with the overall approach to qualifying features of designated sites, is assigned an overall **high** value / sensitivity.

5.9.58 However, the Estuaries qualifying habitat feature is made up of a large number of different ecological components, one of which is the typical fish species assemblage, and this assemblage is not a designated qualifying habitat feature in its own right. Therefore, in line with the assessment presented above for the fish community of the Severn Estuary (not specifically connected to the SAC), and on the basis that the typical fish species assemblage is not itself a named qualifying feature, the ‘typical fish species assemblage’ has been assigned a value / sensitivity of **medium**.

5.9.59 Whilst the entrapment assessment has predicted potential effects on fish species at a population level, with regards to the assemblage it is appropriate in addition to

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consider the structure of the assemblage including aspects such as functional and feeding guilds so as to look at the group of species as a whole.

5.9.60 Impingement estimates generated from Hinkley Point B and scaled to Hinkley Point C, including the appropriate mitigation measures, resulted in predicted annual losses of 2.59 million fish based on CIMP1 and 1.83 million fish based on CIMP2. In addition to impingement numbers, biomass is also considered, due to its importance as a component of understanding energy flows through marine food webs. From a biomass perspective, impingement mortality equates to total annual losses of approximately 45.85 t in CIMP1 and 18.06 t in CIMP2.

5.9.61 The functional guild make-up of the fish community should also be taken into account. The dominant group within both CIMP1 and CIMP2 were 'marine migrants', including 'marine straggler' and 'marine juvenile' groups. Species classed as 'estuarine residents' (i.e., those which may breed in the estuary and able to complete their whole life-cycle in the area) comprised 2.6 % and 8.91 % numerically of CIMP1 and CIMP2, respectively, a relatively small proportion of the overall impingement dataset. The Environment Agency in their Appropriate Assessment concluded that whilst the relative contributions of different species to each functional group may change, the overall functional groups of fish utilising the estuary would unlikely be impacted by the operation

of Hinkley Point C with each group remaining represented by a number of species within the community. The new data provided by CIMP2 indicates the variability in the species present but with different estuarine user groups contributing different proportions between years, however, each user group is represented in both data series.

5.9.62 In addition to functional guilds, the fish community of the Severn Estuary comprises species with a range of feeding guilds, including detritivores, and those which feed on benthic invertebrates, zooplankton, and other fish, occupying different trophic levels. Piscivorous fish species were the most common feeding guild. However, it is noted that the dietary composition of fish is not fixed, depending on fluctuations in food abundance, predation, and seasonal changes, including spawning events.

5.9.63 Taking the above into account, the magnitude of change in relation to the assemblage structure is considered to be **low**, resulting in an overall effect on the Estuaries qualifying feature of **minor (not significant)**.

River and sea lamprey

5.9.64 As named qualifying species of the Severn Estuary SAC, both river and sea lamprey have been categorised as having **high** value / sensitivity.

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5.9.65 Only two river lampreys were recorded within the CIMP1 dataset, and none within the CIMP2 dataset, therefore accurately predicting impingement levels for Hinkley Point C is difficult. However, impingement mortality has been estimated at 14 equivalent adults per annum, contextualised against a population estimate from within the Severn Estuary of 116,109. On this basis, an entrapment mean population effect of 0.01 % was estimated, based on CIMP1 data. It is considered that this is **very low** in magnitude, resulting in a **minor (not significant)** effect.

5.9.66 For sea lamprey, updated analysis of the CIMP1 dataset resulted in a predicted annual loss of 71 individuals, against a population of 15,269 individuals. No sea lamprey were recorded in the CIMP2 dataset. These values resulted in an entrapment mean population effect of 0.43 %, based on the CIMP1 data. It is considered that this is **very low** in magnitude, resulting in a **minor (not significant)** effect.

Twaite shad

5.9.67 As a named qualifying species of the Severn Estuary SAC, twaite shad has been categorised as having **high** value / sensitivity. Updated analysis of the CIMP1 dataset predicted annual losses due to Hinkley Point C of 48 fish, with the estimate from CIMP2 analysis being 104 twaite shad. Using CIMP1 data (equivalent analysis was not

completed for CIMP2), against a population estimate of 86,696 within the Severn Estuary, this results in a mean population entrapment effect of 0.08 %.

5.9.68 Due to the importance of twaite shad, and the substantial decline recorded in recent years, across Europe as a whole, this predicted loss has been categorised as being **low** in magnitude. On this basis, the effects on twaite shad as a qualifying species of the Severn Estuary SAC is **moderate (significant)** in nature.

Severn Estuary SAC summary

5.9.69 Based on the above findings, potential effects on the Severn Estuary SAC are considered to be **minor (not significant)** in nature, with the exception of twaite shad, for which the effect is **moderate (significant)**.

Severn Estuary SPA

5.9.70 Potential effects on the qualifying species of the Severn Estuary SPA are predominantly indirect in nature, through changes to prey resources for those species which are piscivorous in nature, i.e. reliant on fish as a prey resource. For the purposes of this assessment, the species have been divided into those named directly, and the 'waterbird assemblage'.

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Qualifying species

5.9.71 The named qualifying species of the Severn Estuary SPA (Bewick's swan, greater white-fronted goose, dunlin, common redshank, common shelduck, and gadwall) have been categorised as being of **high** value / sensitivity. Of these species, none are piscivorous in nature. Therefore, through changes to fish populations in the Severn Estuary, the magnitude of change is categorised as **very low**. Therefore, effects are considered **minor (not significant)** in nature.

Waterbird assemblage

5.9.72 The waterbird assemblage is itself a qualifying feature of the SPA. Therefore, the waterbird assemblage has been categorised as of **high** value / sensitivity.

5.9.73 The assemblage comprises all the birds named individually as qualifying species, as well as 10 further species which have nationally important populations. As with the species listed above, these species are not piscivorous in nature. In addition, the magnitude of change must be assessed against the assemblage as a whole. Therefore, the magnitude of changes is categorised as **very low**, resulting in effects which are considered **minor (not significant)** in nature.

Severn Estuary SPA summary

5.9.74 Based on the above findings, potential effects on the Severn Estuary SPA are considered to be **minor (not significant)** in nature.

Severn Estuary Ramsar Site

5.9.75 The Severn Estuary Ramsar is designated under six criteria. These are assessed individually in the following subsections.

Criterion 1: Immense tidal range

5.9.76 As a qualifying feature of the Ramsar site, the immense tidal range is categorised as being of **high** value / sensitivity. However, based on the nature of the Proposed Changes, and the insignificant predicted effects on marine water quality, it is considered that changes are categorised as **very low** in magnitude. Therefore, effects are considered to be **minor (not significant)** in nature.

Criterion 3: Unusual estuarine communities

5.9.77 The 'unusual estuarine communities' of the Severn Estuary Ramsar Site is characterised by reduced diversity and high productivity. As a qualifying feature, it is categorised as being of **high** value / sensitivity. The primary pathway of effect from the Proposed Changes to

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estuarine communities is through altered marine water and sediment quality. As described above, potential effects on marine water and sediment quality have been found to be **very low** in magnitude. On this basis, effects on the 'unusual estuarine communities' is considered to be **minor (not significant)** in nature.

Criterion 4: Migratory fish assemblage

- 5.9.78 The qualifying feature is the migratory assemblage (not the individual species) and the assemblage as a qualifying feature has been categorised as being of **high** value / sensitivity.
- 5.9.79 The migratory fish assemblage comprises seven fish species: sea lamprey; river lamprey; twaite shad; Allis shad; Atlantic salmon; sea trout; and European eel. Of these seven species, three are also qualifying species of the Severn Estuary SAC (and of other designated sites, as described and assessed below).
- 5.9.80 The population-level effects for river lamprey, sea lamprey and twaite shad for the Severn Estuary SAC are relevant here (concluded as being **minor to moderate** in nature).
- 5.9.81 For Allis shad, using CIMP1 data, predicted losses of 11 individuals per year equated to 1.48 % of the Ramsar Site population. No Allis shad were recorded in the CIMP2

dataset. On this basis, effects are considered **low** in magnitude.

- 5.9.82 Data on Atlantic salmon from the RIMP and CIMP1 were used to predict a revised value of 22 adults impinged per annum by Hinkley Point C, equating to 0.08 % of the Severn Estuary population estimate. On this basis, effects are considered **very low** in magnitude.
- 5.9.83 No sea trout were recorded in either CIMP sampling programme, and occurrences are therefore very uncommon events, resulting in uncertainty in impingement predictions. The Environment Agency, in their 2022 Appropriate Assessment, calculated impingement effects based on a single occurrence in the RIMP dataset and estimated annual losses of 8 adult equivalent fish per annum. This equates to <0.01 % of the Severn Estuary Ramsar Site population. On this basis, effects are considered **very low** in magnitude.
- 5.9.84 European eels are subject to two routes of impact from Hinkley Point C: entrapment of juvenile (glass eel) stages, and impingement of larger fish. European eel are not hearing specialists, and studies from other sites using AFDs have not shown significant reductions in impingement of adult eels. The AFD was therefore assumed to have zero benefit for eels. Despite the predicted small contribution of Hinkley Point C entrainment to glass eel losses (relative to the ongoing

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licenced fishery), the Environment Agency’s estimated effects equate to approximately 3 % of the equivalent silver eel biomass. Effects are considered **low** in magnitude.

- 5.9.85 Based on the above it is predicted that effects on the migratory fish species assemblage are overall **low** in magnitude, and, when combined with the **high** sensitivity / value of the assemblage qualifying feature, effects are considered **moderate (significant)** in nature.

