Connah's Quay Low Carbon Power

Environmental Statement
Volume II, Chapter 12: Marine Ecology

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12.1 Introduction

Overview

12.1.1 This chapter of the Environmental Statement (ES) presents an assessment of the likely significant environmental effects of the Connah's Quay Combined Cycle Gas Turbine (CCGT) fitted with Carbon Capture Plant (CCP) (hereafter referred to as the Proposed Development) with respect to marine ecology. The assessment has been undertaken in accordance with best practice guidance and professional judgement and has considered the worst-case scenario for all identified impact pathways (the summary table of identified relevant pathways is shown in **Table 12-13**).

12.1.2 This chapter provides an assessment of the potential impacts and effects as a result of the construction, operation (including maintenance) and decommissioning of the Proposed Development on marine ecology. Within this chapter, marine biodiversity has been defined as those estuarine and marine ecological receptors within the tidal reach of the river, found in the area below mean high water spring (MHWS), comprising benthic[1] ecology, coastal and migratory fish, and marine mammals. It does not include birds (e.g. waders, seabirds and waterbirds) and freshwater species (e.g. brook lamprey *Lampetra planeri*, bullhead *Cottus gobio* and Petalwort *Petalophyllum ralfsii*), which are considered in **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**).

12.1.3 A detailed description of the Proposed Development can be found within **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Programme and Management** (**EN010166/APP/6.2.5**). Two parts of the Proposed Development are located within the estuarine environment below mean high-water springs (MHWS) of the River Dee and are therefore the focus of this assessment[2]. These are the Water Connection Corridor and Proposed Surface Water Outfall (collectively referred to as the 'Marine Elements' within this assessment) **Figure 12-1: Marine Ecology Study Area** (**EN010166/APP/6.3**)**)**. The Water Connection Corridor involves the need for cooling water for heat rejection purposes as well as for steam / water cycles for the CCGT and CCP and domestic use during operation. The Proposed Surface Water Outfall involves building a new permanent outfall structure to handle surface water drainage from the Main Development Area. This new outfall will be located next to the Existing Surface Water Outfall.

12.1.4 Any works above MHWS have been assessed in **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**) for relevant ecological receptors.

[1] Anything associated with or occurring on the bottom of a body of water.
[2] The remaining parts of the Proposed Development are considered fully terrestrial and are therefore not considered in this chapter.

12.1.5 Additional relevant works outside the Marine Elements include and use of vessels which would deliver goods using two existing ports - the Port of Mostyn, and / or Connah's Quay North during construction of the Proposed Development. The use of the vessels for deliveries during construction is assessed in this chapter.

12.1.6 Construction-phase works within the Water Connection Corridor include the refurbishment of existing eel screens to meet current legislative requirements, including The Eels (England and Wales) Regulations 2009 (Eels Regulations). The existing intake structure has seven intake pipes each connected to four intake screens with 28 screens in total. The existing cooling water intake is shown on Plate 1 in **Appendix 12-C: Marine Ecology Plates** (**EN010166/APP/6.4**). The works would involve updating the existing eel screens (3 mm diameter mesh) with new eel screens (2 mm diameter mesh) in addition to minor repairs to surface concrete, metalwork, and timbers.

12.1.7 The design of the intake screens would be required to maintain the maximum permitted abstraction flow rates and comply with the requirements of The Eels (England and Wales) Regulations 2009. The abstraction velocity through the seven collection pipes would remain unchanged, ensuring no change in water approach velocity to the screens. The overall cross-sectional arrangement would not change. The screens' conical ends would match the existing design, and scour protection would remain in place. It has been assessed that there would be no increase in water velocities approaching or around the intake screens as a result of the intake screen modifications. The modification to the intake screens also do not increase the risk of scour to occur at the intake structure.

12.1.8 The existing intake screens would be removed individually or in sections at the bolted flange connection points. To facilitate this, the connecting pipework to the intake manifold would be sealed with a temporary blanking plate. This phased approach would allow the intake system to remain operational during high tides.

12.1.9 At no point would more than one of the seven intake pipes and its associated basket assembly be blanked off simultaneously. During this time, the existing Connah's Quay Power Station will not operate at full installed capacity (four CCGT units) alongside the Proposed Development. Instead, its output will be adjusted to ensure that the six remaining baskets continue to function within their existing design parameters. Therefore, in the event of phased construction, Train[3] 1 of the Proposed Development and up to two existing Connah's Quay Power Station units could require cooling water at the same time; or following simultaneous construction (or in the event of phased construction, following commercial operation of Train 2), only the Proposed Development would have demand for abstracted cooling water. The Applicant proposes to maintain the permitted abstraction and discharge parameters as far as reasonably practicable, i.e. abstraction would continue to be limited to periods around high water in line with the current abstraction

[3] **Chapter 1: Introduction (EN010166/APP/6.2.1)** explains that each CCGT unit, and associated carbon capture plant (CCP) and supporting infrastructure is referred to as a 'Train' in this ES. Some supporting infrastructure may be shared between the Trains.

licence. Abstraction and discharge would be regulated by NRW through the Abstraction Licence and Environmental Permit respectively as required for operation of the Proposed Development as detailed in the **Consents and Agreements Position Statement** (**EN010166/APP/3.3**).

12.1.10 The construction phase of the Proposed Surface Water Outfall will involve excavation activities at the periphery of the saltmarsh, ensuring the preservation of the existing mudflat habitat. The installation of the new outfall will be executed using either trenchless methods or open excavation techniques, extending from the current headwall.

12.1.11 Plant and material storage will be limited to the area between the headwall and the access road north of the existing Connah's Quay Power Station fence line, or within the Main Development Area. Larger equipment like cranes or long-reach excavators would also operate from this access road. Excavation will be done by hand or with mini diggers positioned accordingly at low-tide only.

12.1.12 During the operational phase the Marine Elements will be kept clear of silt using the existing cleaning maintenance routine. Within the Water Connection Corridor this will be through the use of a compressed air blasting system which is consistent with existing practice. If required, a jet washing system would be incorporated into the design. The air blast and jet washing activities would only take place on a falling tide to return the silt removed to the estuary sediment budget. Should these options not be sufficient to maintain clean flow through the screen, screens would be removed and replaced by spare screens for mechanical cleaning on land may be required. Where it is required that screens be removed, these would be undertaken in accordance with the methodology for replacement of the existing eel screens as detailed in **Chapter 5: Construction Programme and Management** (**EN010166/APP/6.2.5**).

12.1.13 Furthermore, prior to the refurbishment / upgrades to the existing cooling water intake, a detailed Best Achievable Eel Protection (BAEP) assessment will be undertaken. This assessment will determine the necessary level of protection for intake screens in accordance with BAEP principles and identify the most effective screening option considering both cost and environmental protection. As detailed in the **Framework CEMP** (**EN010166/APP/6.5**), the assessment will be carried out in consultation with relevant stakeholders and will adhere to best practice guidance for eel screening (Ref 12-1).

12.1.14 As specified in the **Framework CEMP** (**EN010166/APP/6.5**), the works in the Water Connection Corridor would be carried out only at low-tide, when the existing intake structures are exposed and accessible by foot. For some works there may need to be a barge positioned alongside the intake infrastructure, as considered in the **Navigational Risk Assessment** (**EN010166/APP/6.15**), which would remain floating at all times (i.e. no jack-up barge would be involved in any aspect of eel screen replacement). There would be no interaction with the riverbed during the construction works.

12.1.15 Access to the intakes would be via a single route through the intertidal area using an existing maintenance access route that follows the old causeway, which avoids the saltmarsh as much as possible. All works would be performed manually or using handheld tools, replacing one screen at a time

(there are seven intake pipes in total) to ensure the intake continues to operate adequately at high tide. The construction period to replace the eel screens is anticipated to take three to five months. Any additional supplies required may be delivered via a materials barge.

12.1.16 This chapter should be read in conjunction with **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**), **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**), **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**), **Chapter 13: Water Environment and Flood Risk** (**EN010166/APP/6.2.13**) and **Chapter 16: Physical Processes** (**EN01066/APP/6.2.16**).

12.1.17 This chapter is supported by the following figures in **EN010166/APP/6.3**:

- **Figure 3-3: Areas Described in the ES;**
- **Figure 12-1: Marine Ecology Study Area including the Water Connection Corridor**;
- **Figure 12-2: Designated Sites with Marine Ecological Features**;
- **Figure 12-3: Overview of Intertidal Benthic Habitats within the Study Area**;
- **Figure 12-4: Broadscale Intertidal Habitats Identified during Intertidal Walkover Survey**; and
- **Figure 12-5: Water Framework Directive Sensitive Habitats**.

12.1.18 This chapter is supported by the following appendices in **EN010166/APP/6.4**:

- **Appendix 1-A: EIA Scoping Report;**
- **Appendix 1-B: Connah's Quay Scoping Opinion;**
- **Appendix 2-B: Scoping Opinion Responses**;
- **Appendix 7-A: Legislative, Policy and Guidance Framework for Technical Topics**;
- **Appendix 8-D: Air Quality Operational Assessment**;
- **Appendix 12-A: Marine Ecology Assessment Methodology**;
- **Appendix 12-B: Relevant Designated Sites**;
- **Appendix 12-C: Marine Ecology Plates**;
- **Appendix 12-D: Intertidal Survey Report;**
- **Appendix 12-E: Marine Biosecurity Risk Assessment**; and
- **Appendix 12-F Marine Invasive Non-Native Species Outline Management Plan**.

12.1.19 In addition to the above documents, this chapter should be read with reference to the following:

- **Works Plans** (**EN010166/APP/2.4**);
- **Parameter Plans** (**EN010166/APP/2.5**);
- **Consultation Report** (**EN010152/APP/5.1**);

- **Chapter 2: Assessment Methodology** (**EN010166/APP/6.2.2**);
- **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**);
- **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**);
- **Chapter 6: Project Alternatives** (**EN010166/APP/6.2.6**);
- **Chapter 8: Air Quality** (**EN010166/APP/6.2.8**);
- **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**);
- **Chapter 13: Water Environment and Flood Risk** (**EN010166/APP/6.2.13**);
- **Chapter 16: Physical Processes** (**EN010166/APP/6.2.16**);
- **Framework Construction and Environmental Management Plan** (**CEMP**) (**EN010166/APP/6.5**);
- **Lighting Strategy** (**EN010166/APP/7.22**);
- **Report to Inform Habitats Regulations Assessment** (**EN010166/APP/6.12**); and
- **Design Principles Document** (**EN010166/APP/7.8**).

Legislation, Policy and Guidance

12.1.20 Legislation, planning policy, and guidance relating to Marine Ecology and pertinent to the Proposed Development are listed in **Table 12-1**. Further detail regarding these can be found in **Appendix 7-A: Legislative, Policy and Guidance Framework for Technical Topics** (**EN010166/APP/6.4**).

Table 12-1: Legislation, Planning Policy, and Guidance relating to Marine Ecology

Type	Legislation, Policy and Guidance
Legislation	• Infrastructure Planning (Environmental Impact Assessment (EIA)) Regulations 2017 (Ref 12-2); • Marine and Coastal Access Act 2009 (MCAA) (Ref 12-3); • The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2009 (Ref 12-4); • Marine Strategy Regulations 2010 (Ref 12-5); • The Ramsar Convention (Ref 12-6); • Conservation of European Wildlife and Natural habitats Convention (Bern Convention) 1979 (Ref 12-7); • Convention for the Protection of the Marine Environment of the North-East Atlantic (the 'OSPAR Convention') (Ref 12-8); • The Wildlife and Countryside Act 1981 (as amended) (WCA) (Ref 12-9); • The Water Environment (Water Framework Directive (WFD)) (England and Wales) Regulations 2017 (Ref 12-10); • The Environment Act 2021 (Ref 12-11);

Type	Legislation, Policy and Guidance
	• Environment (Wales) Act 2016 (Ref 12-12); • Salmon and Freshwater Fisheries Act 1975 (as amended) (SAFFA) (Ref 12-13); • The Eels (England and Wales) Regulations 2009 (Ref 12-14); • Conservation of Seals Act 1970 (Ref 12-15); • The Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas 1992 (ASCOBANS) (Ref 12-16); • Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES) (Ref 12-17); • Invasive Alien Species (Enforcement and Permitting) Order 2019 (Ref 12-18); • Natural Environment and Rural Communities (NERC) Act 2006 (Ref 12-19); and • European Union Directive (92/43/EEC) on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive) (Ref 12-20).
National Planning Policy	• The Overarching National Policy Statement (NPS) for Energy (EN-1) (Ref 12-21); • The NPS for Natural Gas Electricity Generating Infrastructure (EN-2) (Ref 12-22); • The NPS for Natural Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref 12-23); • The NPS for Electricity Networks Infrastructure (EN-5) (Ref 12-24); • Planning Policy Wales (PPW) (Ref 12-25) • Future Wales: The National Plan 2040 (Ref 12-26); • UK Marine Policy Statement (Ref 12-27); and • Welsh National Marine Plan (Ref 12-28).
Local Planning Policy	• Flintshire County Council (FCC) Local Development Plan (LDP) (2015-2030) (Ref 12-29); • Habitats Regulation Assessment (HRA) to Inform the Assessment of the FCC LDP (Ref 12-30); and • Flintshire County Council Biodiversity Plan 'Supporting Nature in Flintshire 2020-2023' (Ref 12-31).
National Guidance	• Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines of Ecological Impact Assessment (EcIA) (Ref 12-32); • Canadian sediment quality guidelines (Ref 12-33); • OSPAR background concentrations and background assessment concentrations (BACs) and effect range low (ERL) and effect range median (ERM) concentrations for contaminants (Ref 12-34);

Type	Legislation, Policy and Guidance
	• Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise (Ref 12-35); • Screening for Intakes: measures to protect eel and elvers (Ref 12-1); • The Planning Inspectorate (PINS) Nationally Significant Infrastructure Projects: Advice on Habitats Regulations Assessment (Ref 12-36); and • PINS Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment (Ref 12-37).

12.2 Consultation and Scope of Assessment

Consultation

Scoping Opinion

12.2.1 A request for an EIA Scoping Opinion was sought from the Secretary of State (SoS) through PINS in February 2024 as part of the EIA Scoping Process. The EIA Scoping Opinion was adopted on 20 March 2024 (**Appendix 1-B: Scoping Opinion** (**EN010166/APP/6.4**)).

12.2.2 Key issues raised in the EIA Scoping Opinion are summarised and responded to in **Table 12-2** and **Appendix 2-B: Scoping Opinion Response** (**EN010166/APP/6.4**). All issues are being considered during the EIA process, at ES stage where appropriate. However, it should be noted that, in response to Statutory Consultation responses, the design of the Water Connection Corridor works of the Proposed Development has changed significantly since the EIA Scoping Opinion comments, and responses have therefore been updated accordingly, with some comments no longer being applicable.

Statutory Consultation

12.2.3 Statutory consultation responses were also received by the Applicant and are shown in **Table 12-3.**

12.2.4 Similar to the EIA Scoping Opinion responses, a large portion of the marine ecology comments were in relation to the original construction methodology which has since largely been reduced, as described in **Chapter 6: Project Alternatives** (**EN010166/APP/6.2.6**). As a result of these design changes, the technical detail within many of these comments no longer applies and has therefore been responded to accordingly.

Targeted Consultation

12.2.5 Following Statutory Consultation changes were made to the heights of the proposed absorber and HRSG stacks and the Applicant undertook further targeted consultation. This consultation included a Supporting Information Report which detailed the environmental considerations associated with these changes. This Targeted Consultation was held between Thursday 8 May to Friday 6 June 2025. Responses to this targeted consultation are

presented in the **Consultation Report** (**EN010152/APP/5.1**) and **Table 12-4** below outlines how and where these comments have been addressed within this chapter of the ES.

Additional Technical Engagement

12.2.6 A summary of consultation undertaken outside of statutory consultation and the EIA Scoping process in relation to the Marine Ecology assessment is provided in **Table 12-5.**

Table 12-2: Scoping Opinion Responses

Comment ID	Consultee	Comment	Response
3.5.1	PINS	*'Based on the distance between the Proposed Development and the closest Marine Conservation Zone (MCZ) (Fylde MCZ, which is more than 50 km at the closest point), and absence of potential impact pathways, PINS agree that this matter can be scoped out of the assessment.'*	This position on the scope of the assessment and scoping out consideration of MCZs is acknowledged and is scoped out in Section 12.3 of this chapter.
3.5.2	PINS	*'Whilst this is not identified as a matter to be scoped out in Table 10- 2, PINS notes that the assessment is proposed to be spatially limited to activities in the Water Connection Corridor (shown on Figure 1-3 of the Scoping Report) rather than a defined Zone of Influence (ZoI) for potential impacts. PINS does not have sufficient information about the operational phase works to exclude the possibility of likely significant effects from this impact pathway. Consideration should be given to whether habitat loss could occur e.g. from maintenance dredging and hydromorphological changes including ongoing scour. Where significant effects are likely, these should be assessed in the ES.'*	**Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) provide an overview of the works required in the Water Connection Corridor. This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment. No habitat loss would occur in the intertidal or subtidal area as a result of the Proposed Development and has been scoped out of assessment in Section 12.3 of this chapter. The impacts identified are assessed in Section 12.6.

Comment ID	Consultee	Comment	Response
3.5.3	PINS	*'The Scoping Report states that river and land-based activities have potential to disturb seals that have surfaced or hauled out, but due to the intervening distance between the Proposed Development and the nearest haul out site at Hilbre Island (more than 15 km downstream) there will be no available pathway. Ornithological receptors will be considered in the terrestrial and aquatic ecology ES chapter. Based on information presented in the Scoping Report, PINS agrees that significant effects are not likely to occur, and this matter can be scoped out of the assessment. Please note PINS comments at ID 3.5.9 of this Scoping Opinion regarding receptors to be considered in relation to underwater noise and vibration during construction.'*	This position on the scope of the construction phases assessment is acknowledged. This pathway has therefore been scoped out of assessment in Section 12.3 of this chapter.
3.5.4	PINS	*'Whilst this (i.e. direct habitat loss and physical disturbance from works below MHWS outside of the Water Connection Corridor during construction) is not identified as a matter to be scoped out in Table 10-2 of the Scoping Report, PINS notes that it is scoped in for the construction phase for in-river works. It is unclear whether there could be in-*	Updated methodology for all phases of the Proposed Developed are detailed in **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**). This includes a significantly reduced scope of works in the Water Connection Corridor which is the focus of this assessment. No maintenance dredging or any other interaction with the riverbed would occur during any phases of the Proposed Development and this pathway has therefore, been scoped out of assessment in Section 12.3 of this chapter.

Comment ID	Consultee	Comment	Response
		river works during operation e.g. maintenance of the outfall and/ or maintenance dredging involving vessels that could result in impact pathways. PINS advises that this should be clarified in the ES, together with an assessment of any likely significant effects.'	The impact pathways identified for the updated Water Connection Corridor methodology are assessed in Section 12.6.
3.5.5	PINS	*'The Scoping Report states that the operational phase will not result in changes to underwater sound or visual disturbance that would impacts marine habitats or species. Based on the information presented in the Scoping Report, PINS agrees that significant effects are not likely to occur. This matter can be scoped out of the assessment.'*	This position on the scope of the operational phases assessment is acknowledged and has therefore, been scoped out of assessment in Section 12.3 of this chapter.
3.5.6	PINS	*'The Scoping Report states that there is uncertainty about the construction methodology for works within the Water Connection Corridor, but the maximum area required is shown on Figure 1-3 in Appendix A of the Scoping Report. The ES should also explain what assumptions have been made about the methodology and the assessment should be based on the maximum*	Updated methodology for all phases of the Proposed Developed are detailed in **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**). This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment. The worst-case scenario is described in Section 12.3. No permanent habitat loss is now predicted and has therefore been scoped out in Section 12.3.

Comment ID	Consultee	Comment	Response
		parameters or worst-case scenario. The potential permanent loss of habitat associated with these works should be quantified. *In addition, the ES should confirm the predicted number of vessel movements during all phases of the Proposed Development. PINS comments at ID 2.1.12 of this Scoping Opinion about flexibility apply equally to this matter.'*	The available information and assumptions regarding the use of vessels for the Proposed Development are discussed in Section 12.1 and 12.3.
3.5.7	PINS	*'The Scoping Report states that the existing CCGT requires abstraction of cooling water and discharge into the River Dee, which is carried out in accordance with rates and limits in an existing Environmental Permit issued by NRW. It is stated that the Proposed Development may reuse the existing infrastructure or new outfall infrastructure may be required. Please refer to PINS' comments at ID 2.1.8 of this Scoping Opinion regarding establishing the baseline condition for the purpose of assessment. This should include information about the existing rates and limits and any monitoring data obtained as part of the Environmental Permit. The ES should define the worst-*	Impacts from abstraction of cooling water and discharge on marine ecology receptors are presented in Section 12.1. This includes an assessment of available information about the existing rates and limits and any monitoring data obtained as part of the existing Environmental Permit. Since the Scoping Report was submitted design freeze has adopted the use of existing infrastructure within the Water Connection Corridor. Existing eel screens would be replaced and basket size increased to ensure flow rates remain at current levels. Therefore, intake and outflow rates would be at a level covered within the existing environmental permit. On this basis the worst-case for thermal discharge has been considered to be within the existing licence permits. Further details are in Section 12.3. This impact has therefore been scoped out from further assessment (Section 12.3).

Comment ID	Consultee	Comment	Response
		case parameters in terms of volumes and thermal impacts from the Proposed Development and include an assessment of any likely significant effects, particularly to marine and estuarine fish receptors. The Applicant should consider whether temperature modelling should be undertaken to inform this assessment.'	
3.5.8	PINS	*'The Scoping Report states that Environment Agency (EA) information on fish counts (TraC data) would be used but then states in a footnote that there are no EA fish sampling stations in the River Dee and no information on fish counts is available. The assessment in the ES should be supported by robust baseline data. If insufficient desk-based data is available, alternative data source(s) should be used, which may include the need for migratory fish survey(s). Please refer to PINS' comments at ID 3.5.10 of this Scoping Opinion. The Applicant's attention is drawn to the comments of NRW (see Appendix 2) regarding the Marine Evidence Based Sensitivity Assessment (MarESA). This*	The Applicant notes the reference to the MarESA data source provided by NRW and has considered and referenced this in **Appendix 12-A: Marine Ecology Assessment Methodology** (**EN010166/APP/6.4**) and this chapter as appropriate. Following the reduced scope of works in the Water Connection Corridor, NRW has agreed that fish surveys and seasonal restrictions would not be required. Data from monitoring reports at Chester Weir have informed the baseline presented in Section 12.4.