Criterion 5: Wintering waterfowl assemblage

- 5.9.86 The assemblage protected under Criterion 5 of the Severn Estuary Ramsar Site comprises the same bird species as the Severn Estuary SPA waterbird assemblage. Therefore, the impact assessment presented above in relation to that qualifying feature (the assemblage being classed as **high** value / sensitivity, with a **very low** magnitude of change) is also applicable to this Criterion 5 assemblage. On this basis, effects on the wintering waterfowl assemblage are considered to be **minor (not significant)** in nature.

Criterion 6: Regularly supporting more than 1 % of individuals in a population of named bird species.

- 5.9.87 With the exception of lesser black-backed gull, the species represented under Criterion 6 of the Severn

Estuary Ramsar Site include a number of the same species as those listed within the Severn Estuary SPA waterbird assemblage (namely: Bewick’s swan; greater white-fronted goose; dunlin; common redshank; common shelduck; gadwall; ringed plover; Eurasian teal; and northern pintail). Therefore, the impact assessment presented above in relation to that qualifying feature (the assemblage being classed as **high** value / sensitivity, with a **very low** magnitude of change). Effects are therefore found to be **minor (not significant)** in nature.

- 5.9.88 Unlike the other species listed under Criterion 6, the lesser black-backed gull is piscivorous in nature. However, whilst fish comprise the majority of the gull’s diet, the species does not prey exclusively on any individual species; rather it is opportunistic, feeding also on prey items including squid, crustaceans, small marine organisms, and surface offal. They have also been known to feed in the terrestrial environment, taking other birds’ eggs and rodents as prey.

- 5.9.89 On this basis, it is concluded that, despite potential entrapment effects predicted on some fish species, there are sufficient alternative prey resources for the lesser black-backed gull. Therefore, with a value sensitivity of **high**, based on its position within the qualifying assemblage, and a **very low** magnitude of change, resulting in effects which are **minor (not significant)** in nature.

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Criterion 8: Wetland habitat including food and nursery ground for fish species.

5.9.90 Following the conclusion of the WDA Permit Inquiry, it was confirmed that fish species are not part of / incorporated into Criterion 8. Therefore, the primary pathway of effects considered is via potential changes to water quality. As a qualifying feature of the Severn Estuary Ramsar Site, the wetland habitat has been categorised as being of **high** value / sensitivity.

5.9.91 Potential effects on marine water quality were considered to represent a **very low** magnitude of change. On this basis, effects on wetland habitats under Criterion 8 are considered to be **minor (not significant)** in nature.

Severn Estuary Ramsar site summary

5.9.92 Based on the above findings, effects on the Severn Estuary Ramsar Site are considered to be **minor (not significant)** in nature, with the exception of the migratory fish assemblage, effects are considered to be **moderate (significant)** in nature.

River Wye SAC

5.9.93 The River Wye SAC is designated for a number of qualifying habitats and species, including those wholly

freshwater in nature. These have been considered collectively within this assessment.

Qualifying features: Freshwater habitats and species

5.9.94 The qualifying features of the River Wye SAC wholly freshwater in nature are:

- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation;
- Transition mires and quaking bogs;
- White-clawed (or Atlantic stream) crayfish;
- Brook lamprey;
- Bullhead; and
- Otter.

5.9.95 As named qualifying features of the SAC, the above have been categorised as having **high** value / sensitivity. However, from a marine ecological / marine water quality perspective, it is considered that there is no pathway of effect between the Proposed Changes and the freshwater habitats and species. Therefore, it is considered that there will be a **very low** magnitude of change, resulting in effects which are **minor (not significant)** in nature.

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River and sea lamprey

- 5.9.96 Potential effects on river and sea lamprey of the River Wye SAC are the same as those described and assessed under the Severn Estuary SAC above. Categorised as being of **high** value / sensitivity, and with effects classed as **very low** in magnitude, effects on both species are concluded as being **minor (not significant)** in nature.

Twaite shad

- 5.9.97 As described under the assessment of effects of twaite shad of the Severn Estuary SAC, there are predicted annual losses of 48 adult fish based on the CIMP1 dataset, and up to 104 adult fish based on the CIMP2 dataset. Against an estimated population of the River Wye SAC of 43,348 individuals, and using the CIMP1 dataset, this equates to an entrapment mean population effect of 0.16 %. This is categorised as being of **low** magnitude.

- 5.9.98 With a value / sensitivity of **high**, being a named qualifying feature, this results in effects categorised as **moderate (significant)** in nature.

Atlantic salmon

- 5.9.99 As described under the assessment of the Severn Estuary Ramsar Site (Criterion 4), data from the RIMP

and CIMP1 datasets predict losses of 22 adult salmon through impingement per annum. When compared to a population estimate from the RIMP of 5,890, this equates to an entrapment mean of 0.18 %. This is considered to be **low** in magnitude, and on a qualifying feature of **high** value / sensitivity, this results in effects categorised as **moderate (significant)** in nature.

Allis shad

- 5.9.100 As described under the Severn Estuary Ramsar Site, there are predicted losses of 11 individuals per year, drawing on CIMP1 data. When compared to the population estimate for the River Wye SAC of 433 individuals, this equates to a mean entrapment population effect of 3.70 %. This is considered to be **low** in magnitude, and on a qualifying feature of **high** value / sensitivity, this results in effects categorised as **moderate (significant)** in nature.

River Wye SAC summary

- 5.9.101 Based on the above findings, effects on the River Wye SAC are considered to be **minor (not significant)** to **moderate (significant)** in nature.

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River Usk SAC

- 5.9.102 As with the River Wye SAC, the River Usk SAC is designated for both freshwater qualifying features and migratory fish species. Those wholly freshwater in nature have again been assessed collectively.
- 5.9.103 The qualifying features of the River Usk SAC which are wholly freshwater in nature are:
- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation;
 - Brook lamprey;
 - Bullhead; and
 - Otter.
- 5.9.104 As named qualifying features of the SAC, the above have been categorised as having **high** value / sensitivity. However, from a marine ecological / marine water quality perspective, it is considered that there is limited interaction between the Proposed Changes and the freshwater habitats and species. Therefore, it is considered that there will be a **very low** magnitude of change, resulting in effects which are **minor (not significant)** in nature.

River and sea lamprey

- 5.9.105 Based on predicted mean annual losses for river lamprey of 14 equivalent adults, against a baseline population of 116,109 fish (as presented above for the Severn Estuary SAC), there is an estimated annual effect from Hinkley Point C on 0.01 % of the river lamprey population. With the species categorised as having **high** value / sensitivity due to its status as a named qualifying species, and this effect considered to be of **very low** magnitude, effects are concluded to be **minor (not significant)** in nature.
- 5.9.106 For sea lamprey, based on the CIMP1 dataset, mean annual losses of 71 equivalent adults are predicted from Hinkley Point C. When this is contextualised against a population estimate of 15,269 individuals, this equates to an annual entrapment effect of 0.46 %. With the species categorised as having **high** value / sensitivity due to its status as a named qualifying species, and this effect considered to be of **very low** magnitude, effects are concluded to be **minor (not significant)** in nature.

Twaite shad

- 5.9.107 Based on updated calculations, there is the potential for annual losses of 48 equivalent adult twaite shad based on CIMP1 data, and up to 104 adult fish based on CIMP2 data. When contextualised against a population estimate of 21,674 adults, this equates to an entrapment mean

population effect of 0.33 %, based on CIMP1 data. With the species categorised as being of **high** value / sensitivity, and this effect considered to be of **low** magnitude, effects are concluded to be **moderate (significant)** in nature.

Atlantic salmon

5.9.108 With limited salmon impinged during the CIMP and RIMP surveys, data from both datasets were collated, resulting in estimated losses of 22 equivalent adult salmon per year. When contextualised against an estimated River Usk population of 6,269 adults, this results in predicted losses of 0.2 %. With the species categorised as being of **high** value / sensitivity, and this effect considered to be of **low** magnitude, effects are concluded to be **moderate (significant)** in nature.

Allis shad

5.9.109 Although two Allis shad were impinged during CIMP1, none were positively identified during CIMP2 surveys. Further, during their review of population estimates for their 2020 HRA, the Environment Agency found no evidence of Allis shad in the River Usk. Therefore, no specific analysis of impingement data to quantify potential effects on the species in the River Usk SAC was undertaken. The species is classed as being of **high** value / sensitivity due to its status as a named qualifying

species. However, with low numbers impinged, and no individuals confirmed within the River Usk, the magnitude of change is considered **very low**, resulting in a **minor (not significant)** effect.

River Usk SAC summary

5.9.110 Based on the above findings, effects on the River Usk SAC are considered to be **minor (not significant) to moderate (significant)** in nature.

River Towy SAC

5.9.111 As with the above sites, the River Towy SAC is designated for both freshwater qualifying features and migratory fish species. Those wholly freshwater in nature have again been assessed collectively.

5.9.112 The qualifying features of the River Towy SAC which are wholly freshwater in nature are:

- Otter;
- Brook lamprey; and
- Bullhead.

5.9.113 As named qualifying features of the SAC, the above have been categorised as having **high** value / sensitivity. However, from a marine ecological / marine water quality perspective, it is considered that there is limited

interaction between the Proposed Changes and the freshwater species. Therefore, it is considered that there will be a **very low** magnitude of change, resulting in effects which are **minor (not significant)** in nature.

River and sea lamprey

5.9.114 For both river and sea lamprey, there is no specific population estimate for individuals within the River Towy, therefore a qualitative assessment has been undertaken. Based on the **high** value / sensitivity of the species, and the predicted **very low** magnitude of change, effects are predicted to be **minor (not significant)** in nature.