Comment ID	Consultee	Comment	Response
		data source should be used to inform the ES as relevant.'	
3.5.9	PINS	*'PINS advises that Pen Llyn a'r Sarnau Special Area of Conservation (SAC) and North Anglesey Marine SAC, as well as harbour porpoise and bottlenose dolphin, should be scoped into the assessment of underwater noise and vibration during construction, given the mobile nature of the marine mammal qualifying features and/ or marine mammals, which could be present in the Dee Estuary. The Applicant's attention is drawn to the comments of NRW (see Appendix 2), which note some omissions and/ or errors in the description of potential fish receptors. These should be corrected in the ES. PINS encourages agreeing assessment parameters with the relevant statutory bodies. The ES should include a figure illustrating the final selected study area(s).'*	The request to consider these designated sites is acknowledged however they are located a considerable distance from the Proposed Development and following the reduced design scope no underwater sound impacts during construction is anticipated. The Pen Llyn a'r Sarnau SAC and North Anglesey Marine SAC are referenced in Section 12.4 as is considered appropriate. The study area for the marine ecology assessment is presented in **Figure 12-1: Marine Ecology Study Area** (**EN010166/APP/6.3**). Both harbour porpoise and bottlenose dolphin are considered in the assessment presented in Section 12.4 of **Chapter 12: Marine Ecology** (**EN010166/APP/6.2.12**), though as a result of design updates the relevant pathways are now very limited. Separate responses are provided to NRW comments on the Marine Ecology Scope within later rows of this table. A meeting was held with NRW on 01 July 2024 and 12 December 2024 to agree receptors for consideration in the ES. The outcome of this meeting is reflected in this chapter.
3.5.10	PINS	*'The Scoping Report proposes intertidal habitat surveys for the area below MHWS within the Water Connection Corridor and a buffer of 500m either side 'where accessible'. The Water*	Marine intertidal walkover and drone surveys were completed in June 2024 and the findings have been included in **Appendix 12-D: Intertidal Survey Report** (**EN010166/APP/6.4**) and Section 12.4.

Comment ID	Consultee	Comment	Response
		Connection Corridor is shown on Figure 1-3 of the Scoping Report. It is stated that this would encompass habitats and any potentially sensitive, protected and Invasive Non-Native Species (INNS) marine ecology. PINS considers that that proposed survey scope is acceptable subject to the following comments: • *Final survey extents should be clearly described and illustrated on figures within the ES;* • *Where survey extent is limited due to access issues, the ES should explain what efforts were made to obtain access and how any gaps in survey data are proposed to be addressed;* • *It is unclear what specific species surveys are being proposed from information presented in the Scoping Report. PINS would expect the survey effort to include migratory fish and benthic invertebrates. Effort should be made to agree the scope, timing and extent of survey effort with relevant consultation bodies prior to survey work commencing. Evidence of any agreement or otherwise should be presented in the ES; and*	Furthermore, following a Discretionary Advice Serve (DAS) meeting with NRW in December 2024, it was agreed that given the reduced scope of works in the Water Connection Corridor, no further subtidal benthic surveys, fish surveys or cetacean surveys were necessary on the basis that the Proposed Development would involve no interaction with the riverbed at all.

Comment ID	Consultee	Comment	Response
		• *Limited reasoning is provided for not undertaking marine mammal surveys (for mammals other than harbour and grey seal). Noting that the study area extends to the Dee Estuary, where harbour porpoise and bottlenose dolphin could be present, and potentially further to specific receptors in the Irish Sea, PINS advises that survey(s) should be carried out where required to establish a robust baseline for marine mammals.* *Based on information in the Scoping Report, PINS agrees that harbour and grey seal surveys are not required as the presence of these marine mammals is well understood.* *PINS advises that survey work should be summarised in the ES and survey reports should be provided as technical appendices to the ES.'*	
3.5.11	PINS	*'Paragraph 10.6.3 of the Scoping Report states that permanent habitat loss because of re-use or replacement of the existing outfall would be*	The reduced scope of works in the Water Connection Corridor have been confirmed to be refurbishment of the existing screens only as a worst-case scenario. Details on these works involved are shown in **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**).

Comment ID	Consultee	Comment	Response
		*minimised 'as far as reasonably practicable' but does not explain how this would be achieved. Embedded mitigation measures relied upon to avoid or minimise significant adverse effects should be clearly explained, including through use of drawings as relevant, with cross-reference in the ES. Measures should be demonstrably secured through the DCO or other legal mechanise.*e *The Applicant's attention is drawn to the comments of NRW (see Appendix 2) regarding INNS. PINS advises that a biosecurity risk assessment and INNS management plan for operational activities in the marine environment should be prepared and submitted with the DCO application.'*	Embedded mitigation including the production of a Biosecurity Risk Assessment and a marine Invasive Non-Native Management Plan has been undertaken. Please see **Appendix 12-E: Marine Biosecurity Risk Assessment** (**EN010166/APP/6.4**) and **Appendix 12-F: Marine Invasive Non-Native Species Outline Management Plan** (**EN010166/APP/6.4**) and Section 12.5.
3.5.12	PINS	*'For the avoidance of doubt, PINS understands that references to marine ecology in the description of construction and operation effects scoped into the assessment include marine mammals. Consideration should be given to whether construction works could result in any temporary habitat loss or disturbance for marine mammals, i.e. those that might be using*	Updated methodology for all phases of the Proposed Developed are detailed in **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**). This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment. The worst-case scenario is described in Section 12.3. There is no interaction with the seabed during construction works, or any change in intake/outfall footprints in the marine environment and therefore, no permanent habitat loss or underwater sound disturbance is predicted and has therefore been scoped out in Section 12.3.

Comment ID	Consultee	Comment	Response
		habitat in the Dee Estuary; where significant effects are likely to occur, these should be assessed in the ES.'	The impacts identified are assessed in Section 12.6.
3.5.13	PINS	*'For the avoidance of doubt, assessment of these impact pathways should include consideration of any physical process effects associated with installation and use of a cofferdam (as identified in Chapter 14 of the Scoping Report). Please refer to PINS' comments at ID 3.9.7 of this Scoping Opinion.'*	**Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) provide an overview of the works required in the Water Connection Corridor. This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment. The worst-case scenario is described in Section 12.3. No cofferdam would be used and is therefore no longer assessed in this chapter. The relevant impacts identified are assessed in Section 12.6.
3.5.14	PINS	*'The Applicant's attention is drawn to the comments of NRW (see Appendix 2). The assessment should consider potential for both temporary and longer-term habitat loss as a result of the full range of construction activities required. The expected effect duration should be described in the ES.'*	Updated methodology for all phases of the Proposed Developed are detailed in **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**). This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment. The worst-case scenario is described in Section 12.3. No permanent habitat loss is predicted and has therefore scoped out in Section 12.3. The impacts identified are assessed in Section 12.6.
3.5.15	PINS	*'Please refer to PINS comments at ID 3.4.13 of this Scoping Opinion regarding confidential annexes for sensitive or vulnerable ecological features.'*	Where necessary to comply with the relevant legislation and guidance, confidential appendices have been provided separately and would not be made available publicly.

Comment ID	Consultee	Comment	Response
N/A	Natural Resources Wales (NRW)	*'There is limited detail about the proposed works for the Water Connection Corridor during construction and operation/maintenance, and particularly the description of the worst-case scenario, which makes it difficult to advise fully on the extent of impacts to marine ecological features at this scoping stage. We therefore advise that more detailed information is provided to enable a robust assessment of impacts in the final ES.'*	**Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) provide an overview of the works required in the Water Connection Corridor. This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment. The worst-case scenario is described in Section 12.3. The impacts identified are assessed in Section 12.6.
N/A	NRW	*'We note that the abstraction and discharge of cooling water is still to be confirmed and will be subject to an Environmental Permit. However, for EIA scoping purposes we advise that worst-case scenarios of proposed volumes and thermal impacts are considered for the assessment of impacts to aquatic receptors.'*	**Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) provide an overview of the works required in the Water Connection Corridor. This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment. The worst-case scenario is described in Section 12.3. This includes details on the worst-case assumption of proposed volumes and thermal impacts being within the existing licence permit. Therefore, impacts relating to proposed volumes and thermal impacts have been scoped out from assessment in Section 12.2. The impacts identified are assessed in Section 12.6.
N/A	NRW	*'Paragraph 10.4.8 / Table 10-1: please note that bullhead (Cottus gobio) is also a qualifying feature of the River Dee*	This has been considered in the aquatic ecological assessment presented in **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**).

Comment ID	Consultee	Comment	Response
		and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC.'	
N/A	NRW	*'We note the requirement to implement intake screens to comply with the Eels Regulations 2009 has been recognised and that this will be considered in Chapter 9 [Terrestrial and Aquatic Ecology] of the ES. We advise that intake screens should also be designed to minimise impacts to migratory Annex II fish species, which are features of the Dee Estuary / Aber Dyfrdwy SAC and River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC.'*	This point is acknowledged. Further information on the design of the Eel screens is provided in Section 12.1 and an assessment is detailed in Section 12.6 which has been designed to minimise impacts to migratory fish.
N/A	NRW	*'Paragraph 10.4.19: non-migratory brook lamprey is mentioned in relation to the Dee estuary. However, brook lamprey is a feature of the River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC, but not of the estuary, and is generally only found in freshwater.'*	This has been corrected as necessary in this chapter.
N/A	NRW	*'Paragraph 10.6.7: regarding fish we advise that given the narrowness of the channel, impact piling should be avoided in favour of vibro piling.'*	**Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) provide an overview of the works required in the Water Connection Corridor. This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment. The worst-case scenario is described in Section 12.3. This includes details on the worst-case assumption of works, there

Comment ID	Consultee	Comment	Response
			would be no interaction with the riverbed whatsoever (include no piling of any type). Therefore, impacts relating to piling have been scoped out from assessment in Section 12.2. The impacts identified are assessed in Section 12.6.
N/A	NRW	*'We note and concur with the identified potential operational impacts to fish in Section 10.7.4, but we also advise that the potential impacts from simultaneous operation of both the existing and the new power station are fully considered in the ES.'*	As described in **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**), the Proposed development and the existing Connah's Quay Power Station would not operate at full capacity simultaneous as they utilise shared infrastructure. An assessment considering the simultaneous operations is not provided.
N/A	NRW	*'Based on the limited amount of detailed information available about the proposed methodology for construction and operation we advise that the following impacts and sites should be scoped in regarding marine mammals:* • *Underwater sound assessment and vibration disturbance e.g., from piling;* • *Accidental pollution;* • *Collisions between any project vessels and marine mammals* • *Temporary habitat loss and/or disturbance;*	**Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) provide an overview of the works required in the Water Connection Corridor. This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment. The worst-case scenario is described in Section 12.3 of this chapter. Following on from the PEIR, many impacts relating to original works are no longer applicable and have been scoped out from assessment in Section 12.2. The relevant impacts identified are assessed in Section 12.6.

Comment ID	Consultee	Comment	Response
		• *Indirect effects to marine mammals from changes in marine water quality;* • *Temporary increases in suspended sediment concentrations and associated turbidity (please refer to our Physical Processes advice for further details).'*	
N/A	NRW	*'A large grey seal 'haul-out' of 300-500 individuals, which forms part of the north Wales grey seal population, is present on the eastern side of Salisbury Middle, adjacent to Hilbre Island, located downstream of the Proposed Development in the mouth of the Dee estuary. Grey seals are a feature of the Pen Llŷn â'r Sarnau SAC and are functionally linked to the Dee estuary due to the mobile nature of this species and haul-out ranges along the north Wales coastline and within the Dee estuary, as well as their regular presence in the Dee estuary and river.* *Therefore, we advise that Pen Llŷn â'r Sarnau SAC should be scoped in for assessment due to the potential underwater noise disturbance and*	Pen Llŷn â'r Sarnau SAC has been considered and is identified within the baseline section (Section 12.4) and relevant impacts identified are assessed in Section 12.6. However, following the reduced scope of works in the Water Connection Corridor, underwater sound and vibration disturbance to benthic ecology has been scoped out from further assessment Section 12.2.

Comment ID	Consultee	Comment	Response
		vibration during construction (e.g. piling). The timing of the proposed works will affect the possibility of disturbance to grey seal due to the seasonality of their haul-outs. We therefore advise that details of any underwater noise disturbance and timing of these works are considered and assessed in the ES. *Harbour seals are also recorded hauled-out on the West Hoyle sandbank. However, exact haul-out numbers of this species are not known.'*	
N/A	NRW	*'Harbour porpoise and bottlenose dolphin could occur in the surrounding coastal waters and within the outer Dee Estuary, and therefore have potential for underwater noise disturbance impacts. We advise that consideration is given to these species and to North Anglesey Marine SAC (designated for harbour porpoise) which is the nearest marine mammal SAC in proximity to the Dee estuary.'*	Acknowledged. Pen Llŷn â'r Sarnau SAC has also be considered and is identified within the baseline section (Section 12.4). However, due to the largely reduced scope of works, underwater sound disturbance has been scoped out from further assessment in Section 12.2.7.
N/A	NRW	*'With reference to paragraph 10.6.7, regarding marine mammals we welcome the proposed use of the*	This position on the use of standard JNCC mitigation measures for construction piling is acknowledged however, it should be

Comment ID	Consultee	Comment	Response
		standard Joint Nature Conservation Committee (JNCC) mitigation measures for construction piling.'	emphasised that piling work is no longer required as part of the Proposed Development.
N/A	NRW	*'We advise that Table 10-1 should include Pen Llŷn â'r Sarnau SAC, due to the functional linkage with grey seals using the Dee estuary.'*	Acknowledged. Pen Llŷn â'r Sarnau SAC has also be considered and is identified within the baseline section (Section 12.4) and has been considered in Section 12.6 as necessary.
N/A	NRW	*'We also advise that Table 10-1 should refer to the qualifying features of each SAC and not coastal features, as this is the terminology used in the conservation advice. Conservation objectives should be taken from the Regulation 33 advice as these are the agreed conservation objectives for cross-border sites.'*	Acknowledged. A summary of the qualifying features of each SAC is provided in Table 1 of **Appendix 12-B: Relevant Designated Sites** (**EN010166/APP/6.4**).
N/A	NRW	*'Paragraph 10.6.3 notes that should the proposed development re-use, refurbish or replace the existing outfall located in the Water Connection Corridor, permanent habitat loss will be minimised as far as reasonably practicable. We advise that the worst-case scenario should be clarified and assessed and that the potential permanent loss of habitat should be calculated. We note that maintenance dredging is discussed but it is not clear*	**Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) provide an overview of the works required in the Water Connection Corridor. This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment. The worst-case scenario is described in Section 12.3. This includes details on the worst-case assumption of works, there would be no interaction with the riverbed whatsoever (including no dredging at any stage). Therefore, impacts relating to dredging have been scoped out from assessment in Section 12.2.

Comment ID	Consultee	Comment	Response
		where the dredge would be deposited, or the quantities and types of sediment to be dredged (please refer to para. 98 in our Physical Processes advice for further details).'	The other relevant impacts identified are assessed in Section 12.6.
N/A	NRW	*'The potential use of a cofferdam is not discussed in Chapter 10 (Marine Ecology) but is included in Chapter 14 (Physical Processes). We advise that details of the proposed works should be defined and described in the ES in order to understand the potential impacts from the proposed development.'*	**Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) provide an overview of the works required in the Water Connection Corridor. This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment. The worst-case scenario is described in Section 12.3. This includes details on the worst-case assumption of works, there would be no interaction with the riverbed whatsoever, including no cofferdam. Therefore, impacts relating to a cofferdam have been scoped out from assessment in Section 12.2. The other relevant impacts identified are assessed in Section 12.6.
N/A	NRW	*'Furthermore, we advise that potential linkages between different receptors and/or chapters should be clearly identified as impacts to one receptor may inform impacts to another i.e. where potential impacts to physical processes inform impacts to benthic ecology receptors and water quality.'*	Acknowledged. Appropriate cross-references have been included in this chapter to other relevant chapters.
N/A	NRW	*'Based on the limited amount of detailed information available about the proposed methodology for construction*	**Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) provide an overview of the works required in

Comment ID	Consultee	Comment	Response
		and operation we advise that the following construction and operation impacts should be scoped in for benthic ecology receptors. *Construction impacts* *Direct loss and physical disturbance to benthic habitats and species from works carried out below Mean High Water Spring tide limits (MHWS) within the Water Connection Corridor: this should be further defined to clearly differentiate between the impact pathways that relate to temporary habitat loss and/or disturbance from, for example, the movement of vehicles on the shore compared to impacts that could result in long-term habitat loss i.e. replacement of the Water Connection Corridor. We therefore advise that the following two impacts should be scoped in:* • *temporary habitat loss and/or disturbance e.g. maintenance dredging;* • *Temporary benthic habitat loss and/or disturbance;* • *Long-term benthic habitat loss* • *Physical disturbance to benthic habitats and species from increased*	the Water Connection Corridor. This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment. The worst-case scenario is described in Section 12.3. This includes details on the worst-case assumption of works, there would be no interaction with the riverbed. Therefore, many impacts originally considered at PEIR stage have been scoped out from assessment in Section 12.2. The other relevant impacts identified are assessed in Section 12.6.

Comment ID	Consultee	Comment	Response
		suspended sediment concentrations (i.e. increased turbidity and deposition): we advise that this should be defined as 'temporary increases in suspended sediment concentrations and associated turbidity' as this would include potential impacts from smothering to benthic receptors; • *Indirect impacts to benthic ecology from changes in marine water quality (excluding turbidity);* • *Indirect impacts to benthic habitats from hydromorphological changes;* • *Introduction and/or spread of Invasive Non-Native Species (INNS): this should include potential introduction of INNS from the movement of vessels required to deliver materials to site;* • *Accidental pollution from vehicles, vessels, and equipment/machinery: this could be mitigated via production and adherence to standard post-consent plans e.g. a Construction Environmental Management Plan [CEMP]; and*	

Comment ID	Consultee	Comment	Response
		• *Impacts from release of sediment-bound contaminants: disturbance to intertidal/subtidal habitats associated with construction activities could lead to remobilisation of sediment-bound contaminants that may affect benthic communities.'*	
N/A	NRW	*'We would not expect underwater sound and vibration disturbance to benthic ecology receptors to be scoped in unless specific benthic species that are sensitive to noise and/or vibration are identified within the project's Zone of Influence [ZoI].'*	This position on the scope of the assessment is acknowledged and following the reduced scope of works in the Water Connection Corridor, underwater sound and vibration disturbance to benthic ecology has been scoped out from further assessment Section 12.2.
N/A	NRW	*'We advise that the following operational impacts should be scoped in:* • *temporary habitat loss and/or disturbance e.g. maintenance dredging;* • *indirect impacts to benthic receptors from changes to existing thermal and chemical effects from treated water discharge;* • *indirect impacts to benthic receptors from hydromorphological changes: this should consider ongoing scour, potentially leading to habitat*	**Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) provide an overview of the works required in the Water Connection Corridor. This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment. The worst-case scenario is described in Section 12.3. This includes details on the worst-case assumption of works, there would be no interaction with the riverbed whatsoever. Therefore, many impacts originally considered at PEIR stage have been scoped out from assessment in Section 12.2. The other relevant impacts identified are assessed in Section 12.6.

Comment ID	Consultee	Comment	Response
		alteration - please also refer to our Physical Processes advice regarding changes to seabed/riverbed morphology (para. 109) and scour of seabed caused by water discharge (para. 110 - 112); • *impacts from release of sediment-bound contaminants;* • *indirect impacts to benthic ecology from changes in marine water quality (excluding turbidity);* • *temporary increases in suspended sediment concentrations and associated turbidity (please refer to our Physical Processes advice below);* • *introduction and/or spread of INNS e.g. from maintenance vessels if required, and also to account for any new infrastructure to function as a 'stepping-stone' for INNS;* • *accidental pollution; and* • *increases in water temperature: this is discussed in Chapter 11 but not Chapter 10 regarding benthic ecology. Some benthic habitats and/or species are sensitive to changes in temperature. We*	

Comment ID	Consultee	Comment	Response
		therefore advise that this should be scoped in.'	
N/A	NRW	*'Section 10.4.5 (Sources of Information): the Marine Evidence Based Sensitivity Assessment (MarESA) should be referred to for any future sensitivity assessments as this supersedes and replaces the Marine Life Information Network (MarLIN) approach.'*	Acknowledged, this has been considered and referenced in **Appendix 12-A: Marine Ecology Assessment Methodology** (**EN010166/APP/6.4**).
N/A	NRW	*'Section 10.4.23 (Marine Ecological Surveys and Data Collection): we agree that more recent surveys should be completed to characterise the intertidal habitats present and potentially affected by the development. This survey should include potential habitats affected within the defined ZoI. We would welcome engagement with the applicant when devising their characterisation survey. Please also refer to Natural Resources Wales / Benthic habitat assessments for marine developments for best practice guidance on how to carry out benthic habitat surveys and monitoring in relation to marine developments.'*	Intertidal surveys were completed in June 2024 and following a Discretionary Advice Service (DAS) meeting with NRW also in June 2024 and December 2024. However, following the reduced scope of works in the Water Connection Corridor it was agreed by NRW following a meeting in December that benthic surveys were no longer required. The findings of the intertidal surveys are detailed in **Appendix 12-D: Intertidal Survey Report** (**EN010166/APP/6.4**) and Section 12.4.
N/A	NRW	*'Section 10.5 (Impact Assessment Methodology): with reference to the*	The impact assessment presented in this chapter has been undertaken in accordance with CIEEM methodology as detailed in

Comment ID	Consultee	Comment	Response
		draft assessment methodology including definitions for longevity of an impact (i.e. short, medium, long term), extent and magnitude, we advise that the sensitivity of receptors should be defined and presented in the ES. Section 4.4.6 notes that specific criteria for each technical assessment will be developed but this has not been presented in Chapter 10.'	**Appendix 12-A: Marine Ecology Assessment Methodology** (**EN010166/APP/6.4**).
N/A	NRW	*'Section 10.6 (Embedded Mitigation): we advise that a full Biosecurity Risk Assessment and INNS Management Plan should be completed in relation to all marine operation activities associated with the proposal. The risk assessment and management plan should include consideration of all activities, vehicles and equipment used as well as how the risk will be minimised through appropriate mitigation and adherence to best practice guidance and management measures. The risk assessment should include a review of all available data in relation to the presence of marine INNS where applicable to the proposal, and the potential risks associated with each species identified.'*	INNS identified in the desk study of the local benthic environment have been considered in Section 12.4 and associated impacts from INNS are assessed in Section 12.6 Furthermore, a marine INNS Management plan and Biosecurity Risk Assessment has been produced: • **Appendix 12-E: Marine Biosecurity Risk Assessment** (**EN010166/APP/6.4**); and • **Appendix 12-F: Marine Invasive Non-Native Species Outline Management Plan** (**EN010166/APP/6.4**).

Table 12-3: Statutory Consultee Responses

Consultee	Comment	Response
JNCC	*'JNCC has responsibility for the provision of nature conservation advice in the offshore area; 'offshore' being defined as beyond 12 nautical miles (nm) from the coastline, to the extent of the United Kingdom Continental Shelf (UKCS). Within territorial limits (<12 nm) nature conservation advice is the responsibility of the relevant country bodies.* *This development proposal is not located within the offshore area, does not have any potential offshore nature conservation issues and is not concerned with nature conservation at a UK-level, therefore JNCC does not have any comments to make on the consultation.'*	Acknowledged.
FCC	*'The scope and methodology of ecology surveys and assessments being undertaken as set out within Chapter 12 Marine Ecology are accepted and as agreed at the EIA Scoping stage.'*	Acknowledged.
Natural England	*'Section 12.3.16 - Natural England advise that the progression of Option 2[4] has the potential for direct loss of benthic habitats that are qualifying features of Dee Estuary / Aber Dyfrdwy SAC. We note a detailed assessment of the potential impacts on marine ecology of progressing this option is not provided in the subsequent assessment.'*	Option 2 is no longer being considered as part of the Proposed Development and is therefore not considered in this ES.

[4] Option 2 reporting within the PEIR at statutory consultation stage referred to an additional / new abstraction and discharge infrastructure being added along with the existing Connah's Quay Power Station cooling water infrastructure remaining in-situ.

Consultee	Comment	Response
Natural England	*'Dredging* *Natural England note that there is currently not enough information provided to assess the potential impacts of required construction dredging.'*	Dredging is no longer being considered as part of the Proposed Development at any stage and is therefore not considered in this ES.
NRW	*'Benthic Ecology* *In principle, we agree with the outline approach presented. However, insufficient information on some topic areas has meant that it is not possible to adequately assess the potential impacts on intertidal and subtidal habitats, which include Annex I SAC features. Therefore, we do not currently agree with some of the preliminary assessments presented. Our concerns are outlined in the detailed comments below and should be addressed as part of the full ES.'*	**Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) provide an overview of the works required in the Water Connection Corridor. This includes a reduced scope of works in the Water Connection Corridor, which is the focus of this assessment. There would be no interaction with the riverbed at any stage of the Proposed Development and therefore impacts to benthic ecology have been substantially reduced since PEIR. Updated impacts relevant to the Proposed Development in relation to benthic ecology are detailed in Section 12.6.
NRW	*'Paragraph 12.2.4 Scope of the Assessment - Construction phase: potential direct benthic habitat loss as a result of construction of the new intake and outfall structures (Option 2, para. 12.3.16) should be included and assessed in the full ES, if Option 2 is to be progressed.'*	**Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) provide an overview of the works required in the Water Connection Corridor. This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment. Option 2 is no longer being considered as an option for the Proposed Development. Therefore, no habitat loss would occur in the intertidal or subtidal area as a result of the Proposed Development and has been scoped out of assessment in Section 12.3 of this chapter. The impacts identified are assessed in Section 12.6.

Consultee	Comment	Response
NRW	*'Paragraph 12.2.4 Scope of the Assessment - Operational phase mentions indirect effects to marine ecology from changes in relation to the thermal plume. This should also make specific reference to the potential influence on INNS. For example, Chinese mitten crab Eriocheir sinensis are known to be present in the Dee estuary and river catchment. The potential influence on the larval stages of this species in relation to the thermal plume should be assessed.'*	The worst-case for thermal discharge has been considered to be within the existing licence permits. Further details are in Section 12.3. This impact has therefore been scoped out from further assessment (Section 12.3). A marine INNS has also been produced and is included in **Appendix 12-F: Marine Invasive Non-Native Species Outline Management Plan** (**EN010166/APP/6.4**).
NRW	*'Paragraph 12.3.16 - Assessment Assumptions: it appears that a direct loss of marine habitats from Option 2 (construction of new intake and outfall infrastructure), has not been considered in this section. It is likely that this would include the potential loss of Annex I SAC features and therefore should be assessed fully to inform the HRA, if Option 2 is progressed.'*	**Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) provide an overview of the works required in the Water Connection Corridor. This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment. Option 2 is no longer being considered as an option for the Proposed Development. Therefore, no habitat loss (including any Annex 1 SAC habitats) would occur in the intertidal or subtidal area as a result of the Proposed Development. This potential impact has therefore been scoped out of assessment in Section 12.3 of this chapter. The impacts identified are assessed in Section 12.6.
NRW	*'Construction phase dredging* *Wwe note reference to a current lack of information on this element and that this will be fully assessed as part of the ES. See our Physical Processes comments below (comments 155 - 157) for further advice regarding this.'*	**Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) provide an overview of the works required in the Water Connection Corridor. This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment. The

Consultee	Comment	Response
		worst-case scenario is described in Section 12.3. This includes details on the worst-case assumption of works, there would be no interaction with the riverbed whatsoever (including no dredging at any stage). Therefore, impacts relating to dredging have been scoped out from assessment in Section 12.2. The other relevant impacts identified are assessed in Section 12.6.
NRW	*'Section 12.5 - Development Design and Embedded Mitigation: reference to the proposed marine biosecurity/INNS Risk Assessment should be included in this section.'*	The marine INNS Management plan **Appendix 12-F: Marine Invasive Non-Native Species Outline Management Plan** (**EN010166/APP/6.4**) and Biosecurity Risk Assessment **Appendix 12-E: Marine Biosecurity Risk Assessment** (**EN010166/APP/6.4**) has been produced and reference to these appendices are included in Section 12.5.
NRW	*'Section 12.6 - Preliminary Assessment of Likely Impacts and Effects, Table 12-8: we are broadly satisfied with the ecological receptors included. However, clarification is needed on whether 'Permanent and temporary direct loss' in relation to construction activities includes the construction of the new intake and outfall structures (Option 2). This may include impacts (direct and indirect) on Annex I habitats and features and should therefore be assessed appropriately.'*	Following the largely reduced scope of works from the Proposed Development, impacts considered in this chapter and listed in **Table 12-13** have now been updated accordingly.
NRW	*'Paragraph 12.6.3 – Construction Phase impacts appear to address our advice above regarding assessment of habitat loss in relation to construction of the intake and outfall structure (Option 2), but further clarification is needed. Intertidal habitats in this area are an Annex I feature and a primary reason for designation of the Dee Estuary / Aber*	As above. Option 2 is no longer being considered in the Proposed Development and no habitat loss below MHWS would occur. Therefore, this potential impact has been scoped out of

Consultee	Comment	Response
	Dyfrdwy SAC. Therefore, any loss of habitat should be assessed and potentially compensated appropriately, in alignment with the site conservation objectives. If Option 2 is pursued and the existing infrastructure (intake and outfall) not utilised, its removal should be considered. This could provide some compensation for the loss of habitat as part of the new infrastructure but should be assessed and presented appropriately in the ES and HRA.'	assessment in Section 12.2 and the **Report to Inform Habitats Regulation Assessment** (**EN010166/APP/6.12**).
NRW	*'Paragraph 12.6.7 -: until full details of the construction activities in relation to the location and number of piles, berthing of vessels and construction phase dredging are available it is not possible to accurately assess the impact of these activities on Annex I features, and ascertain whether these are temporary or permanent. A full assessment should be included in the ES and HRA.'*	As above. Option 2 is no longer being considered in the Proposed Development and no habitat loss below MHWS would occur. Therefore, this potential impact has been scoped out of assessment in Section 12.2 and the **Report to Inform Habitats Regulations Assessment** (**EN010166/APP/6.12**).
NRW	*'Paragraphs 12.6.15/12.6.36 -: until full details of the proposal and confirmation of whether new infrastructure (such as that outlined in Option 2) is likely to be introduced, it is not possible to accurately assess the potential impact on intertidal and subtidal features. Therefore, we do not currently agree with the assessment conclusion of 'negligible/not significant'. Further information should be provided in the ES and HRA.'*	**Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme (EN010166/APP/6.2.5**) provide an overview of the works required in the Water Connection Corridor. This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment. Option 2 is no longer being considered as an option for the Proposed Development. Works within the Water Connection Corridor involve the refurbishment of existing eel screen only with no interaction with the river-bed what so ever. Therefore, a large portion of the impacts identified at PEIR stage have since been scoped out of assessment in Section 12.3 of this chapter.

Consultee	Comment	Response
		The remaining relevant impacts identified are assessed in Section 12.6.
NRW	*'Paragraph 12.6.499 -: in relation to air blast and jet washing of intake and outfall structures and the potential effects on intertidal and subtidal features, until further information on the volumes of sediment, size of structures and frequency of the activity is provided, it is not possible to fully assess the impacts on intertidal and subtidal features. Therefore, we do not currently agree with the assessment conclusion of 'minor adverse/not significant'. Further information should be provided in the ES and HRA.'*	Following completion of the upgrades to the intake and outfall infrastructure, the maintenance and cleaning methods would remain the same as previously used before the upgrades have been undertaken. Therefore, there is expected to be no impacts on intertidal and subtidal features as a result of this and has been scoped out of assessment in Section 12.3 of this chapter.
NRW	*'Marine Mammals* *We agree with the conclusions of the PEIR that there will be no likely significant effects on marine mammals based on expert judgment and the location, depth and topography of the proposed works. However, we consider some of the approaches presented and evidence used regarding marine mammals to be unfounded and speculative. These are outlined in our detailed comments below and should be addressed as part of the full ES and HRA, to ensure robust assessment.'*	Following the updated reduced scope of works in the Water Connection Corridor, the assessment of likely significant effects to marine mammals has been updated in Section 12.6.
NRW	*'Paragraph 12.4.2 - Designated Sites: we welcome the inclusion of Pen Llŷn a'r Sarnau SAC and North Anglesey Marine SAC; the nearest marine mammal SACs in proximity to the Dee Estuary.*	**Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) provide an overview of the works required in the Water Connection Corridor. This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment.

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	Section 12.6 – Preliminary assessment of likely impacts and effects: we welcome the Zone of Influence (ZoI) of 26 km using harbour porpoise to assess the underwater sound (UWS) disturbance on marine mammals and that the SELcum (cumulative sound exposure level) predictions represent the worst-case scenario for marine mammals from piling sound. *Paragraph 12.6.30 -: we welcome implementation of standard JNCC guidance for impact piling in marine waters and expect its implementation regarding mitigating impacts to marine mammals, including the use of soft-start methods during any impact piling.* *Paragraph 12.6.31 -: we welcome the noise disturbance assessment conclusions for seals from impact sheet piling.'*	Option 2 is no longer being considered as an option for the Proposed Development. Works within the Water Connection Corridor involve the refurbishment of existing eel screen only with no interaction with the river-bed what so ever. Therefore, UWS disturbance from piling is no longer part of the Proposed Development and has been scoped out of assessment in Section 12.3 of this chapter. The remaining relevant impacts identified are assessed in Section 12.6.
NRW	*'Section 12.6 – Table 12-8: the inclusion of 'designated sites' as a separate receptor in this table does not fit in with the remainder of the table. Protected features should be clearly identified for each potential impact pathway assessed to allow full consideration under the Habitats Directive.'*	Noted. The 'designated sites' column has been removed from **Table 12-13**.
NRW	*'Paragraph 12.6.30: we consider the following statement to be unsubstantiated and assumptive: 'the presence of cetaceans including harbour porpoise in the estuary, and therefore in the vicinity of the Water Connection Corridor, is considered to be low and limited to occasional presence. Therefore, the risk of injury to cetaceans is highly unlikely.' Such statements should be fully justified and evidenced in the ES.'*	Noted, text has been added to Section 12.6 in relation to risk of injury to marine mammals from vessels.

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NRW	*'Paragraph 12.6.33 states that: 'the impact of UWS effects on marine mammals, which are of high sensitivity, has been assessed as having a magnitude of very low which results in a minor adverse effect, which considered to be not significant'. We agree that the effect on marine mammals is 'not significant' given that the JNCC guidelines on piling would be adhered to. However, given the UWS assessment outcomes presented on impact piling for marine mammals, we do not agree with the magnitude of 'very low' considering the Permanent Threshold Shifts (PTS) thresholds for both seals and harbour porpoise are assessed to be exceeded. We therefore recommend the magnitude of 'very low' is re-classified to a more conservative and realistic magnitude.'*	As above, following the updated scope of works, there would be no UWS produced from pilling as no piling would occur and has been scoped out of assessment in Section 12.3 of this chapter.
NRW	*'Paragraph 12.6.43: we do not agree with the statement that: 'Cetaceans and seals are reasonably resilient to minor strikes and collisions (Ref 12-38).' The paper by Wilson, B., Batty, R. S., Daunt, F. and Carter, C., 2007 does not allege that marine mammals are 'resilient' to minor strike. We consider the use of such statements as unfounded and speculative when assessing the impacts on marine mammals. We therefore recommend the Applicant reconsiders the use of this statement and its removal from the ES.'*	Noted. Following the updated reduced scope of works, Section 12.6 has been updated and reference to cetaceans and seal collision risks has been updated also.
NRW	*'Paragraph 12.6.44 states that: 'the Irish Sea outside of the estuary is characterised by a high volume of vessel traffic (Ref 12-39) and therefore marine mammals in the region are expected to have some habituation'. We do not agree with this and consider the assumption that marine mammals are 'expected to have some habituation' to vessel traffic to*	Acknowledged. Relevant text in Section 12.6 on marine mammal collision risk has been updated accordingly. **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) provide an overview of the works required in the Water Connection Corridor. This included a

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	be a speculative argument. It should not be inferred that, given the existing chronic stressor load of 'high volume traffic' already in the area of the development and estuary, marine mammals in the area will be 'habituated' and therefore undisturbed by a further load on the vessel traffic stressor from the proposed development, with no impact on tolerance level. Increasing the load to this stressor will have effects on marine mammals, especially cumulatively, and this should be assessed in the ES and HRA. Paragraph 12.2.4 Scope of the Assessment - Construction phase: potential direct benthic habitat loss as a result of construction of the new intake and outfall structures (Option 2, para. 12.3.16) should be included and assessed in the full ES, if Option 2 is to be progressed.'	reduced scope of works in the Water Connection Corridor which is the focus of this assessment. Option 2 is no longer being considered as an option for the Proposed Development. Therefore, no habitat loss would occur in the intertidal or subtidal area as a result of the Proposed Development and has been scoped out of assessment in Section 12.3 of this chapter. The impacts identified are assessed in Section 12.6.
NRW	*'Section 12.2 and Paragraphs 12.6.4 & 12.6.29 describe the piling work needed for the cofferdam installation and subsequent piling required. We note that the cofferdam requires approximately 850 m of sheet piling, with 4-5 piles installed per day. For the outfall/intake structure another 850 m of sheet piling may be required. Cumulatively, this would lead to a large number of days of piling. Although stated to be intermittent in works, we advise more detail on the scheduling of the piling operations should be provided in the ES to ensure there are no adverse effects and that piling operations can be mitigated effectively. Paragraph 12.2.4 Scope of the Assessment - Operational phase mentions indirect effects to marine ecology from changes in relation to the thermal plume. This should also make specific reference to the potential influence on INNS. For example, Chinese mitten crab Eriocheir sinensis are known to be present in*	**Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) provide an overview of the works required in the Water Connection Corridor. This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment. The worst-case scenario is described in Section 12.3. This includes details on the worst-case assumption of works, there would be no interaction with the riverbed whatsoever (including no cofferdam/pilling). Therefore, impacts relating to a cofferdam have been scoped out from assessment in Section 12.2. The other relevant impacts identified are assessed in Section 12.6. The worst-case for thermal discharge has been considered to be within the existing licence permits. Further

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	the Dee estuary and river catchment. The potential influence on the larval stages of this species in relation to the thermal plume should be assessed.'	details are in Section 12.3. This impact has therefore been scoped out from further assessment (Section 12.3). A marine INNS has also been produced and is included in **Appendix 12-F: Marine Invasive Non-Native Species Outline Management Plan** (**EN010166/APP/6.4**).
NRW	*'Marine Fish and Fisheries* *We do not currently agree that impacts to protected fish in the Dee estuary from underwater sound from construction can be assessed as 'minor adverse' or 'negligible'. Paragraph 12.3.16 - Assessment Assumptions: it appears that a direct loss of marine habitats from Option 2 (construction of new intake and outfall infrastructure), has not been considered in this section. It is likely that this would include the potential loss of Annex I SAC features and therefore should be assessed fully to inform the HRA, if Option 2 is progressed.'*	Noted. Following the updated reduced scope of works, Section 12.6 has been updated including impacts to fish from UWS. Updated methodology for all phases of the Proposed Developed are detailed in **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**). This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment. Option 2 is no longer being considered as an option for the Proposed Development. Therefore, no habitat loss (including any Annex 1 SAC habitats) would occur in the intertidal or subtidal area as a result of the Proposed Development. This potential impact has therefore been scoped out of assessment in Section 12.3 of this chapter. The impacts identified are assessed in Section 12.6.
NRW	*'We welcome the intention to assess the impacts of impingement and entrainment further in the ES. Until a full assessment is completed, we are unable to agree that the magnitude of impacts is likely to be 'not significant'. Construction phase dredging – we note reference to a current lack of information on this element and that this will be fully assessed as part of the ES. See our Physical Processes comments below (comments 155 - 157) for further advice regarding this.'*	Noted. Following the updated reduced scope of works, the impacts of impingement and entrainment is further assessed in Section 12.6. **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) provide an overview of the works required in the Water Connection Corridor. This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment. The worst-case scenario is described in Section 12.3. This includes

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		details on the worst-case assumption of works, there would be no interaction with the riverbed whatsoever (including no dredging at any stage). Therefore, impacts relating to dredging have been scoped out from assessment in Section 12.2. The other relevant impacts identified are assessed in Section 12.6.
NRW	*'Paragraphs 12.6.16-12.6.18: the potential for localised deoxygenation and smothering following increases in Suspended Sediment Concentration (SSC) and disturbance of anoxic sediments should be further considered for fish and shellfish receptors in the ES. Consideration should be given to the potential impacts of smothering on newly settled cockle spat during the June/July period, particularly from suspended sediment in the water column caused by cofferdam construction. Section 12.5 - Development Design and Embedded Mitigation: reference to the proposed marine biosecurity/INNS Risk Assessment should be included in this section.'*	Noted. Following the updated reduced scope of works, the impacts of increased SSC is further assessed in Section 12.6.The marine INNS Management plan **Appendix 12-F: Marine Invasive Non-Native Species Outline Management Plan** (**EN010166/APP/6.4**) and Biosecurity Risk Assessment **Appendix 12-E: Marine Biosecurity Risk Assessment** (**EN010166/APP/6.4**) has been produced and reference to these appendices are included in Section 12.5.
NRW	*'Consideration of any effects on cockles from a potential rise in water temperature due to discharge from the Water Connection Corridor should be assessed, if it exceeds current permit conditions. Section 12.6 - Preliminary Assessment of Likely Impacts and Effects, Table 12-8: we are broadly satisfied with the ecological receptors included. However, clarification is needed on whether 'Permanent and temporary direct loss' in relation to construction activities includes the construction of the new intake and outfall structures (Option 2). This may include impacts (direct and*	Impacts from abstraction of cooling water and discharge on marine ecology receptors is presented in Section 12.1. This includes an assessment of available information about the existing rates and limits and any monitoring data obtained as part of the Environmental Permit. The worst-case for thermal discharge has been considered to be within the existing licence permits. Further details are in Section 12.3. This impact has therefore been scoped out from further assessment (Section 12.3). Following the largely

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	indirect) on Annex I habitats and features and should therefore be assessed appropriately.'	reduced scope of works from the Proposed Development, impacts considered in this chapter and listed in **Table 12-13** have now been updated accordingly.
NRW	*'Volume II, Chapter 12: Marine Ecology* *Table 12-2: Study Areas for each Marine Ecological Receptor: we welcome use of the regional approach and advise that the ZoI for fish receptors should be informed by underwater sound modelling for impact piling in the Water Connection Corridor. Alternatively, the wider 26 km ZoI adopted for impacts to marine mammals from underwater sound may be applied.* *Table 12-7: Sensitive Receptors within the Existing Baseline: river lampreys are likely to reside in the near coast and estuary so should be considered as being 'within River Dee and Estuary', rather than 'passing through periodically'.* *Paragraph 12.5.2: we welcome the intention to upgrade the abstraction and discharge infrastructure to comply with the Eels (England and Wales) Regulations 2009. We advise that further consideration is given to screening for eggs and juvenile of smelt, a species listed on Section 7 of the Environment (Wales) Act 2016, which are a feature of the Dee Estuary SSSI and breed in the River Dee and estuary.* *Table 12-8 – Potential Impacts Considered Further in the Assessment and Marine Ecological Receptors Most Likely to be Affected by the Proposed Development: we find the use of 'designated sites' as a separate receptor confusing*	The Study Areas for relevant receptors have been updated in Section 12.4. **Table 12-12** has been updated for river lampreys. Screening of eggs and juvenile smelt has been assessed in Section 12.6. A column for 'designated sites' in **Table 12-13** has been removed since PEIR stage. Following the reduced scope of works, impacts to fish have been assessed Section in 12.6. This includes European eel which may bury beneath sediment. **Table 12-15** has also been updated. **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) provide an overview of the works required in the Water Connection Corridor. The worst-case scenario is described in Section 12.3. This includes details on the worst-case assumption of works, there would be no interaction with the riverbed whatsoever (including no cofferdam/pilling). Therefore, impacts relating to a cofferdam and underwater sound disturbance have been scoped out from assessment in Section 12.2.