Twaite and Allis shad

5.9.115 As with lamprey, no targeted determination of impingement rates for shad of the River Towy has been undertaken. Based on the limited data available, whilst both species are categorised as being of **high** value / sensitivity, effects are assumed to be **very low** in magnitude, and therefore **minor (not significant)** in nature.

Site summary

5.9.116 Based on the above findings, effects on the River Towy SAC are considered to be **minor (not significant)** in nature.

Bideford to Foreland Point MCZ

5.9.117 Due to its nationally designated status, Bideford to Foreland Point MCZ has been assigned a value / sensitivity of **high**. As described within **Section 5.5**, the majority of protected features for which the site was classified as an MCZ are static subtidal and intertidal habitats. At a distance of approximately 42 km from the Hinkley Point C site, however, it is considered that there is limited interaction between the static habitats and the Proposed Changes. Therefore, the magnitude of change for these features would be **very low** in magnitude, resulting in **minor (not significant)** effects.

5.9.118 Most of the protected species of the MCZ (sponge and anthozoan communities, honeycomb worm, and pink sea-fan), are also static in nature; again, it is considered that there will be no pathway of effects between the Proposed Changes and the MCZ, so the magnitude of change for these features would be **very low** in magnitude, resulting in **minor (not significant)** effects.

5.9.119 Whilst the spiny lobster is mobile in nature, it is considered unlikely that individuals originating in the MCZ would be found in proximity to the Proposed Changes. On that basis, it is concluded that the magnitude of change for the species would be **very low** in magnitude, resulting in **minor (not significant)** effects.

5.9.120 Overall, therefore, effects on the Bideford to Foreland Point MCZ are considered to be **minor (not significant)** in nature.

Morte Platform MCZ

5.9.121 As with the Bideford to Foreland Point MCZ, protected features of the Morte Platform MCZ have been assigned a **high** value / sensitivity, due to their nationally designated status.

5.9.122 All protected features of the Morte Platform MCZ are static substrates, and at a distance of approximately 75 km from the Hinkley Point C site, it is considered that there is limited interaction between these habitats and the Proposed Changes. Therefore, the magnitude of change for these features would be **very low** in magnitude, resulting in **minor (not significant)** effects.

5.9.123 With no qualifying species listed as features of the Morte Platform MCZ, overall, therefore, effects on the designated site are considered to be **minor (not significant)** in nature.

Summary of Likely Significant Effects

5.9.124 The effects reported on marine ecological receptors and marine water quality in the original ES (see **Table 1-2 of Volume 1 Chapter 1**), and the findings of this interim

assessment, are presented in **Table 5-12**. Only effects associated with the proposed change to the cooling water infrastructure have been included: there are no other changes to the original assessment anticipated, and so the findings of the original assessment remain valid in all other cases.

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Table 5-12: Effects associated with the marine ecology receptors as a result of the project as changed by the proposed changes on-site

Proposed Change	Receptor	Value / Sensitivity	Original ES - Assessment findings for the Hinkley Point C consented development		Assessment of project as changed by proposed changes (current baseline)		Change in level of effect from original ES
			Assessment stage	Likely Adverse Significant Effect(s)	Assessment stage	Likely Adverse Significant Effect(s)	
Removal of the requirement to install an AFD	Fish species of the Severn Estuary / Inner Bristol Channel, including species of conservation interest	Medium	Operation	Minor (when considering the fish community overall)	Operation	Minor (when considering the fish community overall)	No change
	Piscivorous fish species	Medium	N/A – Not considered within original ES		Operation	Minor	N/A – Not considered within original ES
	Piscivorous seabirds	High	N/A – Not considered within original ES		Operation	Minor	N/A – Not considered within original ES
	Marine mammals	High	N/A – Not considered within original ES		Operation	Minor	N/A – Not considered within original assessment
	Marine sediment quality	Medium	N/A – Not considered within original ES		Operation	Minor	N/A – Not considered within original assessment
	Severn Estuary SAC	High	N/A – Not considered within original ES		Operation	Minor to Moderate	N/A – Not considered within original assessment

Proposed Change	Receptor	Value / Sensitivity	Original ES - Assessment findings for the Hinkley Point C consented development		Assessment of project as changed by proposed changes (current baseline)		Change in level of effect from original ES
			Assessment stage	Likely Adverse Significant Effect(s)	Assessment stage	Likely Adverse Significant Effect(s)	
	Severn Estuary SPA	High	N/A – Not considered within original ES		Operation	Minor	N/A – Not considered within original ES
	Severn Estuary Ramsar Site	High	N/A – Not considered within original ES		Operation	Minor to Moderate	N/A – Not considered within original ES
	River Wye SAC	High	N/A – Not considered within original ES		Operation	Minor to Moderate	N/A – Not considered within original ES
	River Usk SAC	High	N/A – Not considered within original ES		Operation	Minor to Moderate	N/A – Not considered within original ES
	River Towy SAC	High	N/A – Not considered within original ES		Operation	Minor	N/A – Not considered within original ES
	WFD waterbodies	High	Operation	Minor	Operation	Minor	No change
	Bideford to Foreland Point MCZ	High	N/A – Not considered within original ES		Operation	Minor	N/A – Not considered within original assessment
	Morte Platform MCZ	High	N/A – Not considered within original ES		Operation	Minor	N/A – Not considered within original ES

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5.10 Potential Mitigation

Mitigation measures for impingement of fish

5.10.1 There is no formal, mandatory guidance for mitigation of abstraction impacts at nuclear new build sites; however, for large, direct-cooled plant, best practice guidance and evidence from the Environment Agency (Environment Agency 2005⁵⁶, 2010⁵⁷) presents the following cooling water intake design features:

- maintenance of low velocities at all tidal states, via LVSE intake design;
- installation of a FRR system to intercept and return any fish which are entrained to the sea; and
- installation of an AFD system to the intake structure to provide avoidance cues.

5.10.2 Based on the above interim findings, along with the safety case / project risks associated with the installation of an AFD system, an AFD is no longer being considered as a mitigation measure for the impingement of fish and other

species at Hinkley Point C. All other mitigation measures listed above will be provided as outlined in the approved CW1 report⁵⁸.

5.10.3 The following two sections provide a brief overview of the location and structure of the intake heads, including use of capped LVSE, and the FRR system, showing how they comply with the recommendations made by the Environment Agency. Full details of the systems, and associated analysis of mitigation success, can be found in the approved CW1 report.

Location / Intake water velocity

5.10.4 The location of the four Hinkley Point C cooling water intake structures are not in the proximity of any known fish spawning or nursery grounds, providing further mitigation against potential effect on fish populations. In addition, the intake is over 10 km to the south of the main channel of the Severn Estuary, where tidal velocities are at their greatest. This means the chance of diadromous fish associated with the Rivers Wye, Usk and Severn are

⁵⁶ Environment Agency (2005) Best practice guide for intake and outfall fish screening. Environment Agency Science Report SC030231. Bristol: Environment Agency.

⁵⁷ Environment Agency (2010) Cooling water options for the new generation of nuclear power stations in the UK. Environment Agency Science Report SC070015/SR3. Bristol: Environment Agency.

⁵⁸ NNB GenCo (Hinkley Point C) (2017) Hinkley Point C Cooling Water Infrastructure Fish Protection Measures: Report to Discharge Requirement CW1 (Paragraph 1) and Marine Licence Condition 5.2.31. Report No. NNB-209-REP-0001030.

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highly unlikely to be swimming close to the Hinkley Point C intake⁵⁹.

5.10.5 The intake design has been developed along the principles outlined within the Environment Agency’s best practice, referenced there as the capped LVSE intake design. This design provides substantially lower velocities around the tidal cycle than the open-all-round cooling water intake structures as installed at Hinkley Point A and Hinkley Point B. However, in the absence of an AFD providing a deterrent cue there is uncertainty over the effectiveness of some of the design features of the LVSE. As a result of the uncertainty, this report assumes no benefit of the LVSE beyond that of the vertical cap. The intake cap reduces the vertical current and therefore reduces the impingement of pelagic species.

5.10.6 A review of the evidence for head designs undertaken by the Environment Agency (Environment Agency, 2020⁶⁰) concluded that capped heads afford a *“higher level of protection for pelagic species than for benthic and proximo-benthic species”*. The literature cited therein includes a review by the New York State Department of

Environmental Conservation that suggests capped heads reduce catches of all species by around 76 % (+/- 14.7 %) and benthic-dominated catches by 57 %.

5.10.7 A precautionary approach has been adopted for this interim assessment, and it has been assumed that only pelagic species would benefit appreciably from this measure.

Fish Recovery and Return ('FRR') System

5.10.8 Drum screens within the onshore cooling water pumphouse area are designed primarily to exclude debris that might clog the steam condensers within the turbine hall. The drum screen system selected for Hinkley Point C is suitable for a FRR system and will follow or improve upon the detailed Environment Agency guidance on FRR system design. In particular, it will include the following features:

- smooth-finish drum screen of up to 5 mm spacing;
- fish bucket design suitable for retention of eel, lamprey and other fish and crustacean species;

⁵⁹ Proof of Evidence of Dr Simon Jennings. Environmental Permitting (England and Wales) Regulations 2016. Appeal by NNB Generation Company (Hinkley Point C) Limited (the “Appellant”) Water Discharge Activity at Hinkley Point C, Somerset. Permit Variation Application

relating to Acoustic Fish Deterrent Application Ref: EPR/HPS3228XT.V004. Appeal Ref: APP/EPR/573.