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	and unnecessary. Protected features should be clearly identified for each potential impact pathway assessed to allow full consideration under the Habitats Directive. *Fish, especially species such as European eel which buries in sediment, should be considered further for the following pathways:* • *'Permanent and temporary direct loss and physical disturbance to benthic habitats and species from works (including construction phase dredging works and berthing of vessels, such as a jack-up barge (JUB), at low tide) below MHWS within the Water Connection Corridor;* • *Indirect effects to marine ecology from hydromorphological changes (e.g. changes to water flow or sediment movement) within the ZoI; and* • *'Direct loss and physical disturbance to benthic habitats and species from works carried out below MHWS within the Water Connection Corridor section of the Site'.* *Paragraph 12.6.4: we note that less than 50% of the river will be obstructed at low tide during construction, due to the cofferdam and JUB. As the restriction in width of the river corridor may affect fish migration the potential for behavioural effects should be fully considered in the ES. It would be useful to provide maps in the ES detailing the river, with overlaid contours describing UWS levels.* *Paragraph 12.6.24: in the absence of any apparent evidence to support the use of soft-start procedures as*	The 'Moderate beneficial' in **Table 12-13** summary impacts under impingement and entrainment to marine ecology receptors has remained unchanged due to the reduced mesh size resulting is less impacts likely compared to the existing baseline conditions. This is discussed further is Section 12.6. As above. Option 2 is no longer being considered in the Proposed Development and no habitat loss below MHWS would occur. Therefore, this potential impact has been scoped out of assessment in Section 12.2 and the **Report to Inform Habitats Regulations Assessment** (**EN010166/APP/6.12**).

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	mitigation for fish we do not currently agree that impacts can be assessed as 'minor adverse' or 'negligible'. We therefore advise that this is further considered in the ES. Please also see our comments on Appendix 12-B Underwater Sound Effects on Fish below. *Paragraph 12.6.55: we welcome the commitment to install upgraded 2 mm screens to comply with The Eels (England and Wales) Regulations 2009.* *Paragraph 12.6.57: we welcome the intention to further assess the impacts of impingement and entrainment in the ES, and advise that until a full assessment is done, we are unable to agree that the magnitude of impacts is likely to be 'not significant'.* *Table 12-13: Summary of Significant Residual Effects (Operation): we note that potential mortality to marine ecology (and presumably fish) is classified as 'Moderate beneficial'. Please confirm whether this is an error or provide further justification in the ES. We note that, in line with the statement in paragraph 12.6.57, entrainment and impingement effects will be further assessed in the ES.* *Paragraph 12.6.3 – Construction Phase impacts appears to address our advice above regarding assessment of habitat loss in relation to construction of the intake and outfall structure (Option 2), but further clarification is needed. Intertidal habitats in this area are an Annex I feature and a primary reason for designation of the Dee Estuary / Aber Dyfrdwy SAC. Therefore, any loss of habitat should be*	

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	assessed and potentially compensated appropriately, in alignment with the site conservation objectives. If Option 2 is pursued and the existing infrastructure (intake and outfall) not utilised, its removal should be considered. This could provide some compensation for the loss of habitat as part of the new infrastructure but should be assessed and presented appropriately in the ES and HRA.'	
NRW	*'Volume II, Chapter 13: Water Environment and Flood Risk* *We note the scope of Assessment Assumption and Limitations as defined in paragraph 13.3.9, including no 3D thermal discharge modelling. While 3D modelling may not be required, to fully assess the potential impacts on migratory fish behaviour and the potential for the thermal plume to create a barrier, as identified in paragraph 12.6.50 of Chapter 12: Marine Ecology, further information and modelling should be provided in the ES. Paragraph 12.6.7: until full details of the construction activities in relation to the location and number of piles, berthing of vessels and construction phase dredging are available it is not possible to accurately assess the impact of these activities on Annex I features, and ascertain whether these are temporary or permanent. A full assessment should be included in the ES and HRA.'*	Following the reduced scope of works in the Water Connection Corridor, the worst-case for thermal discharge has been considered to be within the existing licence permits. Further details are in Section 12.3. This impact has therefore been scoped out from further assessment (Section 12.3). As above. Option 2 is no longer being considered in the Proposed Development and no habitat loss below MHWS would occur. Therefore, this potential impact has been scoped out of assessment in Section 12.2 and the **Report to Inform Habitats Regulations Assessment** (**EN010166/APP/6.12**).
NRW	*'Volume IV, Appendix 12-B: Underwater Sound Effects on Fish* *Paragraph 12.1.3 describes the migratory fish species found in the Dee, including twaite shad and smelt which are both listed under Section 7 of the Environment (Wales) Act 2016. Paragraph 12.5.1 states that none of the migratory fish*	Following the reduced scope of works in the Water Connection Corridor, no pilling or any interaction with the riverbed would occur during any stage of the Proposed Development. Therefore, PEIR *Appendix (previously labelled 12-B: Underwater Sound Effects on Fish)* is no longer necessary for

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	present are of high hearing sensitivity. However, twaite shad have high hearing sensitivity and have been recorded in the Dee estuary. *Section 12.2 describes the piling work required for the cofferdam construction and Section 12.3 describes the piling required for the refurbishment/replacement of the existing outfall and intake infrastructure. We note that the cofferdam would require approximately 850m of sheet piling, with 4-5 piles installed per day giving a total of between 248 and 310 days of construction. For the outfall/intake structure a further 850 m of sheet piling may be needed, although we note that in Chapter 5 this is given ass1000 m. Taken together and based on the cofferdam construction method this would give an estimated minimum 496 working days of pilling.* *Paragraph 12.5.16: we do not consider a 'soft start' effective mitigation for fish. While they may move away from the noise, it would still provide a behavioural deterrent, which is likely to span the river corridor. We note that installation of both cofferdam and intake/outfall structures would be intermittent, but we consider that there is a potential significant risk of UWS affecting the behaviour of migratory fish and therefore do not agree that the impact can be considered 'minor'. We advise that further details are provided on the scheduling of the piling operations to ensure there is no adverse effect and that they can be managed to avoid key fish migration periods.* *Paragraph 12.5.25: we advise full consideration of the in-combination effects of UWS from impact and vibratory piling*	inclusion of this ES as the only UWS generated from the Proposed Development would be from the use of vessels carrying supplies. This has been assessed in Section 12.6 of this chapter. Updated methodology for all phases of the Proposed Developed are detailed in **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**). This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment. Option 2 is no longer being considered as an option for the Proposed Development. Works within the Water Connection Corridor involve the refurbishment of existing eel screen only with no interaction with the river-bed what so ever. Therefore, a large portion of the impacts identified at PEIR stage have since been scoped out of assessment in Section 12.3 of this chapter. The remaining relevant impacts identified are assessed in Section 12.6.

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	in the ES when further details on construction activities and scheduling are available. Paragraphs 12.6.15/12.6.36: until full details of the proposal and confirmation of whether new infrastructure (such as that outlined in Option 2) is likely to be introduced, it is not possible to accurately assess the potential impact on intertidal and subtidal features. Therefore, we do not currently agree with the assessment conclusion of 'negligible/not significant'. Further information should be provided in the ES and HRA.'	
NRW	*'Paragraph 12.6.49: in relation to air blast and jet washing of intake and outfall structures and the potential effects on intertidal and subtidal features, until further information on the volumes of sediment, size of structures and frequency of the activity is provided, it is not possible to fully assess the impacts on intertidal and subtidal features. Therefore, we do not currently agree with the assessment conclusion of 'minor adverse/not significant'. Further information should be provided in the ES and HRA.'*	Following completion of the upgrades to the intake and outfall infrastructure, the maintenance and cleaning methods would remain the same as previously used before the upgrades have been undertaken. Therefore, there is expected to be no impacts on intertidal and subtidal features as a result of this and has been scoped out of assessment in Section 12.3 of this chapter.
NRW	*'Marine Mammals* *We agree with the conclusions of the PEIR that there will be no likely significant effects on marine mammals based on expert judgment and the location, depth and topography of the proposed works. However, we consider some of the approaches presented and evidence used regarding marine mammals to be unfounded and speculative. These are outlined in our detailed comments below and should be addressed as part of the full ES and HRA, to ensure robust assessment.'*	Following the updated reduced scope of works in the Water Connection Corridor, the assessment of likely significant effects to marine mammals has been updated in Section 12.6.

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NRW	*'Paragraph 12.4.2 - Designated Sites: we welcome the inclusion of Pen Llŷn a'r Sarnau SAC and North Anglesey Marine SAC; the nearest marine mammal SACs in proximity to the Dee Estuary.* *Section 12.6 – Preliminary assessment of likely impacts and effects: we welcome the Zone of Influence (ZoI) of 26 km using harbour porpoise to assess the underwater sound (UWS) disturbance on marine mammals and that the SELcum (cumulative sound exposure level) predictions represent the worst-case scenario for marine mammals from piling sound.* *Paragraph 12.6.30: we welcome implementation of standard JNCC guidance for impact piling in marine waters and expect its implementation regarding mitigating impacts to marine mammals, including the use of soft-start methods during any impact piling.* *Paragraph 12.6.31: we welcome the noise disturbance assessment conclusions for seals from impact sheet piling.*	**Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) provide an overview of the works required in the Water Connection Corridor. This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment. Option 2 is no longer being considered as an option for the Proposed Development. Works within the Water Connection Corridor involve the refurbishment of existing eel screen only with no interaction with the river-bed what so ever. Therefore, UWS disturbance from piling is no longer part of the Proposed Development and has been scoped out of assessment in Section 12.3 of this chapter. The remaining relevant impacts identified are assessed in Section 12.6.
NRW	*'Section 12.6 – Table 12-8: the inclusion of 'designated sites' as a separate receptor in this table does not fit in with the remainder of the table. Protected features should be clearly identified for each potential impact pathway assessed to allow full consideration under the Habitats Directive.'*	Noted. The 'designated sites' column has been removed from **Table 12-13**.
NRW	*'Paragraph 12.6.30: we consider the following statement to be unsubstantiated and assumptive: 'the presence of cetaceans including harbour porpoise in the estuary, and*	Noted, text has been added to Section 12.6 in relation to risk of injury to marine mammals from vessels.

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	therefore in the vicinity of the Water Connection Corridor, is considered to be low and limited to occasional presence. Therefore, the risk of injury to cetaceans is highly unlikely.' Such statements should be fully justified and evidenced in the ES.'	
NRW	*'Paragraph 12.6.33 states that: 'the impact of UWS effects on marine mammals, which are of high sensitivity, has been assessed as having a magnitude of very low which results in a minor adverse effect, which considered to be not significant'. We agree that the effect on marine mammals is 'not significant' given that the JNCC guidelines on piling would be adhered to. However, given the UWS assessment outcomes presented on impact piling for marine mammals, we do not agree with the magnitude of 'very low' considering the Permanent Threshold Shifts (PTS) thresholds for both seals and harbour porpoise are assessed to be exceeded. We therefore recommend the magnitude of 'very low' is re-classified to a more conservative and realistic magnitude.'*	As above, following the updated scope of works, there would be no UWS produced from pilling as no piling would occur and has been scoped out of assessment in Section 12.3 of this chapter.
NRW	*'Paragraph 12.6.43: we do not agree with the statement that: 'Cetaceans and seals are reasonably resilient to minor strikes and collisions (Ref 12-38).' The paper by Wilson, B., Batty, R. S., Daunt, F. and Carter, C., 2007 does not allege that marine mammals are 'resilient' to minor strike. We consider the use of such statements as unfounded and speculative when assessing the impacts on marine mammals. We therefore recommend the Applicant reconsiders the use of this statement and its removal from the ES.'*	Noted. Following the updated reduced scope of works, section 12.6 has been updated and reference to cetaceans and seal collision risks has also been updated.

Consultee	Comment	Response
NRW	*'Paragraph 12.6.44 states that: 'the Irish Sea outside of the estuary is characterised by a high volume of vessel traffic (Ref 12-39) and therefore marine mammals in the region are expected to have some habituation'. We do not agree with this and consider the assumption that marine mammals are 'expected to have some habituation' to vessel traffic to be a speculative argument. It should not be inferred that, given the existing chronic stressor load of 'high volume traffic' already in the area of the development and estuary, marine mammals in the area will be 'habituated' and therefore undisturbed by a further load on the vessel traffic stressor from the proposed development, with no impact on tolerance level. Increasing the load to this stressor will have effects on marine mammals, especially cumulatively, and this should be assessed in the ES and HRA.'*	Acknowledged. Relevant text in Section 12.6 on marine mammal collision risk has been updated accordingly.
NRW	*'Section 12.2 and Paragraphs 12.6.4 & 12.6.29 describe the piling work needed for the cofferdam installation and subsequent piling required. We note that the cofferdam requires approximately 850 m of sheet piling, with 4-5 piles installed per day. For the outfall/intake structure another 850m of sheet piling may be required. Cumulatively, this would lead to a large number of days of piling. Although stated to be intermittent in works, we advise more detail on the scheduling of the piling operations should be provided in the ES to ensure there are no adverse effects and that piling operations can be mitigated effectively.'*	**Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) provide an overview of the works required in the Water Connection Corridor. This included a reduced scope of works in the Water Connection Corridor which is the focus of this assessment. The worst-case scenario is described in Section 12.3 **Chapter 12: Marine Ecology**. This includes details on the worst-case assumption of works, there would be no interaction with the riverbed whatsoever (including no cofferdam/pilling). Therefore, impacts relating to a cofferdam have been scoped out from assessment in Section 12.2. The other relevant impacts identified are assessed in Section 12.6.

Consultee	Comment	Response
NRW	*'Marine Fish and Fisheries* *We do not currently agree that impacts to protected fish in the Dee estuary from underwater sound from construction can be assessed as 'minor adverse' or 'negligible'.'*	Noted. Following the updated reduced scope of works, Section 12.6 has been updated including impacts to fish from UWS.
NRW	*'We welcome the intention to assess the impacts of impingement and entrainment further in the ES. Until a full assessment is completed, we are unable to agree that the magnitude of impacts is likely to be 'not significant'.'*	Noted. Following the updated reduced scope of works, the impacts of impingement and entrainment is further assessed in Section 12.6.
NRW	*'Paragraphs 12.6.16-12.6.18: the potential for localised deoxygenation and smothering following increases in SSC and disturbance of anoxic sediments should be further considered for fish and shellfish receptors in the ES. Consideration should be given to the potential impacts of smothering on newly settled cockle spat during the June/July period, particularly from suspended sediment in the water column caused by cofferdam construction.'*	Noted. Following the updated reduced scope of works, the impacts of increased SSC is further assessed in Section 12.6.
NRW	*'Consideration of any effects on cockles from a potential rise in water temperature due to discharge from the Water Connection Corridor should be assessed, if it exceeds current permit conditions.'*	Impacts from abstraction of cooling water and discharge on marine ecology receptors is presented in Section 12.1. This includes an assessment of available information about the existing rates and limits and any monitoring data obtained as part of the Environmental Permit. The worst-case for thermal discharge has been considered to be within the existing licence permits. Further details are in Section 12.3. This impact has therefore been scoped out from further assessment (Section 12.3).
NRW	*'Volume II, Chapter 12: Marine Ecology*	The Study Areas for relevant receptors have been updated in Section 12.4.

Consultee	Comment	Response
	Table 12-2: Study Areas for each Marine Ecological Receptor: we welcome use of the regional approach and advise that the ZoI for fish receptors should be informed by underwater sound modelling for impact piling in the Water Connection Corridor. Alternatively, the wider 26 km ZoI adopted for impacts to marine mammals from underwater sound may be applied. *Table 12-7: Sensitive Receptors within the Existing Baseline: river lampreys are likely to reside in the near coast and estuary so should be considered as being 'within River Dee and Estuary', rather than 'passing through periodically'.* *Paragraph 12.5.2: we welcome the intention to upgrade the abstraction and discharge infrastructure to comply with the Eels (England and Wales) Regulations 2009. We advise that further consideration is given to screening for eggs and juvenile of smelt, a species listed on Section 7 of the Environment (Wales) Act 2016, which are a feature of the Dee Estuary SSSI and breed in the River Dee and estuary.* *Table 12-8 – Potential Impacts Considered Further in the Assessment and Marine Ecological Receptors Most Likely to be Affected by the Proposed Development: we find the use of 'designated sites' as a separate receptor confusing and unnecessary. Protected features should be clearly identified for each potential impact pathway assessed to allow full consideration under the Habitats Directive.*	**Table 12-12** has been updated for river lampreys. Screening of eggs and juvenile smelt has been assessed in Section 12.6. A column for 'designated sites' in **Table 12-13** has been removed. Following the reduced scope of works, impacts to fish have been assessed Section in 12.6. This includes European eel which may bury beneath sediment. **Table 12-15** has also been updated. **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**) and **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) provide an overview of the works required in the Water Connection Corridor. The worst-case scenario is described in Section 12.3. This includes details on the worst-case assumption of works, there would be no interaction with the riverbed whatsoever (including no cofferdam/pilling). Therefore, impacts relating to a cofferdam and underwater sound disturbance have been scoped out from assessment in Section 12.2. The 'Moderate beneficial' in **Table 12-13** summary impacts under impingement and entrainment to marine ecology receptors has remained unchanged due to the reduced mesh

Consultee	Comment	Response
	Fish, especially species such as European eel which buries in sediment, should be considered further for the following pathways: • *'Permanent and temporary direct loss and physical disturbance to benthic habitats and species from works (including construction phase dredging works and berthing of vessels, such as a jack-up barge (JUB), at low tide) below MHWS within the Water Connection Corridor',* • *'Permanent and temporary direct loss and physical disturbance to benthic habitats and species from works (including construction phase dredging works and berthing of vessels, such as a jack-up barge (JUB), at low tide) below MHWS within the Water Connection Corridor',* • *'Indirect effects to marine ecology from hydromorphological changes (e.g. changes to water flow or sediment movement) within the ZoI', and* • *'Direct loss and physical disturbance to benthic habitats and species from works carried out below MHWS within the Water Connection Corridor section of the Site'.* *Paragraph 12.6.4: we note that less than 50% of the river will be obstructed at low tide during construction, due to the cofferdam and JUB. As the restriction in width of the river corridor may affect fish migration the potential for behavioural effects should be fully considered in the ES. It would be useful to provide maps in the ES detailing the river, with overlaid contours describing UWS levels.* *Paragraph 12.6.24: in the absence of any apparent evidence to support the use of soft-start procedures as*	size resulting is less impacts likely compared to the existing baseline conditions. This is discussed further is Section 12.6.

Consultee	Comment	Response
	mitigation for fish we do not currently agree that impacts can be assessed as 'minor adverse' or 'negligible'. We therefore advise that this is further considered in the ES. Please also see our comments on Appendix 12-B Underwater Sound Effects on Fish below. *Paragraph 12.6.55: we welcome the commitment to install upgraded 2mm screens to comply with The Eels (England and Wales) Regulations 2009.* *Paragraph 12.6.57: we welcome the intention to further assess the impacts of impingement and entrainment in the ES, and advise that until a full assessment is done, we are unable to agree that the magnitude of impacts is likely to be 'not significant'.'* *'Table 12-10: Summary of Significant Residual Effects (Operation): we note that potential mortality to marine ecology (and presumably fish) is classified as 'Moderate beneficial'. Please confirm whether this is an error or provide further justification in the ES. We note that, in line with the statement in paragraph 12.6.57, entrainment and impingement effects will be further assessed in the ES.'*	
NRW	*'Volume II, Chapter 13: Water Environment and Flood Risk* *We note the scope of Assessment Assumption and Limitations as defined in paragraph 13.3.9, including no 3D thermal discharge modelling. While 3D modelling may not be required, to fully assess the potential impacts on migratory fish behaviour and the potential for the thermal*	Following the reduced scope of works in the Water Connection Corridor, the worst-case for thermal discharge has been considered to be within the existing licence permits. Further details are in Section 12.3. This impact has therefore been scoped out from further assessment (Section 12.3).

Consultee	Comment	Response
	plume to create a barrier, as identified in paragraph 12.6.50 of Chapter 12: Marine Ecology, further information and modelling should be provided in the ES.'	
NRW	*'Volume IV, Appendix 12-B: Underwater Sound Effects on Fish* *Paragraph 12.1.3 describes the migratory fish species found in the Dee, including twaite shad and smelt which are both listed under Section 7 of the Environment (Wales) Act 2016. Paragraph 12.5.1 states that none of the migratory fish present are of high hearing sensitivity. However, twaite shad have high hearing sensitivity and have been recorded in the Dee estuary.* *Section 12.2 describes the piling work required for the cofferdam construction and Section 12.3 describes the piling required for the refurbishment/replacement of the existing outfall and intake infrastructure. We note that the cofferdam would require approximately 850 m of sheet piling, with 4-5 piles installed per day giving a total of between 248 and 310 days of construction. For the outfall/intake structure a further 850 m of sheet piling may be needed, although we note that in Chapter 5 this is given ass1000 m. Taken together and based on the cofferdam construction method this would give an estimated minimum 496 working days of pilling.* *Paragraph 12.5.16: we do not consider a 'soft start' effective mitigation for fish. While they may move away from the noise, it would still provide a behavioural deterrent, which is likely to span the river corridor. We note that installation of both cofferdam and intake/outfall structures would be*	Following the reduced scope of works in the Water Connection Corridor, no pilling or any interaction with the riverbed would occur during any stage of the Proposed Development. Therefore, PEIR *Appendix (previously labelled 12-B: Underwater Sound Effects on Fish)* is no longer necessary for inclusion of this ES as the only UWS generated from the Proposed Development would be from the use of vessels carrying supplies. This has been assessed in Section 12.6 of this chapter.

Consultee	Comment	Response
	intermittent, but we consider that there is a potential significant risk of UWS affecting the behaviour of migratory fish and therefore do not agree that the impact can be considered 'minor'. We advise that further details are provided on the scheduling of the piling operations to ensure there is no adverse effect and that they can be managed to avoid key fish migration periods. *Paragraph 12.5.25: we advise full consideration of the in-combination effects of UWS from impact and vibratory piling in the ES when further details on construction activities and scheduling are available.'*	

Table 12-4: Targeted Consultation

Consultee	Summary of Comment	Response
Flint Town Council	**Mitigation, Monitoring, and Compensation**: The Council expects: • 'Direct loss and physical disturbance to benthic habitats and species from works carried out below MHWS within the Water Connection Corridor section of the Site'. • Transparent, accountable mitigation strategies for all identified environmental risks—including noise and vibration (e.g., from pile driving) in relation to nearby Listed Buildings; and • Clear summaries of these assessments for public understanding.	Details of all mitigation and monitoring proposed is included within the **Commitments Register** (**EN010166/APP/6.10**).

	Full details of compensation mechanisms available to adversely affected residents and businesses, including: • how compensation will be calculated; • who will administer the scheme; and • how the public will be made aware of it. Additionally, the Council requests clarification on how often the project's environmental performance will be reviewed, and How local residents will be kept informed of those findings.	
Natural Resources Wales	**Protected Sites:** The PEIR reported some potentially significant air quality impacts to protected sites, particularly from operational emissions of ammonia and nutrient nitrogen deposition (Nitrogen Oxides were close to screening out and acidity was also marginal), which will need to be considered in the ES and HRA. In-combination effects with other large developments in the area will also need to be considered.	The Air Quality assessment is presented in **Appendix 8-D: Air Quality Operational Assessment** (**EN010166/APP/6.4**) and is considered in Section 11.6 of **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**) as well as the **Report to Inform Habitats Regulations Assessment** (**EN010166/APP/6.12**).

Table 12-5: Additional Relevant Engagement

Consultee	Description	Response
NRW	A DAS meeting was held between AECOM, NRW and the Applicant on 01 July 2024. An overview of the Proposed	A marine INNS Management Plan and Biosecurity Risk Assessment has been produced and reference to these appendices are included in Section 12.5 (**Appendix 12-F: Marine**

	Development and proposed marine ecology and physical process surveys were shared. Based on the Proposed Development information at the time, NRW requested assessments on various marine ecology and physical process aspects, including the production of a biosecurity risk assessment and INNS management plan, the potential need for updated benthic infauna sampling, and the potential impact of construction activities on marine habitats and species. Discussions covered the necessity of migratory fish and cetacean surveys, sediment sampling for dredging activities, and the modelling approach for hydrodynamic and sediment transport analysis. NRW agreed that existing data was sufficient for some receptors such as fish but mentioned that based on the scope of works at that time, there would be a need for additional sampling required for benthic subtidal ecology.	**Invasive Non-Native Species Outline Management Plan** (**EN010166/APP/6.4**) and **Appendix 12-E: Marine Biosecurity Risk Assessment** (**EN010166/APP/6.4**)). Following the reduced scope of works in the Water Connection Corridor, it has since been agreed by NRW that these surveys, hydrodynamic and sediment modelling and analysis are no longer required. Further information is described in the rows below.
NRW	Another DAS meeting was held between AECOM, NRW, and the Applicant on 12 December 2024 to discuss updates to the Proposed Development, anticipated impact pathways, and survey requirements. The updates included a significant reduction in works within the Water Connection Corridor. Following this, the remaining identified impacts on marine ecology were outlined, including potential effects on INNS, pollution risk, and visual and noise disturbance. AECOM proposed that no further marine ecology or sediment sampling surveys	This ES chapter has been developed based on the reduced scope of works, with no further marine ecology surveys required. The impact assessment for all phases of work within the Water Connection Corridor is detailed in Section 12.6.

	were required, and NRW later confirmed that this approach was acceptable.	
NRW	Another DAS meeting was held between AECOM, NRW, and the Applicant on 12 December 2024 to discuss updates to the Proposed Development, anticipated impact pathways, and survey requirements. The updates included a significant reduction in works within the Water Connection Corridor. Following this, the remaining identified impacts on marine ecology were outlined, including potential effects on INNS, pollution risk, and visual and noise disturbance. AECOM proposed that no further marine ecology or sediment sampling surveys were required, and NRW later confirmed that this approach was acceptable.	This ES chapter has been developed based on the reduced scope of works, with no further marine ecology surveys required. The impact assessment for all phases of work within the Water Connection Corridor is detailed in Section 12.6.
NRW	A further DAS meeting was held between AECOM, NRW, and the Applicant on 29 January 2025 to discuss further reductions to the scope of works within the Water Connection Corridor. These reductions included an overall decrease in the boundary of the Water Connection Corridor and the complete removal of any interactions with the riverbed (e.g., no excavation, no piling, no direct disturbance, and no habitat loss in the riverbed). Following this, licensing requirements were discussed, and NRW later confirmed that a Band 3 licence would be required.	This ES chapter has been developed based on the reduced scope of works, with no further marine ecology surveys required. The impact assessment for all phases of work within the Water Connection Corridor is detailed in Section 12.6. A meeting was held with NRW on the 29 January 2025 to discuss Marine Licensing and the Proposed Development. It was agreed that the Proposed Development would likely require a Band 3 license.

Scope of the Assessment

12.2.7 Following the scoping and PEIR process that has been undertaken, the scope of the assessment considered in this chapter of the ES is as follows; a summary is provided in **Table 12-6**.

Construction phase

- temporary direct loss and physical disturbance from the use of vessels to benthic habitats and species;
- effects to marine ecology from changes in marine water quality due to accidental spills from vessels and surface run-off from land-based construction activities within the ZoI;
- effects on marine ecology from changes in existing lighting conditions during construction;
- introduction and spread of invasive non-native species (INNS) from use of vessels; and
- collisions between any project vessels and marine mammals.

Operational phase

- physical disturbance and potential mortality to marine ecology, in particular fish, from entrainment and impingement within the cooling water abstraction and discharge infrastructure within the Water Connection Corridor; and
- effects on marine ecology from long-term changes in existing lighting conditions during operation.

Exclusions from the assessment

12.2.8 The following aspects have not been considered within the scope of the assessment in this chapter of the ES:

Elements Considered in **Chapter 11: Terrestrial and Aquatic Ecology (EN010166/APP/6.2.12)**

12.2.9 The following elements are considered in Chapter **11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.12**) and are not repeated within this chapter.

- effects to intertidal habitats and species from the deposition of dust and exhaust emissions during construction; and
- effects to intertidal habitats and species from the deposition of airborne pollutants (e.g., from emissions from the power plant stacks during operation).

Permanent and temporary direct loss and physical disturbance from the Proposed Development (excluding vessels) to benthic habitats and species during the construction and operational phase

12.2.10 The construction works in the Water Connection Corridor will involve the refurbishment of existing eel screens and associated works at intakes. There

will be no interaction with the riverbed, and no in-river works will take place. The construction of the Proposed Surface Water Outfall will be installed into an extension of the existing headwall via trenchless construction methods or with open excavation. Works will take place at low-tide only and no in-river works will take place. Any necessary excavations will be confined to the upper edge of the saltmarsh, ensuring they remain outside the boundaries of the existing mudflat habitat. The potential impacts to saltmarsh removal falls within the National Vegetation Classification (NVC) survey area which has been assessed in **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**) and **Report to Inform Habitats Regulations Assessment** (**EN010166/APP/6.12**) and is therefore not assessed in this chapter. During construction, vessels will be used as part of the Proposed Development to deliver goods using two existing ports - the Port of Mostyn, and / or Connah's Quay North. These vessels will navigate up the River Dee and will berth at low-tide and therefore will be included in the assessment. Vessels will not be used during the operational phase and have therefore, been scoped out from further assessment.

12.2.11 During the operational phase, the intake and outfall infrastructure within the Water Connection Corridor will be cleaned to remove silt build-up using the same methods currently applied to existing infrastructure. Further details are provided in Section 12.1. As there will be no change from baseline conditions, this has been scoped out of further assessment. The operational phase of the Proposed Surface Water Outfall is expected to result in an increase in saltmarsh erosion due to discharge, which would be temporary (lasting approximately five to 10 years). As with the construction phase, this area falls in the upper saltmarsh within the NVC survey area and is therefore assessed fully in **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**) and **Report to Inform Habitats Regulations Assessment** (**EN010166/APP/6.12**).

12.2.12 Therefore, other than the upper saltmarsh which has been be assessed fully in **Chapter 11: Terrestrial and Aquatic Ecology (EN010166/APP/6.2.11)** and Report to Inform **Habitats Regulations Assessment (EN010166/APP/6.12)** and use of vessels during construction which will be assessed in this chapter, there would be additional no direct loss or physical disturbance to any other marine habitats or species during construction and operation as a result of the works, and this impact has been scoped out from further assessment.

Physical disturbance to benthic habitats and species from increased SSC (i.e. increased turbidity and deposition) during the construction and operational phase

12.2.13 As above, construction phase work in the Marine Elements would take place at low-tide only and there would be no interaction with the riverbed, and no in-river works would take place.

12.2.14 During operation, cleaning of the Marine Elements (e.g. intake and outfall infrastructure) to remove build-up of silt would be undertaken with the same methods used for existing infrastructure. As a result, increased SSC is not expected to occur during the operational phase.

12.2.15 Therefore, there would be no physical disturbance to benthic habitats and species from increased SSC during construction and operation, and this impact has been scoped out from further assessment.

Indirect effects to marine ecology from any changes to existing thermal and chemical effects from treated water discharge during the operational phase

12.2.16 The Applicant has confirmed that during the operation of the Proposed Development, the chemical, physical and thermal discharges from the cooling water abstracted would not exceed the current permit limits. Furthermore, there is no evidence of any thermal impacts from existing discharge rates. Therefore, there would be no indirect effects to marine ecology from chemical or thermal impacts during operation, and this impact has been scoped out from further assessment.

Underwater sound disturbance to marine ecology, particularly migratory fish, during construction and operational phase

12.2.17 As above, the construction phase work in the Marine Elements would take place at low-tide only and there would be no interaction with the riverbed, and no in-river works would take place. Although the use of vessels is proposed, underwater sound has been scoped out from further assessment and is not considered further. This is because underwater sound produced by the small number of vessels associated with the Proposed Development, are not expected to be greater than the background vessel noise expected to already be occurring in the Study Area (i.e. negligible increase to the existing baseline levels). The two existing ports that may be used to deliver goods (the Port of Mostyn and Connah's Quay North) already accommodate regular vessel traffic. Vessel movements associated with the Water Connection Corridor (as described in Section 12.1) would be minimal. Therefore, there would be no additional underwater sound generated from any construction works, and this impact has been scoped out from further assessment.

12.2.18 The operational phase of the Proposed Development would not result in changes to underwater sound or visual disturbance which could impact marine habitats or species. The maintenance of the proposed intake and outfall infrastructure will be kept clear of silt using the existing cleaning maintenance routine (further information is detailed in Section 12.2). PINS agrees (see **Table 12-2**).

12.2.19 Therefore, there would be no disturbance effects to marine ecology from vessel use and this impact has been scoped out from further assessment.

Indirect effects to marine ecology from hydromorphological changes (e.g., changes to water flow or sediment movement) during the construction and operational phase

12.2.20 As above, construction work in the Marine Elements would take place at low-tide only and there would be no interaction with the riverbed, and no in-river works would take place. Also, while the refurbishment of eels screens would reduce the mesh size from 3 mm to 2 mm the overall dimension of the cannisters would increase diameter and length of baskets would increase to compensate for the reduced mesh sizes and ensure that the existing velocities are maintained.

12.2.21 Works would be undertaken at each of the seven intake pipes (each supporting existing four inlet baskets and two proposed inlet baskets (six in total)) in turn with a temporary seal on the individual intake pipe undergoing works. The existing Connah's Quay Power Station will operate at a reduced capacity to ensure that the remaining six baskets continue to function within their existing design parameters concurrently with the Proposed Development. Therefore, in the event of phased construction, the Train 1 of the Proposed Development and up to two existing Connah's Quay Power Station CCGT units could require cooling water at the same time; or following single phase construction (or in the event of phased construction, following commercial operation of Train 2), only the Proposed Development would have demand for abstracted cooling water.

12.2.22 The Applicant proposes to maintain the permitted abstraction and discharge parameters as far as reasonably practicable, e.g. abstraction would continue to be limited to periods around high water in line with the current abstraction licence. Abstraction and discharge would be regulated by NRW through the Abstraction License and Environmental Permit respectively as required for the operation of the Proposed development. During operation, cleaning of the intake and outfall infrastructure to remove build-up of silt would be undertaken with the same methods used for existing infrastructure. Further details on this can be found in Section 12.1.

12.2.23 Therefore, there would be no indirect effects to marine ecology from hydromorphological changes during construction or operation, and this impact has been scoped out from further assessment.

Physical disturbance to marine ecology from changes in the airborne soundscape and visual disturbance during the construction and operation phase

12.2.24 River and land-based construction and operational activities associated with the Proposed Development would create airborne sound and changes in visual cues which has the potential to disturb seals that have surfaced or have hauled out. However, the nearest haul out site for seals is Hilbre Island in the mouth of the Dee Estuary, over 15 km downstream of the Proposed Development Site. Due to the intervening distance and low presence of marine mammals in the vicinity of the Water Connection Corridor, there would be no available pathway and therefore no likely significant effect to seals and / or other marine mammals from changes in the airborne soundscape and visual disturbance. This matter has therefore been scoped out of the assessment.

12.2.25 Potential disturbance to birds (e.g. waders, seabirds and waterbirds) from changes in the airborne soundscape and visual disturbance during the construction and operation phase has been considered in **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**).

Physical disturbance to marine ecology from changes in the underwater sound, and visual disturbance (excluding lighting) during the operation phase

12.2.26 The operational phase of the Proposed Development would not result in changes to underwater sound, or visual disturbance which would impact

marine habitats or species. PINS agrees and, therefore, this matter has been scoped out of the assessment.

Decommissioning

12.2.27 At the end of its operational life, decommissioning activities are assumed to be limited to filling of the pipework, with the cooling water infrastructure remaining in-situ. There is therefore no pathway for any impact on the marine ecological receptors during this phase and so decommissioning has been scoped out of the assessment.

Marine Conservation Zones

12.2.28 The nearest Marine Conservation Zone (MCZ) is the Fylde MCZ, which is located over 50 km away (at its closest point). This site is designated for benthic habitats (sand and mud) and due to the intervening distance and absence of potential impact pathways an assessment is not considered necessary. PINS agrees and therefore this matter has been scoped out of the assessment.

12.2.29 The scope of assessment on marine ecology has been summarised in **Table 12-6**.

Table 12-6 Summary Scope of the Marine Ecology Assessment

Proposed Development Phase	Potential Effects	Scoped In/Out
Construction phase	Effects to marine ecology from changes in marine water quality due to accidental spills from vessels and surface run-off from land-based construction activities within the ZoI	Scoped in
	Effects to intertidal habitats and species from the deposition of dust and exhaust emissions during construction	Scoped in (assessed in **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**)
	Effects on marine ecology from changes in existing lighting conditions during construction	Scoped in
	Introduction and spread of INNS from use of vessels	Scoped in
	Collisions between any project vessels and marine mammals	Scoped in
	Permanent and temporary direct loss and physical disturbance to benthic habitats and species during the construction	Scoped out

Proposed Development Phase	Potential Effects	Scoped In/Out
	Physical disturbance to benthic habitats and species from increased SSC (i.e. increased turbidity and deposition) during the construction	Scoped out
	Underwater sound disturbance to marine ecology, particularly migratory fish, during construction	Scoped out
	Indirect effects to marine ecology from hydromorphological changes (e.g., changes to water flow or sediment movement) during the construction	Scoped out
	Physical disturbance to marine ecology from changes in the airborne soundscape and visual disturbance during the construction	Scoped out
Operational phase	Physical disturbance and potential mortality to marine ecology, in particular fish, from entrainment and impingement within the cooling water abstraction and discharge infrastructure within the Water Connection Corridor	Scoped in
	Effects on marine ecology from changes in existing lighting conditions during operation	Scoped in
	Effects to intertidal habitats and species from the deposition of airborne pollutants (e.g., from emissions from the power plant stacks during operation)	Scoped in (assessed in **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**)
	Permanent and temporary direct loss and physical disturbance to benthic habitats and species during the operational phase	Scoped out
	Physical disturbance to benthic habitats and species from	Scoped out

Proposed Development Phase	Potential Effects	Scoped In/Out
	increased SSC (i.e. increased turbidity and deposition) during the operational phase	
	Indirect effects to marine ecology from any changes to existing thermal and chemical effects from treated water discharge during the operational phase	Scoped out
	Underwater sound disturbance to marine ecology, particularly migratory fish, during construction and operational phase	Scoped out
	Indirect effects to marine ecology from hydromorphological changes (e.g., changes to water flow or sediment movement) during the operational phase	Scoped out
	Physical disturbance to marine ecology from changes in the airborne soundscape and visual disturbance during the operational phase	Scoped out
	Physical disturbance to marine ecology from changes in the underwater sound, and visual disturbance during the operation phase	Scoped out
Decommissioning phase	Decommissioning activities are assumed to be limited to filling of the pipework, with the cooling water infrastructure remaining in-situ. There is therefore no pathway for any impact on the marine ecological receptors during this phase	Scoped out
All phases of the Proposed Development	Consideration of MCZs	Scoped out

12.3 Assessment Methodology

Impact Assessment Methodology

12.3.1 This chapter applies the methodology as defined **in Chapter 2: Assessment Methodology** (**EN010166/APP/6.2.2**)[5] and **Appendix 12-A: Marine Ecology Assessment Methodology** (**EN010166/APP/6.4**).

12.3.2 The assessment has determined the worst-case scenario for impact pathways to marine ecological receptors, in line with the Rochdale Envelope approach (described below) and has focused on those receptors considered to be 'important'. The importance criteria for marine ecological features are based on sensitivity and value of receptors as shown in **Appendix 12-A: Marine Ecology Assessment Methodology** (**EN010166/APP/6.4**).

12.3.3 The importance of an ecological feature has been defined with reference to a specific geographical context and the scale of protection, ensuring consistency with CIEEM 2024 guidance (Ref 12-32). However, marine features are highly connected, with few boundaries, and therefore the levels of geographical importance must reflect this. The levels presented below are based on the level to which the marine ecological receptor may qualify as a legislative or policy designating feature. Therefore, the approach adopts the level of legislative designation as a proxy for the geographical importance of a marine species receptor:

- international (designated National Site Network sites (designated sites) in accordance with the Habitats Regulations – Special Areas of Conservation (SACs), Special Protected Areas (SPAs), as well as Ramsar Sites);
- national (United Kingdom (UK) protected areas – Sites of Special Scientific Interest (SSSI) and Marine Protected Areas (MPAs)); and
- regional or local (ecological features that do not meet criteria for valuation at an international or national level, but that have sufficient value to merit retention or mitigation e.g., for the purpose of ensuring no net loss of biodiversity).

12.3.4 The sensitivity and value of marine ecology receptors are evaluated based on their vulnerability, recoverability and importance. The definitions and criteria of these further explained in **Appendix 12-A: Marine Ecology Assessment Methodology** (**EN010166/APP/6.4**).

12.3.5 The potential magnitude of change on marine ecological features arising from activities occurring as part of the Proposed Development is evaluated in consideration of their beneficial or adverse nature, the extent, duration, timing and frequency of the change and the reversibility of the impact.

12.3.6 Temporary, permanent, direct and indirect impacts have been considered during the construction and operation phases of the Proposed Development, and any mitigation measures necessary have been identified. To comply with

[5] Note, a non-matrix approach to the assessment is applied in this chapter based on CIEEM guidelines (Ref 12-32).

National and European policy, consideration is given to the need to maintain and enhance biodiversity. The magnitude criteria are listed in **Appendix 12-A: Marine Ecology Assessment Methodology** (**EN010166/APP/6.4**).

12.3.7 Once the potential magnitude of change has been determined for marine ecological features, the significance of an effect can be determined. The significance of effect considers the impact type and the magnitude of that impact having regard for the sensitivity of the marine ecological receptor. Note, that the significance of effect is based on CIEEM guidelines (Ref 12-32) for ecological assessment using a non-matrix approach, professional judgement and the applications of guidelines listed in **Appendix 12-A: Marine Ecology Assessment Methodology** (**EN010166/APP/6.4**). Further details on significance criteria are discussed in **Appendix 12-A: Marine Ecology Assessment Methodology** (**EN010166/APP/6.4**).

Rochdale Envelope

12.3.8 The setting of design parameters using the 'Rochdale Envelope' approach is described in **Chapter 2: Assessment Methodology** (**EN010166/APP/6.2.2**). The maximum parameters for the principal components of the Proposed Development are set out in the **Design Principles Document** (**EN010166/APP/7.8**) and are illustrated on the **Works Plans** (**EN010166/APP/2.4**) and the **Parameter Plans** (**EN010166/APP/2.5**). These parameters, together with assumptions regarding the future plans for the existing Connah's Quay Power Station set out in **Chapter 2: Assessment Methodology** (**EN010166/APP/6.2.2**) have been used to inform the representative worst-case scenario that has been assessed in this chapter, in order to provide a robust assessment of the impacts and likely significance of environmental effects of the Proposed Development at its current stage of design.

12.3.9 In particular, focused use of the Rochdale Envelope (further details on this is set out in **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) has been adopted for the use of vessels.

12.3.10 Regarding the use of vessels, the exact number and type of vessels is not known at this stage but as outlined in the **Framework CEMP** (**EN010166/APP/6.5**) there is assumed to be no more than two vessels used simultaneously at any time during the construction phase. These vessels would be used to deliver supplies via the Port of Mostyn, Port of Ellesmere, and / or to Connah's Quay North. It is envisioned that there would be up to 30 two-way vessel movements across a 12-month period per Train[6] (two Trains total). If scaffolding using an existing concrete platform cannot be used to deliver supplies for the eel screen refurbishment works, then a small barge may be required to lift and lower the screens. The size of vessels used is not currently known but it is anticipated to be up to 60 m in length.

[6] **Chapter 1: Introduction (EN010166/APP/6.2.1)** explains that each CCGT unit, and associated carbon capture plant (CCP) and supporting infrastructure is referred to as a 'Train' in this ES. Some supporting infrastructure may be shared between the Trains.

Assessment Assumptions and Limitations

Assessment Assumptions

12.3.11 The following assumptions have been made with regard to construction of the Proposed Development:

- vessels would be used to deliver supplies for the overall Proposed Development (i.e. Trains 1 and 2) via three ports: the Port of Mostyn Ellesmere Port and / or to Connah's Quay North. No works would occur at the Port of Mostyn and the works taking place (excluding berthing of vessels/barges) at Connah's Quay North will not interact with the marine environment. The exact number and size / weight of vessels is not known at this stage and would be based on specific construction methodologies to be confirmed during Front End Engineering Design (FEED) by the relevant Contractor(s). For the purposes of informing this chapter, assumptions have been made using similar experience, which could suggest a forecast of up to 30 two-way vessel movements across a 12-month period per Train in order to deliver supplies for the Proposed Development. The vessels are used considered to be up to 60 m in length. It is expected that all waterborne movements would be directed through anyone, or a combination of, the three identified ports.
- a vessel would also be required to provide supplies in relation to the eel screen upgrade works within the Water Connection Corridor. The exact size, number and type of vessel is not known at this stage, but it is assumed to include a materials barge to deliver goods at the eel screens during the construction phase. A small crane mounted barge may also be required for lifting and lowering the screens. All barges would remain floating at all times and would not touch the seabed; and
- equipment vendors and fabrication yard locations, from which material would be transported by vessel, have not been identified yet but would likely be a mix of overseas locations and from within the UK.