⁶⁰ Environment Agency, 2020. Technical Brief: TB007. Low Velocity Side Entry Intake Design; effect of intake velocity cap. Draft-04.pdf

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- continuous screen rotation at an elevation rate of at least 1.5 m per minute;
- low pressure (<1 bar) followed by high pressure (usually >3 bar) backwash sprays;
- hopper geometry to minimise the risk of fish recycling within the screen well; and
- smooth-finish gutters with horizontal and vertical bend radius ≥ 3 m.

5.10.9 On review of various options, the chosen route for fish return to the subtidal estuary will be via a dedicated bored tunnel driven from landward, under the seawall and intertidal shore, to a specific point on the tidally scoured rock exposure below Lowest Astronomical Tide ('LAT') but above the subtidal muddy plain. In selecting this location there has been a need to balance several requirements, not least that the relatively small outfall structure does not become clogged due to progressive siltation with relative sea level rise over the design life of Hinkley Point C.

Potential compensation measures under consideration

5.10.10 As explained within **Section 1.4 in Volume 1 Chapter 1**, a need has been identified for the deployment of compensation measures for the relevant migratory fish

species and the wider fish assemblage in the context of the HRA for the proposed changes. At the time of writing, discussions are ongoing with the key regulatory stakeholders with respect to the identification and assessment of potential compensatory measures, and how these may be effectively deployed and monitored. The measures currently under consideration are described in more detail in **Volume 3** of this PEIR.

5.10.11 As set out above, it has been concluded that there is the potential for likely significant effects on some aspects of marine ecology (but not on water / sediment quality) as a result of the proposed changes. This is due to the identification of some moderate effects on nature conservation sites. As explained in the HRA Report, the abovementioned compensation measures will be provided by NNB. The effects of those compensation measures will also be assessed in the ES in due course and are assessed on a preliminary basis in **paragraph 1.2.1** and the sections which follow in **Volume 3** of this PEIR.

Site-Specific Cumulative Effects

5.10.12 The cumulative assessment methodology is based on Volume 2, Chapter 18 (Marine Water Quality) and Chapter 19 (Marine Ecology) of the original ES (see **Table 1-2 in Volume 1 Chapter 1**), and updated accordingly, taking into account newly identified projects

and plans within the vicinity of the proposed changes. **Volume 4 Chapter 2** presents a more detailed methodology and summary of the cumulative effects assessment.

5.10.13 Based on data and analysis previously presented within this chapter, cumulative effects as a result of non-installation of an AFD are not anticipated.

5.11 Summary

5.11.1 Impacts considered within this interim assessment include the entrapment of fish and the subsequent indirect effects on piscivores (fish, seabirds, and marine mammals), and changes to marine water and sediment quality. Potential effects on designated sites have also been considered.

5.11.2 The EIA will consider the emerging and developing evidence base, drawing on the final outcomes of this data, and the relevant findings will be reported within the ES.

5.12 Next Steps

5.12.1 The EIA will include a detailed assessment of potential effects on marine ecology and marine water/sediment quality, drawing upon, as applicable, any additional

analysis and assessment work on the newly collected fish impingement data from Hinkley Point B, and further desk-based study.

5.12.2 This assessment will be presented within the ES, to be submitted as part of the proposed material change application.

6. LANDSCAPE AND VISUAL

6.1 Introduction

- 6.1.1 This chapter considers whether the Hinkley Point C Project, as changed by the proposed changes on-site, will give rise to new or materially different likely significant effects on landscape character and visual amenity from those identified in the original ES. Landscape and visual impact assessment ('LVIA') is defined in the Guidelines for LVIA, Third Edition ('GLVIA3')⁶¹ as '*a tool used to identify and assess the significance of and the effects of change resulting from development*'.
- 6.1.2 The Aspects of landscape and visual amenity have been considered individually. Landscape takes its character from a combination of elements, including landform, watercourses, land use and pattern, land cover / vegetation, open space, and cultural heritage influences.
- 6.1.3 To a large extent, people experience the landscape visually, and the quality of views can affect the quality of life. This assessment addresses potential changes in the quality of existing views, taking into account the extent to

which the proposed changes would be visible from surrounding residential properties, settlements, farms, and footpaths.

- 6.1.4 This chapter provides a summary of the landscape and visual-related stakeholder engagement carried out to date, and the assessment methodology for the LVIA. This chapter also presents baseline conditions relevant to landscape and visual effects; an outline of potential landscape and visual impacts; design and mitigation; and a summary of likely significant effects that would be caused by the proposed changes on-site.
- 6.1.5 The proposed changes to the ISFS, Equipment Storage Building and meteorological mast have the potential to result in impacts on both landscape character and visual amenity and therefore these changes have been considered further. The details of the proposed changes to the ISFS, the Equipment Storage Building and meteorological mast are described in **Volume 1 Chapter 2**.
- 6.1.6 The proposed removal of the requirement to install an AFD has no possible landscape or visual effects. The proposed retention of the existing Hinkley Point

⁶¹ The Landscape Institute and Institute of Environmental Management and Assessment (2013) Guidelines for Landscape and Visual Impact Assessment Third Edition (GLVIA3). Abingdon, Routledge.

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Substation and the installation of the sluice gates storage structures would be very small alterations to the approved Hinkley Point C Project and are unlikely to result in any perceptible change. Therefore, it is proposed to scope these changes out of further assessment, as outlined in the Scoping Report. This has been agreed by the Planning Inspectorate in the Scoping Opinion (comment ID 3.2.1).

6.2 Engagement and Consultation

6.1.7 As outlined in **Volume 1 Chapter 2 paragraph 2.3.42**, the proposed changes to the ISFS and Equipment Storage Building were included in the non-material change application in 2017. Following submission of that application, concerns were raised that landscape and visual matters had not been fully considered in relation to the alteration of the ISFS building parameters when changing from wet to dry storage and the location and alteration in building parameters of the Equipment Storage Building. These concerns and how these have been / will be considered within the proposed material change application have been compiled into **Table 2-3** in **Volume 1 Chapter 2**.

6.1.8 Type 1 visualisations will support the LVIA, subject to agreement with the relevant stakeholders. The Type 1 visualisations comprise simple, annotated photographic

illustrations of the proposed changes on-site. NNB sought agreement from relevant stakeholders on the methodology for the production of these Type 1 visualisations (included as **Appendix A** of this PEIR). Agreement in full has been received from Somerset West and Taunton Council (now part of Somerset Council). The Quantock Hills Area of Outstanding Natural Beauty ('AONB') service agreed to the methodology but not as yet the visualisation locations. Sedgemoor District Council (who are now part of Somerset Council along with Somerset West and Taunton Council) verbally agreed but written agreement is yet to be received.

6.1.9 A visualisation methodology document has been included as **Appendix A** of this PEIR, for consultation.

6.1.10 The PEIR includes consideration of the potential effects on views along the West Somerset Coastal Path, in response to the Scoping Opinion. Refer to **Table 6-1** below.

6.3 Scoping Scoping Opinion

6.3.1 The Scoping Opinion was received on 3 May 2022. Regulation 14(3) of the 2017 EIA Regulations states that the ES must be based on the most recent scoping opinion

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adopted (so far as the proposed development remains materially the same as the proposed development which was subject to that opinion). To demonstrate compliance with Regulation 14(3), **Table 6–1** illustrates how the comments raised in the Scoping Opinion in relation to landscape and visual have been considered.

Table 6–1: Comments received as part of the Scoping Opinion

Consultee	ID	Comment	Response
Planning Inspectorate	3.2.1	<i>'The Inspectorate notes that the Hinkley Point C substation is to become a permanent building and the sluice gates are new structures. However, the Inspectorate agrees that these matters can be scoped out from the landscape and visual impact assessment in the ES as additional significant landscape and visual effects are unlikely to arise due to their location and context of the wider Hinkley Point development site.'</i>	It is acknowledged that the Planning Inspectorate agrees that effects from the Hinkley Point Substation and sluice gates storage can be scoped out of the landscape and visual assessment.
Planning Inspectorate	3.2.7	<i>The Scoping Report seeks to scope this matter out [Effects on Fairfield Historic Park and Garden and Nether Stowey Conservation Area resulting from the Proposed Changes] on the grounds that there are unlikely to be views to the ISFS from either receptor. On the basis of the Site layout plan in Appendix A, the Inspectorate agrees that LSE are unlikely to arise and this matter can be scoped out of further assessment.</i>	It is acknowledged that the Planning Inspectorate agrees that effects from the ISFS on Fairfield Historic Park and Garden and Nether Stowey Conservation Area can be scoped out of the landscape and visual assessment. This Planning Inspectorate response (ID 3.2.7) has been included here to inform the response (ID 3.2.8) below.
Planning Inspectorate	3.2.8	<i>'In relation to VP7, while Table 10-5 states that this viewpoint would be scoped out, para 10.5.13 of the Scoping Report states that the effects on the setting of Stogursey Conservation Area have been scoped in and will be considered under VP7. On this basis, the Inspectorate does not consider that this viewpoint can be scoped out from</i>	Location VP7 refers to Fairfield House which is over 1 km outside of the Stogursey Conservation Area and was incorrectly identified in the scoping report to assess the effects on Stogursey Conservation Area