12.3.12 The following assumptions have been made for the operational phase of the Proposed Development:

- it is assumed that once the upgrades to the intake and outfall infrastructure and Proposed Surface Water Outfall are complete, cleaning of the infrastructure would follow the same methods as previously used.

12.3.13 Given the above assumptions, this assessment presents a reasonable 'worst-case' approach.

Limitations

Construction

12.3.14 No limitations during the construction phase were identified.

Operation

12.3.15 Existing eel screens would be replaced with reduced mesh size from 3 mm to 2 mm and basket size would be increased. Collection pipes connected to the intake infrastructure would also remain at the same diameter (700 mm,

which is greater than the proposed diameter of the new intake screens). This would ensure flow rates remain at current levels. Therefore, intake and outflow rates would be at level covered within the existing environmental permit. The requirement for thermal plume discharge modelling was confirmed by NRW not to be required on the basis that the Applicant has confirmed that the thermal load from the proposed new power station would not exceed the current permit limits.

Decommissioning

12.3.16 At the end of its operational life (which is expected to be 30 years), decommissioning activities are assumed to be limited to filling of the pipework, with the cooling water infrastructure remaining in-situ.

12.4 Baseline Conditions and Study Area

12.4.1 This section describes the baseline environmental characteristics for the Construction and Operation Area and surrounding areas with specific reference to Marine Ecology.

Study Area

12.4.2 The study area was defined to include Marine Ecology receptors likely to be at risk from possible direct and indirect impacts that might arise from the Proposed Development, each with its own zone of influence (ZoI). The largest potential ZoI is considered to be 10 km from the Marine Elements (for designated sites, with the exception of marine mammals), as shown on **Figure 12-1: Marine Ecology Study Area** (**EN010166/APP/6.3**) and in **Table 12-7**. The mean tidal ellipse (nearshore at the entrance to the Dee Estuary) is approximately 6.2 km, with a maximum tidal excursion of 10 km (see **Chapter 16: Physical Processes** (**EN010166/APP/6.2.16**) for further information). Therefore, the Rochdale Envelope has been applied so that the baseline characterisation data is sufficient to underpin a reasonable worst-case assessment of impact pathways.

Table 12-7: Study Areas for each Marine Ecological Receptor

Marine Ecological Receptor	ZoI distance	Rational
Designated sites	10 km (sites excluding sites designated for marine mammals) and 160 km for sites designated for marine mammals	The study area for the search for relevant designated sites for marine ecology includes a 10 km radius from the Marine Elements within the marine environment (except for marine mammals which is 160 km, as explained in the marine mammal row below). This spatial extent was chosen on the basis that it is considered to be a worst-case scenario, taking into consideration the mean tidal ellipse and maximum tidal excursion. This distance encompasses the relevant functional habitats and range of movement of most species, particularly migratory fish (see

Marine Ecological Receptor	ZoI distance	Rational
		below), present within the predicted ZoIs of the Proposed Development.
Benthic ecology	Tidally influenced limits of the River Dee and Dee Estuary within 10 km	The study area for benthic ecology covers the tidally influenced limits of the River Dee and Dee Estuary. This includes White Sands, Flint Sands, Bagillt Bank, Holywell Bank, Salisbury Bank, Mostyn Bank and West Hoyle sandbank and extends upstream to around Chester Weir. Upstream of this point, the river's flow is predominantly controlled by freshwater inputs rather than tidal action. **Figure 12-1: Marine Ecology Study Area** (**EN010166/APP/6.3**).
Coastal and migratory fish	Tidally influenced limits of the River Dee and Dee Estuary within 10 km, a regional approach for migratory fish and relevant ICES statistical rectangles	The study area for fish and shellfish is defined as the area comprising the tidally influenced limits of the River Dee and Dee Estuary. This includes White Sands, Flint Sands, Bagillt Bank, Holywell Bank, Salisbury Bank, Mostyn Bank and West Hoyle sandbank and extends upstream to around Chester Weir. Upstream of this point, the river's flow is predominantly controlled by freshwater inputs rather than tidal action. Guidance produced by ABPmer (Ref 12-39) also recommends that a regional approach should be adopted for migratory fish to ensure any fish which may pass through the Study Area and therefore any other sites which may have interaction with the Project, but are beyond the initial screening distance, are also considered. In addition, the wider coastal area which falls within the International Council for the Exploration of the Sea (ICES) statistical rectangle 35E6, which includes the Dee Estuary, has also been considered.

Marine Ecological Receptor	ZoI distance	Rational
Marine mammals	Celtic Sea with a particular focus on the Dee Estuary	Recognising the highly mobile and transient nature of marine mammals, the study area for marine mammals is designed accordingly. While acknowledging that the Proposed Development would involve no in-river works and no interaction with the riverbed, the initial study area covers a 10 km radius. This area is further extended to 160 km to account for designated sites with marine mammal qualifying features. Although, is considered unlikely that most cetacean species will occur in far upstream parts of the River Dee itself, due to their preference for open, offshore, deeper waterbodies (e.g. SCANS IV final report (Ref 12-39) and Distribution maps of cetacean and seabird populations in North-East Atlantic (Ref 12-40), consideration has been given to the nearby coastal area.

Existing Baseline

Designated sites

12.4.3 There are five nature conservation designations (SAC/SSSI/Ramsar) with relevant marine / estuarine receptors within the study area. These designated sites are listed in detail in **Appendix 12-B: Relevant Designated Sites** (**EN010166/APP/6.4**) and shown in **Figure 12-2: Designated Sites with Marine Ecological Features** (**EN010166/APP/6.3**). The designated sites considered in this chapter, and their distance from the Marine Elements (hydrologically), are:

- the Dee Estuary (Aber Dyfrdwy) SAC / RAMSAR / SSSI (located within the Marine Elements) designated for a number of marine Annex I habitats and Annex II lamprey species;
- River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC (located adjacent to the Water Connection Corridor) designated for Annex II Atlantic salmon *Salmo salmar*;
- River Dee (Afon Dyfrdwy) SSSI (located approximately 0.1 km upstream of the Water Connection Corridor designated for Annex II Atlantic salmon and brown trout *Salmo trutta*;
- North Anglesey Marine / Gogledd Môn Forol SAC/ MPA (located 80 km from the Water Connection Corridor) designated for Annex II Harbour porpoise *Phocoena phocoena*; and

- Lleyn Peninsula and the Sarnau (Pen Llŷn â'r Sarnau) SAC is primarily designated for a number of marine Annex I habitats but is also designated for bottlenose dolphin *Tursiops truncatus* and grey seal *Halichoerus grypus* (located 160 km from the Water Connection Corridor).

Estuarine Habitats

12.4.4 The Marine Elements section of the Proposed Development is situated within the River Dee and Dee Estuary. The Dee Estuary comprises Annex I habitats which are qualifying features of the Dee SAC / SSSI and River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC, listed in **Appendix 12-B: Relevant Designated Sites** (**EN010166/APP/6.4**).

12.4.5 The habitats identified during the desk study and field surveys are described in the following sections below. All habitats are classified using the European Nature Information System (EUNIS) biotope habitat classification system and are listed in order of area presence with the most dominant habitat listed first.

Desk Study Results

12.4.6 Habitats present overall within the Study Area (10 km) were identified from online data from intertidal surveys undertaken by Countryside Council Wales (CCW) between 2002 and 2005 (available to view on Multi Agency Geographic Information for the Countryside (MAGIC)) (Ref 12-41). The specific estuarine habitats were dominated by the following EUNIS habitats (**Figure 12-3: Overview-up of Intertidal Benthic Habitats within the Study Area** (**EN010166/APP/6.3**)):

- A2.2 Intertidal Sand and Muddy Sand;
- A2.3 Intertidal Mud;
- A2.5 Coastal Saltmarshes and Saline Reedbeds[7]; and
- A2.4 Intertidal Mixed Sediments.

Field Survey Results

12.4.7 The intertidal walkover and drone survey (detailed in **Appendix 12-D Intertidal Survey Report** (**EN010166/APP/6.4**)) identified the following EUNIS habitats within a more specific 'Survey Area'. The Survey Area includes the Water Connection Corridor and extends approximately 300 m either side of the Water Connection Corridor along the River Dee (shown in **Appendix 12-D Intertidal Survey Report** (**EN010166/APP/6.4**)). The Proposed Surface Water Outfall is located outside of the Survey Area but within the NVC survey area which is covered in **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11)**. The habitats identified within the Survey Area were:

- A2.2 Intertidal Sand and Muddy Sand;
- A2.5 Coastal Saltmarshes and Saline Reedbeds;

[7] This is referred to as 'Saltmarsh (Wales)' on figure.

- A2.3 Intertidal Mud;
- A2.4 Intertidal Mixed Sediment; and
- A1 Intertidal Rock.

12.4.8 During the intertidal walkover survey, the following habitats were identified within the Water Connection Corridor specifically and are therefore discussed in more detail (and shown on **Figure 12-4: Broadscale Intertidal Benthic Habitats Identified during the Intertidal Walkover Survey** (**EN010166/APP/6.3**)):

A2.4 Intertidal Mixed Sediment

12.4.9 This habitat is located along the lower shore within the Water Connection Corridor. However, this habitat is considered to be artificial (i.e. man-made), located at the existing Connah's Quay Power Station outfall, and is therefore not considered to be an Annex I habitat. It comprises a distinct row of regular sized boulders which appeared to be specifically placed behind the existing outfall structures and eel screens (**Appendix 12-D Intertidal Survey Report** (**EN010166/APP/6.4**): Plate A-13 (Appendix A)). Behind this, a large area of artificial boulders and mixed sediment (muddy sand with pebbles, cobbles and gravel) was present, creating intertidal pools during low-tide **(Appendix 12-D Intertidal Survey Report** (**EN010166/APP/6.4**)**:** Plate A-14 (Annex A)). This provided habitat representative of 'Intertidal Mixed Sediments (A2.4)'.

A2.2 Intertidal Sand and Muddy Sand

12.4.10 This habitat is located in the mid-lower shore and is representative of Annex I habitat protected by Dee Estuary (Aber Dyfrdwy) SAC / RAMSAR / SSSI. The sand content in this habitat appeared to increase towards the lower shore, with clear zones shown in the sediment where the tidal cycle has deposited varying compositions of mud and sand. Where sand content was higher, several sea gooseberries (*Pleurobrachia pileus*) and moon jellyfish were identified on top of the sediment, particularly towards Kelsterton Brook (**Appendix 12-D Intertidal Survey Report** (**EN010166/APP/6.4**)**:** Plate A-11 (Annex A)).

A2.5 Coastal Saltmarshes and Saline Reedbeds

12.4.11 This habitat was located along the upper shore of the intertidal area in the Water Connection Corridor and extended above the MHWS. This habitat is representative of Annex I habitat protected by Dee Estuary (Aber Dyfrdwy) SAC / RAMSAR / SSSI. It primarily consisted of common cordgrass *Spartina anglica* and common glasswort *Salicornia europaea*. As this was present above MHWS, further detailed information of the saltmarsh habitat can be found in the **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**).

A2.3 Intertidal Mud

12.4.12 A very small area of mud habitat was located in the upper shore between A2.5 Coastal Saltmarshes and Saline Reedbeds and A2.2 Intertidal Sand

and Muddy Sand. This habitat is representative of Annex I habitat protected by Dee Estuary (Aber Dyfrdwy) SAC / RAMSAR / SSSI[8].

Benthic Invertebrates

12.4.13 Habitats present in the Dee Estuary where the footprint of the Water Connection Corridor is located (**Figure 12-1: Marine Ecology Study Area** (**EN010166/APP/6.3**)), consists of fine muddy sand, dominated by ragworm *Hediste diversicolor* and the Baltic tellin bivalve mollusc *Macoma balthica*. Other benthic invertebrates present within the Dee Estuary include the bivalves *Cerastoderma edule*, *Macoma balthica* and *Mya arenaria* and the lugworm *Arenicola marina*, which are typically present in muddy sand shores. Common heart urchin *Echinocardium cordatum*, peppery furrow shell *Scrobicularia plana*, Ensis sp. and polychaete worms such as *Eteone longa* are also typically present in lower shore or shallow sublittoral muddy fine sand. Slightly higher up the shore the sediments are more often dominated by amphipods *Bathyporeia pilosa* and *Corophium arenarium*.

12.4.14 The most recently available online data are from marine benthic invertebrate surveys carried out by the Environment Agency (Ref 12-42[9]) in the Dee Estuary in 2015. The surveys included 10 sample sites taken in estuarine muddy, sandy mud habitats. The location of each sample site is included in **Table 12-8**. The closest sampling site is station #10 (located at UK grid reference: SJ2544278109) which is located approximately 7.5 km downstream of the Water Connection Corridor. The surveys collected information regarding the presence and abundance of benthic invertebrate species. The survey findings at these locations were analysed to evaluate benthic composition within the Dee Estuary. The overall benthic composition across all 10 locations comprised 31% molluscs, 25% nematodes, 23% annelids (polychaetes and oligochaetes), 19% crustaceans, and 1% Nemertea, with an overall relatively good species diversity and abundance. Across the sampling sites, the most commonly occurring taxa were Nematoda, *Peringia ulvae*, *Corophium volutator* and *Pygospio elegans.* There were no protected or rare invertebrate species identified in the Environment Agency surveys. The benthic species composition is typical of estuarine muds, likely similar within the Water Connection Corridor though it may have a higher component of more brackish benthic species given the Water Connection Corridor is located a little further upstream.

Table 12-8 Environmental Agency sample station locations in the Dee Estuary

Sample Station Number	UK Grid Reference
1	SJ2021784935

[8] A small area of A1 Intertidal rock was identified within the survey area but outside the Water Connection Corridor so is not discussed in detail in this section.
[9] The Environment Agency's database includes information regarding the presence, and number, of benthic invertebrate species at specific marine monitoring points (sample stations).

Sample Station Number	UK Grid Reference
2	SJ2096483103
3	SJ2120885337
4	SJ2185283383
5	SJ2295182568
6	SJ2331978943
7	SJ2337981271
8	SJ2350782587
9	SJ2422580688
10	SJ2544278109

12.4.15 The invertebrates in the sediments provide an abundant food source for fish and are of particular importance for waterbirds, with over 120,000 birds visiting the estuary during the winter months (Ref 12-43). However, the lower estuary is considered to be the area most likely to support significant numbers of waterbirds (Ref 12-44). Further information on birds is included in **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**).

Invasive Non-Native Species

12.4.16 One marine INNS, the Chinese mitten crab *Eriocheir sinensis* was identified during the desk study within the Study Area. This species is understood to have been spreading throughout the mid and lower catchment of the River Dee over many years (Ref 12-45). A single record of Chinese mitten crab has been found approximately 300 m from the Water Connection Corridor in the 'Connah's Quay Box' (Grid Reference: SJ280713) in January 2012 (Ref 12-46). However, results from the intertidal walkover survey did not identify this species or any habitat suitability for this species within the Water Connection Corridor.

12.4.17 The Chinese mitten crab primarily lives in freshwater but migrates downstream to brackish, estuarine and marine environments to reproduce (Ref 12-45). Mating takes place in brackish conditions in the upper and middle estuary typically from mid-November after which females spawn and retain the eggs until the embryos develop. The highest abundance of larval stages are likely to be found in the Dee Estuary between May and July (Ref 12-45). A suitable water temperature (>12°C) is crucial for larval survival and development (Ref 12-45). Water temperature in the Dee Estuary between October and May is likely to exclude the presence of mitten crab larvae due to low survival rates below 12°C.

12.4.18 Following metamorphosis, juvenile mitten crabs settle out of the water column throughout the estuary and migrate upstream to brackish and freshwater regions. Due to the high peak salinity juveniles are thought to migrate upstream through the River Dee but may not be present in the

vicinity of the Water Connection Corridor after the summer migration period[10] (Ref 12-47).

12.4.19 Downstream migration of reproductive adults from freshwater habitats occurs during the same period annually across all populations. The migration occurs from August to October and usually peaks during September. The timing of records from the fish trap are consistent with this period. Mating is thought to occur, as in other populations, in the upper estuary from mid-November onwards (Ref 12-47). Reports from a fisherman at Connah's Quay of catches of adult mitten crabs of both sexes and adult size starting in mid-November appear to indicate the arrival of mating adults to the Dee Estuary (Ref 12-47).

12.4.20 The total abundance of mittens crabs in the River Dee has been recorded at the Chester Weir fish trap from 2007 to 2014 (Ref 12-48). Total counts fluctuated between five and 21 individuals between 2008 and 2012. In 2013, the number increased to 82 individuals and remained at a comparable 76 individuals in 2014. This suggests that Chinese mitten crab abundance may be increasing in the River Dee. While more recent total counts were unavailable at the time of writing, an individual Chinese mitten crab was caught approximately 5 km downstream of the Water Connection Corridor in November 2020 (Ref 12-47) and 2.5 km upstream in May 2022 (Ref 12-48).

Coastal and Migratory Fish

12.4.21 The Dee Estuary and River Dee is an important breeding, sheltering and nursery area for many coastal fish species. It also supports a number of migratory species[11] including Atlantic salmon, brown trout, river lamprey *Lampetra fluviatilis*, sea lamprey *Petromyzon marinus*, European eel *Anguilla Anguilla*, twaite shad *Alosa fallax* and smelt *Osmerus eperlanus*. These species are all listed as Species of Principal Importance NERC Act 2006.

12.4.22 The River Dee is of particular interest for Atlantic salmon as it is one of the North Wales' index rivers[12] for this species (Ref 12-49; Ref 12-50) and is a designated feature of River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC and River Dee (Aber Dyfrdwy) SSSI. The Mynach, Meloch and Ceiriog tributaries are the most important Atlantic salmon spawning tributaries in the Dee catchment. However, the closest of these tributaries to the Dee Estuary is the Afon Ceiriog, located upstream approximately 31 km away from the Water Connection Corridor.

12.4.23 The Dee Estuary also supports non-migratory fish populations of brook lamprey Lampetra *planeri,* which in the context of this assessment is considered a freshwater species and is assessed in **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**).

[10] Greater numbers of juvenile mitten crabs were observed during July shoreline surveys than the later autumn surveys (Ref 12-13).
[11] Migratory fish species are diadromous fish which migrate between bodies of freshwater and seawater during different life phases.
[12] Index rivers are characterized by their intensive and long-term monitoring programs.

Spawning and Nursery Grounds

12.4.24 Broadscale fish sensitivity maps (Ref 12-51, Ref 12-52) indicate that there are spawning areas and nursery ground for a number of fish species within the broad Study Area. They are considered to be present mostly in the surrounding coastal areas, although the larvae of some species may occur in the estuary. For example, plaice larvae enter estuarine nursery areas during the flood tide where they stay whilst metamorphosing into adults, at which point they start to prefer sandy sediments and move to coastal areas outside the estuary (Ref 12-53).

12.4.25 The outer Dee Estuary is also recognised as a European bass *Dicentrarchus labrax* nursery area and is a designated European bass nursery area under the Sea Fisheries (Bass Regulation) Order 1990 (Ref 12-45). However, species such as plaice and European bass have pelagic larvae. Due to the nature of the Proposed Development, pelagic spawning and nursery grounds are not considered at risk of disturbance and / or loss. Therefore, pelagic spawners have not been considered further, with the exception of salmon and brown trout, which are important migratory species, known to spawn in the upper reaches of the River Dee. Salmon and brown trout and are discussed further in paragraphs 12.4.24 to 12.4.28.

12.4.26 The nursery grounds for herring located in Dee Estuary (Ref 12-51) are of high intensity (Ref 12-52). Spawning and nursery grounds for sandeel are also located within the Dee Estuary (Ref 12-51, Ref 12-52). While total counts of these species present within the River Dee or Dee Estuary is unknown[13] they are both generally understood to be present in the Dee Estuary (Ref 12-45). However, the habitats within the Water Connection Corridor comprise mainly mud and muddy sand which is not the preferred habitat for these species and so are not considered further in this assessment.

Atlantic salmon

12.4.27 Atlantic salmon are protected as an Annex II species of the Habitats Directive and are a qualifying feature of River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC and the River Dee SSSI (See **Appendix 12-B: Relevant Designated Sites** (**EN010166/APP/6.4**) and **Figure 12-2: Designated Sites with Marine Ecological Features** (**EN010166/APP/6.3**)). They are also listed as a UK Priority Species, are included on the OSPAR list of threatened or declining species and as a SOPI for the purpose of conservation of biodiversity under the NERC Act 2006. The River Dee is also classified as an 'index river' for Atlantic salmon and is therefore, of special interest for this species. The Mynach, Meloch and Ceiriog tributaries are identified as the most important Atlantic salmon spawning tributaries in the Dee catchment (Ref 12-53).

12.4.28 The long-term Atlantic salmon monitoring programme, the 'Dee Stock Assessment Programme' (DSAP), has been carried out by NRW between 1991 and 2023 (Ref 12-50). The DSAP found that there has been an overall

[13] No Environment Agency fish sampling stations were located within the River Dee and therefore no information on fish counts (TraC data) were available.

decreasing trend over the last 20 years in the overall abundance of Atlantic salmon returning to Chester weir (located >13 km upstream of the Water Connection Corridor). Over the last 30 years, the lowest run was recorded in 2019 with a run size of 1,551 returning individuals and in the second lowest run was recorded in 2022, with a run size of 2,956 returning individuals. The main trap catch period (i.e. count numbers) for Atlantic salmon migrating upstream in the Chester Weir during 2022 was between May and August with the peak trap count being between June and August (Plate 2 in **Appendix 12-C: Marine Ecology Plates** (**EN010166/APP/6.4**), Ref 12-50). The salmon stock on the River Dee was assessed as being 'at risk' both in 2021 and projected to 2026 (Ref 12-50).