Consultee	ID	Comment	Response
		<i>further assessment. Accordingly, the ES should include an assessment of the effects on this viewpoint or evidence demonstrating the absence of an LSE and agreement with the relevant stakeholders, where possible.'</i>	However, VP18 is included in this PEIR and considers the impacts on the residential area of Stogursey, Burgage Road and Lime Street (including the Conservation Area). It is not considered that Fairfield House requires further assessment as the Planning Inspectorate has set out in the Scoping Opinion (ID 3.2.7).
Planning Inspectorate	3.2.9	<i>'The Scoping Report states that the views at dusk recorded for the original ES would not be included in the assessment of the Proposed Changes as the lighting design for the development will not be amended. The Inspectorate agrees that this matter can be scoped out of further assessment.'</i>	It is acknowledged that the Planning Inspectorate agrees that views at dusk can be scoped out of the landscape and visual assessment.
Planning Inspectorate	3.2.10	<i>'The Inspectorate has reviewed the figures submitted with the original ES and the revised Site layout plan in Appendix A of the Scoping Report and is content that these viewpoints can be scoped out of further assessment. However, the assessment should also include a viewpoint which represents the views from the National Coastal Footpath (the Applicant's attention is drawn to the comments from Somerset West and Taunton Council and Stogursey Parish Council in Appendix 2 of this report).'</i>	An additional viewpoint (representative viewpoint VP19a) has been identified along the West Somerset Coastal Path which represents the views from the National Coastal Footpath. The viewpoint is closer to the Hinkley Point C site and provides views to the ISFS. This will be included in the updated ES.
Planning Inspectorate	3.2.11	<i>'Paragraph 10.4.2 of the Scoping Report states that an 8km study area will be used for the landscape and visual impact assessment however paragraph 10.4.4 states that a new zone of theoretical visibility will be determined for the ISFS as part of the Preliminary Environmental Information Report. It is not clear from the wording of the Scoping Report whether the study area is 8km or will be determined through this later assessment. The ES should clearly identify the final study area and provide justification for this, including agreement with relevant stakeholders where possible.'</i>	The study area extends over a distance of 8 km from the ISFS and includes the Quantock Hills AONB (refer to Figure 6.1 and Figure 6.2 in PEIR Figures – Volume 2).

Consultee	ID	Comment	Response
Planning Inspectorate	3.2.12	<i>'The Inspectorate notes that the baseline to be used in the assessment will be the baseline in the original ES to allow a 'like for like' comparison. However, the Scoping Report also states that the changes resulting from the four previous non-material change applications will be taken into consideration when assessing new impacts from the ISFS; paragraph 3.1.2 of the Scoping Report states that the four non-material changes will form part of the current baseline. These two positions appear to contradict each other. It is not clear from the Scoping Report if the non-material changes would be included in an updated baseline or would be treated as cumulative changes alongside the Proposed Changes. The ES must provide a clear definition of the baseline and an explanation as to how the non-material changes have been accounted for...'</i>	<p>The consented non-material changes will be reviewed and considered as part of the current baseline for the landscape and visual assessment. The baseline assessed in the original ES will be considered as part of the original baseline.</p> <p>The proposed changes to the ISFS (including Equipment Storage Building) and meteorological mast have been included in the preliminary landscape and visual assessment.</p>
Planning Inspectorate	3.2.13	<i>'The assessment of effects should be supported by revised photomontages which reflect the effects of the Proposed Changes.'</i>	<p>Since submission of the Scoping Report and receipt of the Scoping Opinion, it has been identified that it is not possible to access the data used to produce the original DCO photomontages. It was assumed that these data were available for the production of revised photomontages to enable the comparison of the original photomontages against the current baseline and the proposed changes.</p> <p>Supported by an appraisal by a qualified landscape architect, it is considered to be proportionate to undertake Type 1 visualisations to support the proposed material change application and LVIA, subject to agreement with the relevant stakeholders.</p> <p>Given the nature of the proposed changes, three viewpoint locations previously developed as Verified Visualisation Images within the original DCO application have been</p>

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Consultee	ID	Comment	Response
			<p>selected for developing into Type 1 visualisations for the proposed material change application to provide a suitable reflection of the proposed changes.</p> <p>The Type 1 visualisations have been produced for:</p> <ul style="list-style-type: none"> • VP13 – Public Right of Way ('ProW') No. WL 23/57, West of Wick (see Figure 6.3 in PEIR Figures – Volume 2); • VP19 – Stolford, West Somerset Coastal Path, ProW No. WL 23/95 (see Figure 6.4 in PEIR Figures – Volume 2); and • VP28 – Quantock Hills AONB, ProW No. BW 10/9 (see Figure 6.5 in PEIR Figures – Volume 2). <p>Please refer to Appendix A for further information on the methodology proposed.</p>
Sedgemoor District Council	No ID provided in Scoping Opinion	<i>'...the applicant proposes to undertake a Landscape and Visual Impact Assessment. The inclusion of this assessment is welcomed because it is not clear what impacts the proposed change to the [ISFS] may have, particularly in terms of visual impact or light pollution, these are areas of particular local concern.'</i>	<p>The ES will include a LVIA of the impacts of the proposed changes to the ISFS. The Scoping Report states that the views at dusk recorded for the original ES would not be included in the assessment of the proposed changes as the lighting design for the Hinkley Point C Project will not be amended. The Planning Inspectorate agreed that this matter could be scoped out of further assessment (Scoping Opinion ID 3.2.9) as the lighting design for the Hinkley Point C Project will not be amended.</p> <p>Furthermore, operational impacts are controlled through the DCO via a number of Requirements, which oblige NNB to submit a detailed plan or strategy that complies with the principles set out in the original ES, or to comply with a specified limit. This includes Requirement MS29 Operational Lighting Strategy, the detailed design of which will be submitted to and approved by Somerset Council.</p>

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Consultee	ID	Comment	Response
Somerset Council (formerly Somerset West and Taunton Council)	No ID provided in Scoping Opinion	<i>'...it is crucial that the Applicant provides detailed and appropriate evidence and examination on the potential for impact to visual amenity from the Coastal footpath area which will lie adjacent to the proposed new ISFS...'</i>	The ES will include a LVIA of the impacts of the changes to the ISFS. A new viewpoint location (representative viewpoint VP19a) will be included along the West Somerset Coastal Path (refer to Figure 6.1 and Figure 6.2 in PEIR Figures – Volume 2 for the location of this viewpoint).

6.4 Baseline

Baseline Context

6.4.1 The Hinkley Point C site is located to the west of and adjacent to the existing Hinkley Point Power Station Complex which includes Hinkley Point A and Hinkley Point B. It occupies farmland extending westwards up to Benhole Lane, and southwards to Holford Stream and the village of Shurton. The onshore part of the Hinkley Point C site is bounded to the north by Bridgwater Bay, from which it is separated by a low cliff. Within the vicinity of the Hinkley Point C site are a number of small villages and hamlets, including Stogursey, Shurton and Wick, widely dispersed around a network of minor roads. Within this context, the Hinkley Point Nuclear Power Station Complex is a dominant landscape feature.

Baseline for assessment

6.4.2 The preliminary assessment for the proposed changes on-site in this chapter has been undertaken with consideration of three baseline scenarios:

- the original baseline – being that outlined and assessed against within the original ES;
- the current baseline – comprising the original baseline updated to incorporate the changes approved through the four DCO non-material changes and the relevant planning consents obtained under the Town and Country Planning Act 1990 since the original baseline was prepared, as well as other relevant changes to the baseline including elements of the Hinkley Point C Project that have already been constructed; and
- the future baseline – which is the current baseline updated to take into account changes to the baseline

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that are expected to have been made by Year 1 and Year 15, including as a result of the currently consented Hinkley Point C Project in the absence of the proposed changes that will be the subject of the proposed material change application.

Landscape character baseline

- 6.4.3 The original baseline is described in Volume 2 Environmental Statement Chapter 22 Landscape and visual⁵.
- 6.4.4 There have been several changes to the original baseline on site although the current baseline is principally unaltered from the original baseline elsewhere which is described below.
- 6.4.5 In undertaking this preliminary assessment, further development changes included within the four consented non-material change applications (see **Section 1.3 in Volume 1 Chapter 1**) have been considered as part of the current baseline. One of the four non-material change applications related to a change to accommodation campuses in Bridgwater so is not considered to be relevant to the landscape baseline. The buildings included within the other three non-material change applications are all lower level Hinkley Point C buildings, as compared to the tallest buildings on the site (Reactor Buildings and Turbine Hall Buildings). The changes

principally affect smaller service buildings which have been subject to some limited repositioning, some expansion or reduction in scale, or not built, and some new smaller buildings. Each of the non-material change applications has undertaken a review of the effects on visual receptors using representative viewpoint locations identified within the original ES where the changes have the potential for new or additional landscape and visual impacts. Each of these assessments has been reviewed for this PIER and it has been concluded that there would be no change or no materially different visual effects from those already assessed in the original ES as a result of those non-material changes.

- 6.4.6 A review of the combined design changes consented through those non-material changes has been undertaken for this PIER, and with the findings from each of the three relevant landscape and visual appraisals in mind. Given the small scale of the design changes relative to the overall Hinkley Point C Project, and screening from topography, surrounding vegetation, and the Hinkley Point C Project, and the distance from surrounding visual receptors, the non-material changes are not likely to be visible and would not result in a greater combined visual effect.
- 6.4.7 An analysis of the relevant planning consents obtained under the Town and Country Planning Act 1990 since the original baseline was prepared has been undertaken to

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inform the current baseline. Given the other projects completed since the original ES was prepared in 2011 are of small scale and widely dispersed within the study area, it is concluded that there are not likely to be any materially different changes to the baseline within the study area as a result of those projects.

- 6.4.8 Physical changes to the original baseline were noted during the site work in June 2022. These principally comprise extensive construction activities clearly visible from locations near the Hinkley Point C site and the array of cranes and tall structures apparent above the skyline from surrounding areas.
- 6.4.9 Other notable changes include the establishment of ‘advance planted’ tree belts along the Hinkley Point C site boundary (refer to **Figure 6.1** and **Figure 6.2** in **PEIR Figures – Volume 2** for the Hinkley Point C site boundary), including along the southern boundary north of Shurton, and also existing tree belts and hedgerows beyond the Hinkley Point C site boundary that have further established since the original ES. A number of new pylons are apparent from locations east of the Hinkley Point C site.
- 6.4.10 As outlined in **paragraph 6.4.2**, the future baseline is the current baseline updated to take into account changes to the baseline that are expected to have been made by Year 1 and Year 15, including as a result of the currently

consented Hinkley Point C Project in the absence of the proposed changes on-site. As the current baseline beyond the site is not materially different to the original baseline in relation to landscape and visual impacts, and the Hinkley Point C Project is not materially different from the original application (with the non-material changes taken into account) (refer to **paragraphs 6.4.5** to **6.4.9**), the future baseline is assumed to be unchanged from the Year 15 assessment in the original ES.

- 6.4.11 Other projects that have been granted consent or are under construction have been considered within the cumulative effects assessment (refer to **Volume 4 Chapter 2**).

Study Area

- 6.4.12 To help establish the potential zone of influence for the proposed change to the ISFS, a Zone of Theoretical Visibility (‘ZTV’) has been developed (refer to **Figure 6.1** and **Figure 6.2** in **PEIR Figures – Volume 2**). This has helped focus the assessment on previously identified receptors and new receptors with the potential to be affected by the proposed ISFS. A ZTV has not been developed for the Equipment Storage Building and Meteorological Mast as their zone of influence is much smaller and not likely to extend beyond the zone of influence of the ISFS. Therefore, the ZTV for the ISFS is

representative of the potential visibility for all buildings included in this PEIR assessment.

6.4.13 A digital ZTV has been produced for the extended ISFS which indicates the potential area within which the proposed changes would potentially be ‘theoretically visible’. The Nuclear Islands and the Conventional Islands have been modelled for the ZTV as these are very large structures that will have a considerable influence on the visibility of the ISFS.

6.4.14 The LVIA study area for the original ES⁵ extended up to 25 km from the Hinkley Point C site which is proportional to the scale of the original Hinkley Point C site and area over which it is likely to influence.

6.4.15 The proposed LVIA study area for the assessment of the proposed changes extends to 8 km from the Hinkley Point C site. This distance includes the more defined topographical features and extends to the Quantock Hills AONB west of the Hinkley Point C site and includes the extent of directly affected landscape character areas. Receptors beyond this distance are unlikely to be significantly affected and for the more outlying receptors the proposed changes would not result in any perceptible change.

6.4.16 Through site work undertaken during June 2022 and a review of the ZTV, it was found that topography,

vegetation, existing development, and the consented Hinkley Point C Project (as indicated on **Figure 6.2** in **PEIR Figures – Volume 2**, the ZTV) limit the influence of the ISFS. Areas to the west within the very gently undulating landform will mostly be screened by the consented Hinkley Point C Project. Topography and vegetation also limit the potential influence of the proposed changes to the south and south-east beyond Stogursey and Stockland Bristol, while site work established that intervening woodland and tree belts limited views of the proposed changes from the east.

6.4.17 The main areas where the proposed changes may be theoretically visible are along the Coastal Path, the areas between Stogursey, Shurton and Wick and from elevated ground to the south-west within the Quantock Hills AONB.

Landscape character and designations

Landscape character

6.4.18 The original ES found that the Hinkley Point C Project would result in both direct and indirect impacts on The Quantock Vale Landscape Character Area (‘LCA’) as defined in the West Somerset Landscape Character Assessment, which is divided into three areas. Quantock Vale Eastern Lowlands Local Landscape Character Area (‘LLCA’) and Quantock Vale Wick Moor and Coast LLCA

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are included in this preliminary assessment. The LLCAs extend east, south and west between approximately 4 km and 6 km from the Hinkley Point C site and are characterised as lowland landscapes of wider valleys and gentle hills, rarely above 60 m AOD. Within this context, the Hinkley Nuclear Point Power Station Complex is a dominant landscape feature. Quantock Vale Wall Common and Coast LLCA would not be affected, either directly or indirectly by the proposed changes and are not included in this preliminary assessment.

- 6.4.19 In consideration of the AONB designation in safeguarding the distinctive character and natural beauty of AONBs Doniford Stream and Quantock Fringe LLCA, Central Quantocks LLCA further to the west, and Quantock Hills LLCA have been included in this preliminary assessment.
- 6.4.20 The original ES described five local seascape character areas ('LSCA') which described relevant character areas within the LVIA study area extending to the low water mark. Seascape character areas are unique geographical areas of seascape and include the shoreline. These extend along the Bridgewater Bay coastline and include areas of open water beyond the mainland, views from the land to sea, from sea to land and along the coastline. Two LSCAs, St. Audries Bay to Hinkley Point and Hinkley Point to River Parrett, cover the coastline approximately 6 km to the east and west of the Hinkley Point C site and have been included in this

preliminary assessment. Of the other three LSCAs assessed in the original ES, Blue Anchor to St. Audries Bay; Burnham-on-Sea to Brean Down; and Brean Down the operational effects of Hinkley Point C were assessed to be of minor significance in the original ES and the revised ISFS, Equipment Storage Building and Meteorological Mast would not result in any increased significance of effect.

Designations

- 6.4.21 There are several national and international designations within the wider study area. The Quantock Hills AONB is approximately 5 km to the south-west. The Hinkley Point C site is adjacent to the Severn Estuary Ramsar site, a Special Area of Conservation ('SAC'); a Special Protection Area ('SPA') and a National Nature Reserve.
- 6.4.22 Fairfield Historic Park and Garden is present within the study area and there are two Conservation Areas, Stogursey and Nether Stowey within the study area. However, there are unlikely to be views to the proposed changes from the Nether Stowey Conservation Area or Fairfield Historic Park and Garden.

Views and visual amenity

- 6.4.23 This preliminary assessment has considered how people's views from viewpoints within the study area may

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be affected by the proposed changes on-site. The assessment identifies which visual receptors are likely to be more sensitive to changes in views. The value and sensitivity of these visual receptors are classed as either high, moderate or low.

6.4.24 The identified visual receptors are:

- Residents within Stogursey, Shurton, Wick and Stockland Bristol; and
- People using Public Rights of Way ('PRoW') including the Coastal Path.

6.4.25 Representative viewpoints have been selected for this preliminary assessment from those identified within the original ES⁵, outlined in **Table 6–2**. A new location east of the Hinkley Point C site on the Coastal Path (VP19a) has also been included within the preliminary assessment in line with the Scoping Opinion.

6.4.26 The original ES identified 42 principal viewpoints and six secondary viewpoints for the visual assessment. The principal viewpoints have been reviewed by considering the residual visual effects during the construction, operation Year 1 and Year 15 phases in the original ES. The principal viewpoints that have been assessed as having a residual moderate adverse significance of effect or greater have been further considered against the proposed changes and have been included in the

preliminary assessment and listed in **Table 6–2**. The other principal viewpoints and all secondary viewpoints from the original ES have been scoped out in accordance with the Scoping Opinion, with VP7 being scoped out by NNB as explained in response to ID 3.2.8 (see **Volume 2 Chapter 2**).

Table 6–2: Principal viewpoints assessed

Viewpoint location (VP) - numbering from the original ES	Viewpoint description	Receptor type	Sensitivity Value
11	Shurton East, PRoW No. WL 23/56	Residential, recreational	High
13 (and visualisation location)	PRoW No. WL 23/57, West of Wick	Recreational	Medium
14	Pixies Mound (Wick Barrow)	Recreational	High
16	Wick, PRoW No. WL 23/61	Residential, recreational	High
18	Residential area of Stogursey (Conservation Area) Burgage Road and Lime Street	Residential, recreational	High
19 (and visualisation location)	Stolford, West Somerset Coastal Path, PRoW No. WL 23/95	Residential, recreational	High

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Viewpoint location (VP) - numbering from the original ES	Viewpoint description	Receptor type	Sensitivity Value
19a	West Somerset Coastal Path, PRoW No. WL 23/95	Recreational	High
20	Stockland Bristol, PRoW No. BW 32/3	Residential, recreational	High
26	Quantock Hills AONB, Beacon Hill	Recreational	High
28 (and visualisation location)	Quantock Hills AONB, PRoW No. BW 10/9	Recreational	High

6.5 Landscape and Visual Impact Assessment (LVIA)

Methodology

- 6.5.1 This preliminary assessment has considered the likely significant effects of the proposed changes to the ISFS, Equipment Storage Building and Meteorological Mast on landscape and visual receptors. The assessment methodology is in line with GLVIA3⁶¹.
- 6.5.2 The legislative requirements for EIA and the general approach to determining significance of effects is outlined in **Volume 1 Chapter 4**.

6.5.3 GLVIA3 provides further guidance on assessing sensitivity by combining judgements of the susceptibility of the receptor to the specific type of change proposed and the value of that receptor.

6.5.4 The full LVIA, to be presented within the updated ES, will take account of the value and sensitivity of the landscape and people's views at given locations. For example, in terms of the existing quality of landscape or relative importance of visual amenity at a given location, as well as the degree of change predicted to occur as a result of the proposed changes on-site.

6.6 Likely Significant Effects

Potential Impacts during Construction

ISFS

- 6.6.1 The assessment of landscape and visual effects in this PEIR is undertaken by considering the current baseline described in **Section 6.4**, the consented Hinkley Point C Project during each stage of assessment and any changes that occur from the revised ISFS, the Equipment Storage Building and the Meteorological Mast. The findings of this assessment are then compared with the findings of the original ES.