12.4.29 The key migratory period for Atlantic salmon includes much of the spring, summer and autumn months with smolts migrating downstream in spring to early summer (Ref 12-54; Ref 12-55). After spending one to five years at sea, adults return to upstream spawning habitats, which in the River Dee occurs in late summer (Ref 12-50).

Brown trout

12.4.30 Brown trout (sea trout) are UK Priority Species and protected as a SOPI the under the NERC Act 2006. This species is also a qualifying feature of River Dee SSSI (See **Appendix 12-B: Relevant Designated Sites** (**EN010166/APP/6.4**)). The River Dee is an important river for migrating brown trout. The most recent DSAP run estimates recorded 13,991 individuals within the River Dee in 2019, which is slightly above the long-term average run estimates at 11,900 individuals between 1991 and 2019 (Ref 12-42). The brown trout stock is also classified as 'probably at risk' both in 2021 and projected to 2026 (Ref 12-50).

12.4.31 The general migration period for brown trout is similar to Atlantic salmon between spring and autumn months with smolts migrating downstream in spring and early summer and adults returning to upstream habitats peaking in June to August, as in the River Dee (Plate 2) (**Appendix 12-C: Marine Ecology Plates** (**EN010166/APP/6.4**)) (Ref 12-50; Ref 12-54; Ref 12-55).

European eel

12.4.32 The European eel is a UK Priority Species, on the OSPAR list of threatened or declining species, and a SOPI under the NERC Act 2006. Although this species is not a qualifying feature of any relevant designated site, it is known to be present in the River Dee.

12.4.33 While there are no specific count data for European eels available from the Environmental Agency[14] or specific information on their migration period within the River Dee, the NRW fish monitoring desk data search found 285 individuals within 5 km of the Main Site present (i.e. at Swinchiard Brook (SJ 24028 73481) and Wepre Brook (SJ 30142 68806)). Furthermore, aquatic surveys carried out as part of the terrestrial and aquatic ecological chapter identified eDNA samples of European eel and a number of sampling stations

[14] No Environment Agency fish sampling stations were located within the River Dee and therefore no information on fish count data (i.e. TraC data) were available.

with European eel comprising the highest percentage of fish species presence at sample WC1 at Allt-Goch Brook. This is located outside of the Marine Elements, by the Proposed CO_2 Connection Corridor and under the Repurposed CO_2 Connection Corridor. Full details on these survey findings are detailed in **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**) and **13-A: Water Environment Baseline Survey and Methodology Report** (**EN010166/APP/6.4**)).

12.4.34 European eel generally migrate upstream into freshwater during spring but may continue to do so until early Autumn (Ref 12-55; Ref 12-56). Once within freshwater habitats, European eels remain for five to 15 years, transforming into yellow eels and then finally to silver eels when they begin their downstream migration through rivers and estuaries towards spawning grounds in the marine environment, predominately between August and December (Ref 12-57; Ref 12-58). Spawning occurs mainly in spring (Ref 12-59). Some European eels do not migrate into freshwater but instead inhabit estuaries before returning to spawning grounds.

Sea lamprey and river lamprey

12.4.35 Sea lamprey and river lamprey are protected as an Annex II species of the Habitats Directive and are a qualifying feature of The Dee Estuary / Aber Dyfrdwy SAC and River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC (See **Appendix 12-B: Relevant Designated Sites** (**EN010166/APP/6.4**)). They are also listed as a SOPI under the NERC Act 2006. Sea lamprey is further listed as a UK Priority Species and is on the OSPAR list of threatened or declining species.

12.4.36 Sea lamprey and river lamprey are both anadromous migratory species, spawning in freshwater. Adults return to freshwater once they have spent several years in the marine environment (Ref 12-60). Both species spawn in spring and early summer (Ref 12-60).

12.4.37 The UK distribution of river lamprey and sea lamprey, (presented in Plate 3 (outlined by the red circles), **Appendix 12-C: Marine Ecology Plates** (**EN010166/APP/6.4**)), suggests that both species have been recorded in the River Dee (Ref 12-61 and Ref 12-62). However river lamprey appear to be more widely recorded throughout Wales and the River Dee. Records of river lamprey caught at the fish trap at Chester weir indicate that mature adults undertake their upstream migration at two different periods of the year, either early spring (March-April) or late summer/autumn (August-November). While recent numbers of river lamprey at Chester Weir are not available, 421 individuals have been recorded at eight sites in 2014 within the River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC (Ref 12-63).

12.4.38 Records of sea lamprey caught at the fish trap at Chester Weir indicate that mature adults migrate upstream almost exclusively during the months of May and June (Ref 12-63). Although, not designed to trap lamprey, the fish trap at Chester Weir recorded 32 individuals of sea lamprey in 2013 (between May and July), zero individuals in 2014 and 8 in 2015 (in July).

Marine Mammals

12.4.39 The Marine Elements are located within the International Council for the Exploration of the Sea (ICES) Celtic Sea ecoregion (Ref 12-64), which in part forms the boundaries for the Inter-Agency Marine Mammal Working Group (IAMMWG) marine mammal Management Units[15] (MUs) for the Celtic Sea. Within this region, 13 cetacean species are known to occur. The five most commonly occurring species are harbour porpoise, bottlenose dolphin, common dolphin, *Delphinus delphis*, Risso's dolphin *Grampus griseus* and minke whale *Baleanoptera acutorostrata*.

12.4.40 Marine mammals are highly mobile and transient organisms, which means that local impacts can result in implications to wider populations. As such, the study area reflects MUs by Inter-Agency Marine Mammal Working Group (IAMMWG) for the most common cetaceans (**Table 12-9**). These MUs have been established to reflect biological population structure, movement, habitat use, and relevant management boundaries (Ref 12-65).

Table 12-9: IAMMWG Management Units for common cetacean species in the UK

Species	MU Name	MU Extent
Harbour porpoise	Celtic and Irish Seas	Entire territorial waters (TW) of south-west coast of England, Wales, and Ireland, including the western English Channel.
Bottlenose dolphin	Irish Sea	Irish Sea between St George's Channel and the North Channel
Common dolphin	Celtic and Greater North Seas	All TW around Great Britain and beyond
Risso's dolphin	Celtic and Greater North Seas	All TW around Great Britain and beyond
Minke whale	Celtic and Greater North Seas	All TW around Great Britain and beyond

12.4.41 A summary of conservation protection afforded to the five most common species is presented in **Table 12-10**.

[15] MUs are defined management units for UK's seven most common cetacean species. These MUs are different for each species and is used for conservation and management purposes, representing a scale between biological populations and wider species distributions to ensure effective protection and monitoring.

Table 12-10: Protection status of common cetaceans present in the Study Area

Species	Wildlife and Countryside Act 1981	EC Habitats Directive (Annex)	Bonn Convention (Appendix)	Bern Convention (Appendix)	ASCOBANS
Harbour porpoise	✓	II, IV	II	II	ü
Bottlenose dolphin	✓	II, IV	II	II	✓
Common dolphin	✓	-	I, II	II	✓
Risso's dolphin	-	-	II	II	✓
Minke whale	✓	IV	-	II	-

12.4.42 An additional five species occur regularly in the ecoregion but are less common: white-beaked dolphin *Lagenorhynchus albirostris*, Atlantic white-sided dolphin *Lagenorhynchus acutus*, fin whale *Balaenoptera physalus* long-finned pilot whale *Globicephala melas*, and killer whale *Orcinus orca*.

12.4.43 In the North-East Atlantic, cetacean abundance has been monitored via the Small Cetaceans in European Atlantic waters and the North Sea (SCANS) project. This has been a ship and aerial-based effort to quantify cetacean abundance and distribution throughout the UK and North-East Atlantic. The most recent effort (SCANS IV) occurred in 2022, the data from which are presented here (Ref 12-39). Abundance estimates are divided into blocks (Plate 4 in **Appendix 12-C: Marine Ecology Plates** (**EN010166/APP/6.4**)), with the relevant block containing the Marine Elements being CS-E. The estimated abundance of these coastal species in block CS-E is:

- Harbour porpoise – 6, 325;
- Bottlenose dolphin – 127;
- Common dolphin – 0;
- Risso's dolphin – 0; and
- Minke whale – 0

12.4.44 Overall, low abundance of these species has been observed in this coastal block with much lower numbers expected to be present within the River Dee itself due to their habitat preference of open water.

Harbour Porpoise

12.4.45 Harbour porpoise are widespread and abundant throughout UK waters including the Irish and Celtic Seas. They most commonly occur in continental shelf waters less than 100 m deep and are frequently observed in coastal

bays and estuaries. Along the west coast of the UK, modelling of harbour porpoise density indicates that high densities occur year-round in the eastern Irish Sea in the coastal waters east of the Isle of Man (Ref 12-40).

12.4.46 The Marine Elements occur within IAMMWG Celtic and Irish Sea MU for harbour porpoise. The most recent estimated abundance for this MU is 62,517 individuals.

12.4.47 Within the MU, there are several sites designated for the protection of harbour porpoise: North Anglesey Marine / Gogledd Môn Forol SAC (80 km from the Water Connection Corridor), North Channel SAC (181 km from the Water Connection Corridor), West Wales Marine/Gorllewin Cymru Forol SAC (188 km from the Water Connection Corridor), and the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC (361 km from the Water Connection Corridor). The North Anglesey Marine / Gogledd Môn Forol SAC has been designated for its persistently high density of harbour porpoise (Ref 12-67). In summer, it is in the top 10% of densities for harbour porpoise in UK waters (Ref 12-67). It is estimated that the designated site hosts approximately 1,084 individuals for at least part of the year, comprising 4% of the Celtic and Irish Sea MU population (Ref 12-67).

12.4.48 However, harbour porpoise are only considered occasional visitors to the Dee Estuary and are most often observed around and offshore from the estuary mouth at high tide rather than further up the river (Ref 12-68). Thus, presence within the Marine Elements are expected to be minimal.

12.4.49 Harbour porpoise were considered to be 'in decline' in the Celtic Seas (including the Irish Sea) by the OSPAR commission (2008), however, the range and future prospect of the harbour porpoise in the UK is considered to be of 'favourable' conservation status (Ref 12-69). Globally, this species is considered 'least concern,' despite previously being considered vulnerable (Ref 12-70).

Bottlenose Dolphin

12.4.50 Bottlenose dolphin have a near global distribution and are common throughout UK waters. In the Irish Sea a resident population is believed to occur, particularly along the north coast of Wales (Ref 12-71). The Marine Elements occur within the IAMMWG Irish Sea MU for bottlenose dolphin. The most recent abundance estimate for this MU is 293 individuals.

12.4.51 There are two recognised ecotypes of bottlenose dolphins – a coastal ecotype which primarily occurs within 30 km of the coastline and exhibits habitat fidelity, and a wide-ranging offshore ecotype (Ref 12-72). The coastal ecotype is more common in the UK than the offshore ecotype, with an estimated 700 individuals distributed across four regions: the greater North Sea, coastal south-west England, western Scotland, and coastal Wales (Ref 12-73).

12.4.52 Within the MU, sites designated for the protection of bottlenose dolphin are the Pen Llyn a`r Sarnau / Lleyn Peninsula and the Sarnau SAC (174 km) and the Cardigan Bay/ Bae Ceredigion SAC (265 km). However, there is very little indication that bottlenose dolphin are regular visitors to the River

Dee and Estuary, with presence considered to be limited to small numbers of individuals, very occasionally.

Common Dolphin

12.4.53 The common dolphin is abundant in the northern Atlantic, occurring in the UK primarily offshore west Scotland, western English Channel, and in the Irish and Celtic Seas (Ref 12-74). It is most common in the western approaches to the Channel and the deeper waters of the Irish Sea. Some seasonal movements are apparent, with an influx of species along the continental shelf between July and October. Modelling of common dolphin density indicates that common dolphin marginally increase their range in summer months, with increased densities occurring in the Irish Sea during at this time (Ref 12-40).

12.4.54 The Marine Elements occur within the IAMMWG Celtic and Greater North Sea MU for common dolphin. The most recent abundance estimates for this MU is 102,656 individuals. However, while a sighting of common dolphin has been recorded in 2013 and again in 2019 (Ref 12-66), it was six years between sightings and given their habitat preference for open water they are not believed to be regular visitors to the River Dee and Estuary, with presence limited to small numbers of individuals, very occasionally.

Risso's Dolphin

12.4.55 Risso's dolphin occur globally between 60°N and 60°S, although it prefers waters warmer than 10 to12°C (Ref 12-75). In the northeast Atlantic, their main range is along the west coast of Ireland. In summer months, their range extends to the west coast of the UK (including the Irish Sea), up to the Shetland Isles of Scotland (Ref 12-40). Major populations are considered to occur around the Hebrides, and regularly occurs in small numbers near Shetland, Orkney, and in the Irish Sea (Ref 12-75).

12.4.56 The Marine Elements occur within the IAMMWG Celtic and Greater North Sea MU for Risso's dolphin. The most recent abundance estimates for this MU is 12,262 individuals. However, Risso's dolphin are not considered to be regular visitors to the Dee Estuary and are considered unlikely to be present within the vicinity of the Marine Elements.

Minke Whale

12.4.57 In the UK, this species is widely distributed across the northeastern Atlantic and occurs regularly in the northern and central North Sea. In the Irish Sea, it occurs in small numbers but is primarily in the deeper central region.

12.4.58 The Marine Elements occur within the IAMMWG Celtic and Greater North Sea MU for Minke whale. The most recent abundance estimates for this MU is 20,118 individuals. However, due to a preference for deeper waters, this species is unlikely to be found in the River Dee and Estuary.

Other Cetaceans

12.4.59 In addition to the most common species described above, an additional five species are known to occur within the study area:

- White-beaked dolphin;

- Atlantic white-sided dolphin;
- Fin whale;
- Long-finned pilot whale; and
- Killer whale.

12.4.60 These five species are common in deeper waters ranging from 50 to 2,000 m and primarily occur in continental shelf waters (Ref 12-76; Ref 12-77; Ref 12-78; Ref 12-79; Ref 12-80). White-beaked dolphin are present in the northern Irish Sea year-round in depths of 50 to 100 m (Ref 12-76) and fin whales, long-finned pilot whale and killer whales are also occasionally observed. However, due to the preference for deeper water environments, the presence of these species in the River Dee and Estuary is highly unlikely and therefore they are not considered further.

Pinnipeds

12.4.61 Two seal species occur in the northeast Atlantic, the harbour seal *Phoca vitulina* and grey seal *Halichoerus grypus*, with the UK known to support important populations of both species. For harbour seal, approximately 32% of the European population is found in the UK, with a current population estimate in UK waters of 43,750 individuals (Ref 12-81). For grey seal, 36% of the world's population breeds in the UK, with the most recent population estimate of 157,300 individuals (Ref 12-82). However, approximately 86% of this population resides in Scottish waters.

12.4.62 Seal MUs have been defined by the Special Committee on Seals (SCOS; Plate 5 in **Appendix 12-C: Marine Ecology Plates** (**EN010166/APP/6.4**)) based on expert knowledge and opinion of seal ecology in the UK, using a pragmatic approach to management without inferring discrete populations (Ref 12-82). The Marine Elements lie along the border between the Wales and Northwest England MU. The most recent abundance estimates for harbour and grey seal within these MUs are provided in **Table 12-11**.

12.4.63 Both harbour and grey seal use haul out sites for breeding, resting, and moulting. They are occasionally seen in the River Dee, with the closest haul-out site for both species on the West Hoyle sandbank (Hilbre Island, located 15 km downstream of the Proposed Development). This haul-out is considered to be the most important haul-out site in Wales, with over 800 grey seals recorded here (Ref 12-83). Grey seals are the only pinniped species to breed in Wales, however the West Hoyle haul-out site is used throughout the year, with peak numbers during the summer months, and no recent records of pup births (Ref 12-83). Harbour seals are also recorded hauled-out on the West Hoyle sandbank, however exact haul-out numbers of this species are not known.

12.4.64 The nearest designated site for pinnipeds is the Pen Llyn a'r Sarnau SAC which is designated for grey seals and is located over 160 km south-west of the Site. Additional designated sites within the relevant MUs are Cardigan Bay/Bae Ceredigion SAC and Pembrokeshire Marine/ Sir Benfro Forol SAC for grey seal.

12.4.65 Due to the presence of the haul-out site on West Hoyle sandbank, there is potential for both harbour and grey seals to be present upriver within the vicinity of the Marine Elements. However, this is expected to be limited to occasional presence of a small number of individuals as the haul-out site is some distance from the Proposed Development.

Table 12-11: Abundance estimates for harbour and grey seal within the study area

Species	South-west England MU Abundance	Wales MU Abundance
Harbour seal	0	10
Grey seal	500	900

Summary of Existing Baseline

12.4.66 Based on the information provided in Section 12.4, the following sensitive marine ecology receptors and their closest location to the Proposed Development are listed in **Table 12-12.**

Table 12-12: Sensitive Receptors within the Existing Baseline

Sensitive Receptor	Closest location to the Proposed Development
Mudflats and sandflats not covered by seawater at low-tide	Within the Water Connection Corridor
Saltmarsh	Small area present within Water Connection Corridor
Benthic communities of molluscs, nematodes, crustaceans and nemerteans	Within and adjacent to the Water Connection Corridor
Atlantic salmon	Passing through periodically, adjacent to the Water Connection Corridor
Sea and river lamprey	Within River Dee and Estuary, within and adjacent to the Water Connection Corridor
European eel	Within River Dee and Estuary
Twaite shad	Within River Dee and Estuary
Smelt	Within River Dee and Estuary
Herring	Dee Estuary
Sandeel	Dee Estuary
European bass	Dee Estuary
Harbour porpoise	Irish Sea
Bottlenose dolphin	Irish Sea

Sensitive Receptor	Closest location to the Proposed Development
Common dolphin	Irish Sea
Risso's dolphin	Irish Sea
Minke whale	Irish Sea
Harbour seal	River Dee (occasionally), West Hoyle sandbank
Grey seal	River Dee (occasionally), West Hoyle sandbank

Future Baseline

12.4.67 The future baseline scenarios are set out in **Chapter 2: Assessment Methodology** (**EN010166/APP/6.2.2**).

12.4.68 This section considers any changes to the baseline conditions described above that might occur over the lifespan of the Proposed Development, regardless of its presence (i.e. in the event it is not installed).

12.4.69 There is uncertainty surrounding the impacts of climate change on benthic ecology around the UK, and whether long-term changes in ecosystems are related to changes in the climate and nutrients or internal factors such as predation (Ref 12-84). This is particularly considered the case with muddy sediment substrates present within the Marine Elements and River Dee. These environments are subject to naturally high variability often observed in benthic communities, influenced by stochastic events such as larval settlement and the patchy distribution of many species. While muddy sediments are less dynamic compared to mobile sandbanks, they still experience significant ecological fluctuations. The variability in these habitats complicates the assessment of long-term changes, as it can be challenging to disentangle the effects of climate change from natural cycles and internal ecological processes.

12.4.70 There have also been substantial changes in fish communities in the North-East Atlantic, thought to be influenced by human exploitation. As well as coming under severe pressure from anthropogenic factors, particularly fishing, fish communities are likely to be affected by future climate change through a rise in sea temperatures (Ref 12-84). Climate change may influence fish distribution and abundance by affecting growth rates, recruitment rates, behaviour, survival and responses to changes at other trophic levels (Ref 12-85).

12.4.71 Changes to fish populations can also cause knock-on effects for marine mammals due to reduced prey availability. For example, the distribution of bottlenose dolphin around the coast of Wales appears to have changed recently, for example the number of individuals classified as resident in the Cardigan Bay SAC has declined raising concerns about the possible reasons (Ref 12-86). At present, there is no evidence to infer any negative effect to the population of bottlenose dolphins, currently classified as

'favourable' in both the Cardigan Bay SAC and the Lleyn Peninsula and the Sarnau SAC (Ref 12-86).

12.4.72 An increase in ocean acidification is also being observed in line with rising atmospheric CO_2 conditions and other greenhouse gases. This can reduce the levels of important minerals such as aragonite (Ref 12-87 and Ref 12-88) on which many shell-forming organisms rely. An estimated 70% of cold-coral locations are expected to be in waters under-saturated by aragonite, but over saturated by CO_2, by the end of the century. Without sufficient minerals, many shell-forming organisms such as molluscs will struggle to grow and maintain their structures, leading to weaker and more fragile shells. In comparison, macroalgae and seagrass species are expected to thrive and grow in increased CO_2 conditions (Ref 12-88).

12.4.73 These changes are expected to continue to occur regardless of the Proposed Development.

12.5 Development Design and Embedded Mitigation

12.5.1 The Proposed Development has been designed, as far as possible, to avoid or minimise impacts and effects on Marine Ecology through the process of design development, and by embedding measures into the project design.

12.5.2 During the design phase, the Applicant has substantially reduced the proposed scope of works in the Marine Elements which have reduced impacts to marine ecology receptors. The reduced scope of works is detailed in Section 12.1.2, and many impacts have since been scoped out of further assessment. For example, there would be no works in the riverbed at all and no intertidal / subtidal habitat loss would occur. The impacts scoped out from assessment following the reduced scope of works are detailed in Section 12.3.

12.5.3 The following embedded mitigation measures have been incorporated into the Proposed Development design:

- The **Biosecurity Risk Assessment**[16] (**Appendix 12-E: Marine Biosecurity Risk Assessment and Management Plan** (**EN010166/APP/6.4**)) and **Appendix 12-F: Marine Invasive Non-Native Species Outline Management Plan** (**EN010166/APP/6.4**) identify measures to prevent the introduction and / or spread of marine INNS during all phases of the Proposed Development. These measures include:
  - visual inspection of project equipment (including vessels) to ascertain the biosecurity risk from no visible fouling (Risk Rank 0) to Very heavy fouling assemblage comprising many different types of plants and/or animals (Risk Rank 5);

[16] The Biosecurity Risk Assessment is a form from NRW which has been completed in relation to the Proposed Development. This form is required to understand the risk of spreading INNS from the Proposed Development and is required to obtain a marine licence through NRW.