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- 6.6.2 The construction of the proposed larger ISFS would require tall but temporary and mobile cranes and other similar machinery. Tall, mobile cranes and similar machinery would also have been used in the construction of a wet ISFS for similar durations and in similar numbers. It is therefore likely that during construction, Eastern Lowlands LLCA (including the four-site specific LLCAs; Coastal Lilstock, Rolling Farmland East, Fairfield, Fairfield, and Quantock Fringes), Wick Moor and Coast LLCA would be directly affected, and the high sensitivity Quantock Hills AONB, and the surrounding LLCAs and SCAs would be indirectly affected. However, the construction activities would be seen in the context of wider construction activity and the effects of the construction of the larger ISFS are not likely to result in adverse effects that would be greater than those of the consented ISFS.
- 6.6.3 In the winter months residents within Shurton East (VP11), Wick (VP16), Burgage Road and Lime Street within Stogursey (VP18) and Bristol Stockland (VP20) and people using the local PRoW network and visitors to Pixies Mound (VP11, VP13, VP14, VP16 and VP20) would have medium-distance or long-distance views to the construction of the ISFS above the skyline to the north and north-west. However, construction activity and any additional crane movements would be partially filtered by existing intervening tree belts and tall hedgerows and viewed above the skyline against construction activity and the array of tall cranes operating for the Hinkley Point C site. During the summer months, vegetation in leaf would further screen or filter views of construction activity and cranes.
- 6.6.4 Walkers along the Coastal Path (VP19) would have views westwards towards the construction of the ISFS south of the Hinkley Point B complex. Construction activity for the proposed ISFS would be viewed against the array of tall cranes and buildings above the skyline. Walkers along the Coastal Path adjoining the Hinkley Point C site (VP19a) would have views towards the ISFS, however, construction activity for the proposed ISFS would be viewed within the context of the wider construction of the Hinkley Point C site.
- 6.6.5 Additional construction activity for the proposed ISFS would be barely perceptible within long-distance views from the Quantock Hills AONB (VP26 and VP28).
- 6.6.6 Overall, visual receptors would experience short term adverse effects on their views. Changes would be seen in the context of the much larger Hinkley Point C Project under construction. There will be no new or materially different likely significant effects of the proposed ISFS during construction from those of the consented ISFS assessed in the original ES.

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Equipment Storage Building

- 6.6.7 The construction of the Equipment Storage Building would be within the context of the much wider Hinkley Point C construction works and effects on landscape character would not be significant.
- 6.6.8 Construction activity for the Equipment Storage Building would potentially be visible for people within Stogursey, Wick, people using the local PRow network, including the coastal path and visitors to Pixies Mound (VP11, VP13, VP14, VP16, VP18, VP19, VP19a and VP20). There would be very long-distance views from the Quantock Hills AONB (VP26 and VP28).
- 6.6.9 The Equipment Storage Building would be heavily filtered by intervening vegetation from most locations and seen against the backdrop of construction of the wider Hinkley Point C Project. The change to landscape character and people's views would not be significant. There will be no new or materially different likely significant effects of the proposed Equipment Storage Building during construction from those of the consented Access Control Building assessed in the original ES.

Meteorological Mast

- 6.6.10 The construction of the relocated meteorological mast would be within the context of the much wider Hinkley

Point C construction works and due to the reduction in height would be less visible during construction than the consented mast. Therefore, the effect on views due to the repositioning and construction of the meteorological mast are not likely to be significant.

- 6.6.11 This new arrangement would not require the previously consented meteorological station. The equipment would instead be located outside, within a compound area situated in the vicinity of the mast, potentially resulting in a very slight reduction in construction activity. There will be no new or materially different likely significant effects of the proposed Meteorological Mast during construction from those of the consented Meteorological Mast assessed in the original ES.

Potential Impacts during Operation Year 1 and Year 15

ISFS

- 6.6.12 By winter Year 1, existing intervening tree belts and other vegetation within the surrounding area would have further established providing a greater level of screening or filtering of the Hinkley Point C Project from most viewpoint locations.

Landscape effects

- 6.6.13 At Year 1 of operation, when the ISFS is operational, the increase in size of the ISFS would result in a barely perceptible change on the directly affected Eastern Lowlands LLCA (including the four-site specific LLCAs; Coastal Lilstock, Rolling Farmland East, Fairfield, Fairfield, and Quantock Fringes), Wick Moor and Coast LLCA, and on the indirectly affected high sensitivity Quantock Hills AONB, and the surrounding LLCAs and SCAs compared to the findings in the original ES.
- 6.6.14 By Year 15, proposed new woodland planting at Brandland Copse North and Brandland Copse, east of the Hinkley Point C site (shown on Figure 22.59, the Landscape Restoration / Habitats Plan, of the original ES⁶²) would help integrate the proposed ISFS into the surrounding landscape. There will be no new or materially different likely significant effects on landscape character of the proposed ISFS during Year 1 or Year 15 of operation from those of the consented ISFS assessed in the original ES.

Visual effects

- 6.6.15 At Year 1, proposed new woodland planting on the landscaped and contoured area south of the Hinkley Point C Project would not have established sufficiently to provide screening or filtering and there are likely to be glimpsed views from locations in Shurton East and Stogursey (VP11 and VP18). There are also likely to be glimpsed views of the proposed ISFS from Wick, Stockland Bristol, Pixies Mound and the PRoW network (VP11, VP13, VP14, VP16 and VP20). During the summer months, vegetation in leaf would further screen or filter views of operational Hinkley Point C Project.
- 6.6.16 Walkers along the Coastal Path (VP19 and VP19a) would have open views to the ISFS which would be perceptibly larger, extending northwards by 79 m from its original footprint, and 8 m wider and 5 m taller than the consented ISFS. 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, therefore, the effects of the proposed ISFS alone are not likely to be significant compared to the findings in the original ES. The 55 m high stack, consented within the

⁶² EDF Energy (2011) Hinkley Point C Development Consent Order Application: Environmental Statement – Volume 2 – Chapter 22 – Figures 42a to 62 of 62. Document ref: Environmental Statement 4.3, October 2011. [[Online](#)]. Accessed 28 November 2023.

DCO, would not be required, reducing the visual draw of the ISFS.

6.6.17 Overall, visual receptors would experience short term adverse effects on their views. Changes would be seen in the context of the much larger operational Hinkley Point C site. There are no new or materially different likely significant effects of the proposed ISFS during Year 1 of operation from those of the consented ISFS assessed in the original ES.

6.6.18 By Year 15, Shurton Wood, Bishop's Wood, Brandland Copse North and Brandland Copse would have established sufficiently to provide further screening or filtering from Shurton East and Stogursey (VP11 and VP18). Views from Wick, Stockland Bristol, Pixies Mound and the PRoW network (VP11, VP13, VP14, VP16 and VP20) are possible, although by Year 15 vegetation in leaf would screen or filter views of operational Hinkley Point C site.

6.6.19 There would continue to be open views to the ISFS from the Coastal Footpath (VP19 and VP19a) which would be seen in the context of the much larger operational Hinkley Point C site and the effects of the proposed ISFS alone are not likely to be significant.

6.6.20 There would be no views of the proposed ISFS from large areas within the Quantock Hills AONB. From the PRoW

network on the northern east flank of the Quantock Hills AONB (VP26 and VP28) the proposed ISFS would be barely perceptible.

6.6.21 There are no new or materially different likely significant effects of the proposed ISFS during Year 1 or Year 15 of operation from those of the consented ISFS assessed in the original ES.

Equipment Storage Building

6.6.22 The Equipment Storage Building would be within the context of the much wider Hinkley Point C operational site and would not result in a significant effect on landscape character.

6.6.23 The Equipment Storage Building would potentially be visible from Pixies Mound (VP14) and from Wick and the PRoW network (VP13 and VP16) and from the coastal path (VP19 and VP19a) although the Equipment Storage Building would be heavily filtered by intervening vegetation from VP13 and VP16 and seen against the backdrop of the much larger ISFS from other locations. There would be no views from other viewpoint locations due to a combination of intervening topography, buildings and vegetation.

6.6.24 The change to people's views would not be significant. There are no new or materially different likely significant

effects of the proposed Equipment Storage Building during Year 1 of operation or Year 15 of operation from those of the consented Access Control Building assessed in the original ES.

Meteorological Mast

- 6.6.25 As the proposed meteorological mast would be designed to a reduced height to that originally proposed and the meteorological equipment would be located within a compound instead of a purpose-built building, no new or materially different effects compared to the original ES are likely to arise and therefore no change in significance is likely to occur.
- 6.6.26 There would potentially be some beneficial effects from the reduction in density of buildings resulting from the use of a compound instead of a building to house meteorological equipment, although this reduction is likely to be barely noticeable.

Summary of Likely Significant Effects

- 6.6.27 **Table 6–3** and **Table 6–4** outline the effects reported on landscape and visual receptors in the original ES, the effects of the project as changed by the proposed changes on-site and the degree of change as a result of

the proposed changes on-site. **Table 6–3** and **Table 6–4** demonstrate that there is no anticipated change in the level of effect for any of the receptors scoped into the assessment from what was reported in the original ES as a result of the proposed changes on-site.

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Table 6–3: Effects associated with the landscape receptors as a result of the proposed changes

Proposed Change	Receptor	Sensitivity	Original ES - Assessment findings for the Hinkley Point C consented development		Assessment of project as changed by proposed changes (current baseline)		Change in level of effect from original ES
			Assessment stage	Likely Adverse Significant Effect(s)	Assessment stage	Likely Adverse Significant Effect(s)	
ISFS Equipment Storage Building Meteorological Mast	Quantock Vale – Eastern Lowlands LLCA, West Somerset Landscape Character Assessment	Medium	Construction	Major	Construction	Major	No change
			Year 1	Minor	Year 1	Minor	No change
			Year 15	Minor	Year 15	Minor	No change
	Doniford Stream and Quantock Fringe LLCA, West Somerset Landscape Character Assessment	Medium	Construction	Minor	Construction	Minor	No change
			Year 1	Minor	Year 1	Minor	No change
			Year 15	Minor	Year 15	Minor	No change
	Central Quantocks LLCA, West Somerset Landscape Character Assessment	Low	Construction	Moderate	Construction	Moderate	No change
			Year 1	Minor	Year 1	Minor	No change
			Year 15	Minor	Year 15	Minor	No change
	Quantock Vale - Wick Moor and Coast LLCA	Medium	Construction	Major	Construction	Major	No change
			Year 1	Minor	Year 1	Minor	No change
			Year 15	Minor	Year 15	Minor	No change
	Coastal - Lilstock	High	Construction	Major	Construction	Major	No change
			Year 1	Major	Year 1	Major	No change

NOT PROTECTIVELY MARKED

Proposed Change	Receptor	Sensitivity	Original ES - Assessment findings for the Hinkley Point C consented development		Assessment of project as changed by proposed changes (current baseline)		Change in level of effect from original ES
			Assessment stage	Likely Adverse Significant Effect(s)	Assessment stage	Likely Adverse Significant Effect(s)	
			Year 15	Moderate	Year 15	Moderate	
Rolling Farmland East	Medium	Construction	Major	Construction	Major	No change	
		Year 1	Minor	Year 1	Minor	No change	
		Year 15	Minor	Year 15	Minor	No change	
Fairfield	High	Construction	Moderate	Construction	Moderate	No change	
		Year 1	Minor	Year 1	Minor	No change	
		Year 15	Minor	Year 15	Minor	No change	
Fairfield and Quantock Fringes	High	Construction	Minor	Construction	Minor	No change	
		Year 1	Minor	Year 1	Minor	No change	
		Year 15	Minor	Year 15	Minor	No change	
St. Audries Bay to Hinkley Point LSCA	High	Construction	Major	Construction	Major	No change	
		Year 1	Moderate	Year 1	Moderate	No change	
		Year 15	Moderate	Year 15	Moderate	No change	
Hinkley Point to River Parret LSCA	Medium	Construction	Minor	Construction	Minor	No change	
		Year 1	Minor	Year 1	Minor	No change	
		Year 15	Minor	Year 15	Minor	No change	
	High	Construction	Moderate	Construction	Moderate	No change	

Proposed Change	Receptor	Sensitivity	Original ES - Assessment findings for the Hinkley Point C consented development		Assessment of project as changed by proposed changes (current baseline)		Change in level of effect from original ES
			Assessment stage	Likely Adverse Significant Effect(s)	Assessment stage	Likely Adverse Significant Effect(s)	
	Quantock Hills LLCA, Sedgemoor Landscape Assessment and Countryside Design Summary		Year 1	Minor	Year 1	Minor	No change
			Year 15	Minor	Year 15	Minor	No change

NOT PROTECTIVELY MARKED

Table 6–4: Effects associated with the visual receptors as a result of the proposed changes

Proposed Change potentially visible	Receptor	Sensitivity	Original ES - Assessment findings for the Hinkley Point C consented development		Assessment of project as changed by proposed changes		Change in level of effect from original ES
			Assessment stage	Likely Significant Adverse Effect(s)	Assessment stage	Likely Significant Adverse Effect(s)	
ISFS Equipment Storage Building	VP11 - Shurton East, PRoW No. WL 23/56	High	Construction	Major	Construction	Major	No change
			Year 1	Moderate	Year 1	Moderate	No change
			Year 15	Moderate	Year 15	Moderate	No change
ISFS Equipment Storage Building	VP13 - PRoW No. WL 23/57, West of Wick	Medium	Construction	Moderate	Construction	Moderate	No change
			Year 1	Moderate	Year 1	Moderate	No change
			Year 15	Moderate	Year 15	Moderate	No change
ISFS Equipment Storage Building	VP14 - Pixies Mound (Wick Barrow)	High	Construction	Major	Construction	Major	No change
			Year 1	Major	Year 1	Major	No change
			Year 15	Moderate	Year 15	Moderate	No change
ISFS Equipment Storage Building	VP16 - Wick, PRoW No. WL 23/61	High	Construction	Major	Construction	Major	No change
			Year 1	Moderate	Year 1	Moderate	No change
			Year 15	Moderate	Year 15	Moderate	No change
ISFS Equipment Storage Building	VP18 - Residential area of Stogursey (Conservation Area), Burgage	High	Construction	Moderate	Construction	Moderate	No change
			Year 1	Moderate	Year 1	Moderate	No change
			Year 15	Moderate	Year 15	Moderate	No change

NOT PROTECTIVELY MARKED

Proposed Change potentially visible	Receptor	Sensitivity	Original ES - Assessment findings for the Hinkley Point C consented development		Assessment of project as changed by proposed changes		Change in level of effect from original ES
			Assessment stage	Likely Significant Adverse Effect(s)	Assessment stage	Likely Significant Adverse Effect(s)	
	Road and Lime Street						
ISFS Equipment Storage Building	VP19 - Stolford, West Somerset Coastal Path, PRow No. WL 23/95	High	Construction	Major	Construction	Major	No change
			Year 1	Moderate	Year 1	Moderate	No change
			Year 15	Moderate	Year 15	Moderate	No change
ISFS Equipment Storage Building	VP19a - West Somerset Coastal Path, PRow No. WL 23/95	High	Construction	N/A	Construction	Minor	Non-significant increase
			Year 1	N/A	Year 1	Minor	Non-significant increase
			Year 15	N/A	Year 15	Minor	Non-significant increase
ISFS	VP20 - Stockland Bristol, PRow No. BW 32/3	High	Construction	Major	Construction	Major	No change
			Year 1	Moderate	Year 1	Moderate	No change
			Year 15	Moderate	Year 15	Moderate	No change
ISFS Equipment Storage Building	VP26 - Quantock Hills AONB, Beacon Hill	High	Construction	Major	Construction	Major	No change
			Year 1	Moderate	Year 1	Moderate	No change
			Year 15	Moderate	Year 15	Moderate	No change

NOT PROTECTIVELY MARKED

Proposed Change potentially visible	Receptor	Sensitivity	Original ES - Assessment findings for the Hinkley Point C consented development		Assessment of project as changed by proposed changes		Change in level of effect from original ES
			Assessment stage	Likely Significant Adverse Effect(s)	Assessment stage	Likely Significant Adverse Effect(s)	
Meteorological Mast							
ISFS Equipment Storage Building Meteorological Mast	VP28 - Quantock Hills AONB, PRow No. BW 10/9	High	Construction	Major	Construction	Major	No change
			Year 1	Moderate	Year 1	Moderate	No change
			Year 15	Moderate	Year 15	Moderate	No change

NOT PROTECTIVELY MARKED

6.7 Potential Mitigation

- 6.7.1 A range of mitigation measures which relate to landscape and visual impacts have been incorporated into the environmental design for the consented DCO, as presented in the original ES. These are described in Section 22.5 of the original ES⁵, Figure 22.59 Landscape Restoration / Habitats Plan, Figure 22.60 landscape Restoration Rendered masterplan, Figure 22.61 Pixies Mound Landscape Mitigation Plan and Figure 22.62 Off-site Mitigation Plan⁶².
- 6.7.2 No further mitigation is proposed as there are no changes to the likely significant effects anticipated as a result of the proposed changes.

6.8 Summary

- 6.8.1 Following a preliminary assessment, it is considered likely that the Hinkley Point C Project, as changed by the proposed changes on-site, would not give rise to new or materially different significant landscape and visual effects from those assessed in the original ES. However, given the feedback from respondents to the application for the 2018 Amendment Order and the Planning Inspectorate's comments in the Scoping Opinion, it is proposed that the potential impacts on

landscape and visual receptors should be considered within the updated ES, to provide evidence to support the predicted conclusion that the Hinkley Point C Project, as changed by the proposed changes on-site, will not result in any new or materially different likely significant landscape and visual effects.

- 6.8.2 This PEIR has been prepared to outline the proposed scope of the updated EIA and present a preliminary assessment of the likely effects of the proposed changes. The final assessment will be reported within an updated ES submitted as part of the proposed material change application.
- 6.8.3 The preliminary findings of the updated EIA will be consulted on through the publication of this PEIR.

6.9 Next Steps

- 6.9.1 The ES will include a LVIA, which will be supported by the Type 1 visualisations (refer to **Figure 6.3**, **Figure 6.4** and **Figure 6.5** in **PEIR Figures – Volume 2**); the methodology for which has been agreed with Somerset West and Taunton Council (now part of Somerset Council) in full, but which is to be agreed with other relevant stakeholders based on the information presented in **Appendix A** of this PEIR. As part of the LVIA, further assessment will be undertaken

to determine if the proposed changes on-site would alter the character of the landscape as well as the quality of people's views.

- 6.9.2 The LVIA will be undertaken and presented within the ES which will be submitted as part of the proposed material change application.
- 6.9.3 The preliminary assessment presented in this PEIR will be refined and updated to reflect any updates to the desk study along with the results of consultation and engagement.
- 6.9.4 The list of receptors will be kept under review during the progress of the EIA as more detailed information is obtained during baseline surveys and other forms of data collection and will be reflected in the ES submitted as part of the proposed material change application.