  - the GB Non-Native Species Secretariat and RAPID LIFE project have outlined important biosecurity control measures for reducing the spread of INNS in the marine environment (Ref 12-89);
  - additional measures related to the Proposed Development include the use of appropriate anti-fouling coatings on the new eel screen replacements. Where elements cannot receive an anti-fouling coating, they would be appropriately visually inspected, thoroughly cleaned, and dried out prior to placement within the marine environment; and
  - furthermore, although all vessels are expected to originate from within UK waters, and local to the Proposed Development, all vessels should adhere to the International Convention for the Control and Management of Ships' Ballast Water and Sediments with the aim of preventing the spread of marine INNS (Ref 12-90) and the International Maritime Organisation (IMO) Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (Biofouling Guidelines) (Ref 12-91).
- Implementation of a **Framework Construction Environmental Management Plan** (**CEMP**) including an **Framework Site Waste Management Plan** (**SWMP**) (**EN010166/APP/6.5**), with measures including;
  - control and minimise the risk of pollution to surface waters by managing construction site run-off; and
  - measures to control storage, handling and disposal of polluting substances.
  - Restriction of lighting to a focused point where reasonably practicable, during construction. Refer to **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) and the **Lighting Strategy** (**EN010166/APP/7.22**). The strategy seeks to provide safe working conditions whilst reducing light pollution and the visual impact of light on the local environment[17]; and
  - operational lighting requirements for the Proposed Development that identify that lighting would be sited or screened in such a way as to reduce illumination on adjoining sensitive habitats to minimise effects on receptors sensitive to light impacts where practicable (**Lighting Strategy** (**EN010166/APP/7.22**).
- Implementation of an **Outline Landscape and Ecology Management Plan** (**LEMP**) (**EN010166/APP/6.9**) has been developed to secure habitat management and monitoring of retained and created habitats (including saltmarsh). A final version of the plan would be prepared and approved in advance of the construction/operation of the Proposed Development;
- a Pollution Prevention Plan, including an emergency spill plan which would be implemented during all stages of the Proposed Development;
- pollution prevention will be achieved with both physical and procedural measures such as temporary sediment forebays within a designated attenuation basin during construction, suitable interceptors within the

[17] Though this does not specify impacts to marine receptors, such as fish.

permanent and temporary surface water drainage networks and suitable storage of construction materials;

- as part of the drainage design, appropriate pollution measures will be implemented and in place within the drainage network in the form of full retention fuel interceptors, shut-off valves and fire suppression / contaminated water tanks;
- the appointed contractor shall provide suitable pumps, settlement tanks and filters to filter all water being pumped/ discharged from excavations into existing drains. The appointed contractor shall also take measures to ensure that runoff from open excavations does not enter the surrounding drainage system without being treated;
- all discharged water (rainwater and groundwater) from pumping will be treated and tested before re-infiltration. Such water will be disposed of as construction site run-off having first passed through a settlement tank or filtration system where appropriate;
- all vessels used during the Proposed Development will be required to adhere to the International Convention for the Control and Management of Ships' Ballast Water and Sediments with the aim of preventing the spread of marine INNS (Ref 12-90) and the IMO Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (Biofouling Guidelines) (Ref 12-91);
- the final stack height for the Proposed Development has been optimised to aid dispersion of pollutants, with consideration given to minimisation of ground-level air quality impacts, including on relevant marine biodiversity and nature conservation features. **Chapter 8: Air Quality** (**EN010166/APP/6.2.8**) and **Appendix 8-D: Air Quality Operational Assessment** (**EN010166/APP/6.4**) describe the results of atmospheric dispersion modelling which have informed the maximum and minimum stack heights set out in **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**). The proposed height of the absorber stacks and Heat Recovery Steam Generator stack(s) for the Proposed Development have been assessed as a robust case with consideration given to minimisation of ground-level air quality impacts and the visual impacts of taller stacks, based on current biggest building massing of the main structures of the Proposed Development; and
- a Decommissioning Environmental Management Plan (DEMP) would be produced in time for the decommissioning phase.

12.5.4 The following construction best practice measures are relevant to this assessment and are to be adopted by the Proposed Development:

- International Regulations for Preventing Collisions at Sea (IMO, 1972);
- International Convention for the Prevention of Pollution from Ships (MARPOL Convention 73/78);
- IMO Guidelines for the control and management of ships' biofouling to minimise the transfer of invasive aquatic species (Biofouling Guidelines);

- International Convention for the Control and Management of Ships' Ballast Water and Sediments with the aim of preventing the spread of marine INNS; and
- Delivery of Abnormal Invisible Loads will be received through a choice of three existing ports.

12.6 Assessment of Likely Impacts and Effects

12.6.1 Taking into account the embedded mitigation measures, as defined in Section 12.5 above, the potential impacts and effects of the Proposed Development have been assessed using the methodology defined in Section 12.3 of this chapter, **Appendix 12-A: Marine Ecology Assessment Methodology** (**EN010166/APP/6.4**) and **Chapter 2: Assessment Methodology** (**EN010166/APP/6.2.2**) and are listed in **Table 12-13**. Note, that the significance of effect is based on CIEEM guidelines (Ref 12-32) for ecological assessment using a non-matrix approach, professional judgement and the applications of guidelines listed in **Appendix 12-A: Marine Ecology Assessment Methodology** (**EN010166/APP/6.4**).

Table 12-13: Potential Impacts to Marine Ecological Receptors

Potential Impacts	Benthic Ecology	Coastal and Migratory Fish	Marine Mammals
Construction			
Temporary direct loss and physical disturbance from the use of vessels to benthic habitats and species	✓	✓	
Effects to marine ecology from changes in marine water quality due to accidental spills from vessels and surface run-off from land-based construction activities within the ZoI	✓	✓	✓
Effects to intertidal habitats and species from the deposition of dust and exhaust emissions during construction (assessed in **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**)	✓		
Effects on marine ecology from changes in existing lighting conditions during construction.		✓	

Potential Impacts	Benthic Ecology	Coastal and Migratory Fish	Marine Mammals
Introduction and spread of INNS from use of vessels	✓		
Collisions between any project vessels and marine mammals			✓
Operation			
Physical disturbance and potential mortality to benthic and fish and shellfish ecology from entrainment and impingement within the cooling water abstraction and discharge infrastructure within the Water Connection Corridor	✓	✓	
Effects on marine ecology from changes in existing lighting conditions during operation		✓	
Effects to intertidal habitats and species from the deposition of airborne pollutants (e.g. from emissions from the power plant stacks and vehicles during operation) (assessed in **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**)	✓		

Construction Phase

12.6.2 Impacts on Marine Ecology receptors during construction of the Proposed Development are considered below, from paragraphs 12.6.7 to 12.6.25.

Temporary direct loss and physical disturbance from the use of vessels to benthic habitats and species during construction

12.6.3 The construction phase of the Proposed Development is likely to require the deployment of several vessels/barges for delivery of materials using the three ports: the Port of Mostyn, Ellesmere Port and / or to Connah's Quay North. These vessels/barges may be moored and left to ground-out on the riverbed at low tide until they are then floated off the quay. The footprint area in which the vessel/barge would be moored would likely be on soft mud/sandy mud habitat adjacent to these existing ports. Therefore, the use of vessels/barges at these ports could result in the temporary direct loss

and/or physical disturbance of benthic habitat and species under the footprint area designated for the grounding of the barge(s).

12.6.4 However, while there may be some temporary disturbance or loss of benthic habitat due to physical interaction with the riverbed, the impact is likely to be very limited in scale and duration. The soft sediment habitats present in and around the identified ports are considered to have a high level of resilience to physical disturbances such as abrasion or compression from vessel grounding[18]. Furthermore, these are existing ports subject to existing berth of vessels/barges so are likely of low species abundance. In addition, any temporary loss of benthic species within the grounding footprint is expected to be followed by rapid recolonisation from adjacent, undisturbed areas. These habitats and species are therefore considered to be of low sensitivity. Furthermore, as the barges would be grounding at low tide, sediment disturbance is likely to be minimal and short-term. This is especially relevant given that the area is a highly dynamic intertidal environment, where natural sediment movement and disturbance occur regularly and the habitat would be expected to rapidly return any disturbed habitat back to their natural form.

12.6.5 Fish and shellfish may be affected by the direct loss and physical disturbance of functional habitats under the footprint of the barge, with less mobile species, such as molluscs, potentially unable to escape and vulnerable to mortality. European eel is known to occur within the River Dee. However, this species has the ability to recolonise nearby suitable sediments during and following completion of the works and therefore is considered to have a low sensitivity to direct loss and physical disturbance.

12.6.6 The impacts caused by the grounding of barges at low-tide at these existing ports are considered to be small, localised and temporary in nature, and therefore of low magnitude. In addition, the affected receptors are of low sensitivity, the benthic habitat and species present being recoverable in nature. Overall, the direct loss and physical disturbance to habitat and species under the footprint of the vessels/barges is low in magnitude and is therefore considered **negligible** and **not significant**.

Effects to marine ecology from changes in marine water quality due to accidental spills from vessels and surface run-off from land-based construction activities within ZoI

12.6.7 There is potential for the accidental release of fuels and pollutants from vessels used during construction. Such discharges have the potential to alter water quality in terms of physical, biological, and chemical parameters in the River Dee and Estuary. Spills or contaminated water can propagate along the initial receiving watercourse due to tidal and river flow and ultimately discharge into waters on the north Wales coastline.

12.6.8 To avoid accidental spills from vessels, all Proposed Development vessels would be required to adhere to the International Convention for the Control and Management of Ships' Ballast Water and Sediments with the aim of preventing the spread of marine INNS (Ref 12-90) and the IMO Guidelines

[18] Based on the Marine Life Information Network (MarLIN) Marine Evidence-Based Sensitivity Assessment (MARESA).

for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (Biofouling Guidelines) (Ref 12-91). This is detailed in the **Framework CEMP** (**EN010166/APP/6.5**). In any case, any spillages are expected to be small and would likely undergo rapid dispersion and evaporation when subjected to wave action, wind and currents.

12.6.9 There is the potential for impacts on marine water quality during land-based construction activities for the Proposed Development for example surface water run-off or accidental discharges, potentially impacting on sensitive habitats (**Figure 12-5: Water Framework Directive Sensitive Habitats** (**EN010166/APP/6.3**)).

12.6.10 Several embedded mitigation measures would be implemented during construction to minimise impacts and effects on the water environment, including management of construction site run-off and emergency spillage plans (see Section 12.5 and **Chapter 13: Water Environment and Flood Risk** (**EN010166/APP/6.2.13**)) which are detailed in the **Framework CEMP** (**EN010166/APP/6.5**).

12.6.11 The sensitivity of marine ecological receptors (benthic ecology, fish and shellfish and marine mammals) are considered to be high. However, given the design measures in place, and the high baseline presence of vessels in the River Dee and Dee Estuary, any significant effect to marine ecology receptors is considered unlikely and the magnitude is assessed as very low. Therefore, effects to marine ecology receptors due to changes in water quality from accidental spills are predicted to be **minor adverse** and **not significant**.

Effects on marine ecology from changes in existing lighting conditions during construction

12.6.12 There are waterbodies located within or overlapping the Marine Elements where artificial light may be utilised during the construction phase, particularly in the winter months when daylight hours are shortest.

12.6.13 Light, particularly Artificial Light at Night (ALAN) is known to affect the movement of migratory species of fish (Ref 12-93), especially Atlantic salmon (Ref 12-93), Lamprey (Ref 12-96), and European eel (Ref 12-97) which are known to be present within Allt-Goch Brook and the River Dee (Section 12.4; and **13-A: Water Environment Baseline Survey and Methodology Report** (**EN010166/APP/6.4**)).

12.6.14 Atlantic salmon, sea and river lamprey, and European eel, are all of National value:

- Atlantic salmon are protected as an Annex II species, are a qualifying feature of River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC and the River Dee SSSI, are listed as a UK Priority Species, are included on the OSPAR list of threatened or declining species, and listed as a SOPI for the purpose of conservation of biodiversity under the NERC Act 2006;
- Sea lamprey and river lamprey are protected as an Annex II species, are a qualifying feature of The Dee Estuary / Aber Dyfrdwy SAC and River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC, and are also listed

as a SOPI under the NERC Act 2006. Sea lamprey is further listed as a UK Priority Species and is on the OSPAR list of threatened or declining species (Section 12.4); and

- European eel is protected species under the Section 7 of Environment (Wales) Act 2016, a UK Priority Species, on the OSPAR list of threatened or declining species, and a SOPI under the NERC Act 2006.

12.6.15 The **Framework CEMP** (**EN010166/APP/6.5**) and the **Lighting Strategy** (**EN010166/APP/7.22**) specify that lights used during construction would be shielded and angled to minimise disturbance to ecological receptors. However, these documents do not specifically address the impact on fish or waterbodies

12.6.16 While the general approach to the use of lighting, and the completion of many works at low-tide could reduce the levels of ALAN, it is highly likely that waterbodies in the immediate vicinity of works would be illuminated, during the construction phase. Therefore, the presence of lights near waterbodies during the construction phase could result in a temporary, direct effect on a species of high importance. Thus, there is considered to be a **significant** (**moderate adverse effect**) on migratory fish as a result of changes in existing lighting conditions during construction.

12.6.17 Increases in lighting also has potential to affect ornithological features. These receptors are appraised in **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**), including marine and coastal bird species.

Introduction and spread of INNS from use of vessels

12.6.18 The use of marine vessels as part of the Proposed Development could result in the potential for the introduction, transportation and spread of INNS, either from biofouling or from the discharge of ballast water and bilge water. These can contribute to increased rate of spread and act as an 'ecological stepping-stone' for INNS to further establish their range (Ref 12-45).

12.6.19 During a desk study of the local benthic environment, one marine INNS was identified, the Chinese mitten crab, which is understood to spreading through the catchment of the River Dee (Ref 12-47). The Chinese mitten crab has a preference for freshwater and estuarine soft sediment habitats. It is possible that use of vessels during construction could result in spread of the Chinese mitten crab and facilitate range expansion. However, the results from the intertidal walkover survey did not record the presence of Chinese mitten crab within the Water Connection Corridor. Furthermore, a Marine INNS Management Plan has been produced for the Proposed Development (**Appendix 12-F: Marine Invasive Non-Native Species Outline Management Plan** (**EN010166/APP/6.4**)) and determined the risk of spread from vessels to be low.

12.6.20 Furthermore, regardless of whether Chinese mitten crab are present in the Study Area or not, several good practice mitigation measures (e.g. early detection to prevent spread of species via visual monitoring of materials, vessels and other equipment to be used for the Proposed Development and use of appropriate anti-fouling coatings on the new eel screen replacements)

would be implemented throughout all phases of the Proposed Development, as listed in the **Framework CEMP** (**EN010166/APP/6.5**).

12.6.21 With these measures in place, and the limited use of vessels, the impact of the introduction and spread of INNS on marine ecology, which is of low sensitivity, has been assessed as having a magnitude of very low which considered **negligible** and **not significant**.

Collisions between project vessels and marine mammals, particularly seals

12.6.22 The construction phase of the Proposed Development is likely to require the deployment of several vessels for delivery of materials using any of the three ports: the Port of Mostyn Ellesmere Port and / or to Connah's Quay North , and for construction support. The total number of vessels to be used for the Proposed Development is not known at this stage, however, there is assumed to be no more than two vessels used simultaneously at any time during the construction phase within the River Dee (as detailed in Section 12.3.10).

12.6.23 Marine mammals, particularly cetaceans, are considered to be fast swimming, agile species, with rapid reflexes and good sensory capabilities (Ref 12-98). However, individuals can become distracted during important activities such as foraging and social interactions, and therefore may not perceive the threat of an approaching vessel (Ref 12-38).

12.6.24 Vessel strikes can result in physical impairment, which may reduce foraging abilities and fitness at an individual level, or even mortality (Ref 12-38). No construction works would be carried out on the riverbed. Vessels would only be used to deliver supplies via the two ports and at the eel screens. They are likely to be traveling at slow speeds (estimated to be less than 10 knots) due to the shallow water depth in the river, and therefore are unlikely to pose a significant risk of collision to marine mammals. Most serious injuries are considered to occur at speeds >14 knots (Ref 12-99). Furthermore, the presence of marine mammals in the river is considered to be only occasional, with cetaceans preferring open water and the closest seal haul-out site being located 15 km downstream (see Section 12.4).

12.6.25 Although collisions with vessels could result in injury or mortality, the likelihood of vessel collision with marine mammals is considered low due to the highly mobile nature of marine mammals, their ability to exhibit avoidance behaviour, and the likely slow vessel operation speeds. Therefore, although marine mammals have a high sensitivity to vessel collision, the magnitude is assessed as very low, and therefore the overall impact is assessed as **minor adverse**, which is considered to be **not significant**.

Operation Phase

12.6.26 Impacts on Marine Ecology receptors during operation of the Proposed Development are presented from paragraphs 12.6.28 to 12.6.41.

12.6.27 The earliest year of operation for the Proposed Development is anticipated to be 2030, under a phased construction approach beginning in 2026 for a period of five years. If construction was to be undertaken in a single phased

approach, the earliest year of operation is anticipated to be 2035. If a single phased construction approach was undertaken at the latest possible time, five years after DCO Consent, operation would be anticipated to occur in late 2036.

Physical disturbance and potential mortality to benthic and fish and shellfish ecology from entrainment and impingement within the cooling water abstraction and discharge infrastructure within the Water Connection Corridor

12.6.28 During operation of the Proposed Development, there is the potential for entrainment and impingement of marine receptors, particularly fish, within the abstraction and discharge infrastructure, such as fish eggs, fish larvae, juvenile fish, small mature fish and invertebrate zooplankton. Impingement refers to organisms that get sucked onto the intake screens as the velocity of water being drawn through the screen exceeds that of the organisms swimming ability. Entrainment is when smaller organisms such as fish eggs, larvae zooplankton and phytoplankton pass through the power station cooling system before they are discharged back into the estuary (Ref 12-99). During operation, there is a risk that biota, in particular fish and invertebrates would be drawn into the cooling water system and discharged to the marine environment via the outfall located in the River Dee. Conversely, organisms which are too large to pass through screens are at risk of becoming impinged on the intake screens. Several tributaries of the River Dee are important for Atlantic salmon spawning, with nursery grounds also present in the estuary for herring, European bass and smelt. Therefore, these species and their larvae are all considered at risk of entrainment.

12.6.29 Plankton including ichthyoplankton (fish eggs and larvae), phytoplankton and zooplankton are most at risk of being entrained as not only are they small enough to pass through the screens, but they are also unable to swim against the intake currents. Once within the cooling water system, planktonic organisms are exposed to a range of stressors, including pressure and temperature differentials, mechanical effect and abrasion and hydraulic shear stress which can lead to mortality. For the purpose of this assessment 100% mortality of the entrained fraction has been assumed.

12.6.30 The majority of biota which become impinged would not be able to move away from the intake screens and would thus be vulnerable to physical injury and subject to mechanical effects (i.e. abrasion) causing fatal injuries, and predation. For the purpose of this assessment 100% mortality of the impinged fraction has been assumed. The susceptibility of biota to impingement depends on several factors including the abstraction volume, water temperatures, the life stage of the organism, species specific hearing ability and swimming ability.

12.6.31 To minimise these risks, the Proposed Development includes the installation of upgraded intake screens compliant with The Eels (England and Wales) Regulations 2009 (Ref 12-10). The proposed reduction in mesh size from 3 mm to 2 mm is designed to prevent the passage of larger fish and larvae (total length >10 mm), allowing them to swim away and reducing the risk of impingement, while smaller organisms (total length <10 mm) remain at risk of entrainment. However, the abstraction volume and velocity would remain

unchanged from the current levels as described in Section 12.1. The approach velocities will be designed to meet the requirements of The Eels (England and Wales) Regulations 2009 (Ref 12-10) to ensure no significant residual effects.

Plankton (Phytoplankton and Zooplankton)

12.6.32 Even with consideration of the design mitigation, plankton would remain at risk of entrainment. For the purpose of assessment, 100% mortality of entrained organisms is assumed and so the sensitivity of this receptor group is considered to be high. However, it is important to note that phytoplankton, primarily consisting of organisms in the 20-200 microns size range, are unlikely to be significantly affected due to their small size. In contrast, for zooplankton, the primary concern lies with fish larvae, which are more vulnerable to entrainment. While some copepods can reach a few millimetres in size, most zooplankton are smaller than the mesh size, reducing their risk of being entrained. While plankton play a valuable role in the ecosystem, plankton are not a qualifying feature of any designated site and are a common unprotected species are therefore considered low sensitivity.

12.6.33 Mortality of plankton has the potential to reduce primary and secondary production in the immediate vicinity of the outfall in the Dee River. Effects would be continuous and long-term. However, given that the velocity would remain the same as the baseline conditions and abstraction volumes would remain within the existing permitted limits even when working in conjunction with a reduced capacity from the existing Connah's Quay Power Station, the number of plankton likely to be affected is low, therefore, the magnitude of impact is predicted to be low and replenishment from the wider area is likely. Thus, there is unlikely to be any discernible impact to plankton communities and food web dynamics at the regional level.

12.6.34 Due to the low sensitivity of plankton and the minimal (low) impact magnitude, the effect of entrainment on phytoplankton and zooplankton communities during the operational phase is expected to be **negligible** and, therefore, **not significant**.

Fish and Shellfish

12.6.35 As detailed in Section 12.1, any upgrades to the intake would include the installation of new screens designed to comply with The Eels (England and Wales) Regulations 2009 (Ref 12-10). This compliance aims to minimise the risk of entrapment for European eel, while also providing benefits to other fish species and life stages. Furthermore, the approach velocities will be designed to meet the requirements of the Eels (England and Wales) Regulations 2009 (Ref 12-10) to ensure no significant residual effects. This includes maintaining consistent approach velocities during operation and ensuring that abstraction rates remain within the existing permitted flow rates.

12.6.36 Given these factors, along with the proposed mitigation measures in place, the magnitude of impact on migratory fish is anticipated to be very low. As such, although migratory fish are high sensitivity, entrapment is expected to have only a **minor** effect on populations at either the local or broader

geographical scales, and impacts on migratory fish are therefore assessed as **not significant**.

12.6.37 Other fish and invertebrate species, including those of conservation and / or commercial importance, may remain at risk of impingement. Species such as juveniles (e.g. smelt) and invertebrates, including crabs, shrimp, prawns, and molluscs, are particularly vulnerable due to their limited swimming ability. Despite the proposed mitigation, ichthyoplankton (with the exception of early life stages of migratory fish) would also remain at risk of entrainment.

12.6.38 While entrapment represents a continuous and permanent adverse effect during the operational phase, many species demonstrate a high tolerance to mortality at the population level due to their life history traits. For instance, numerous invertebrates and fish species (e.g., sprat and sand smelt) are short-lived, exhibit little to no parental care, and are highly fecund. This reproductive strategy enables these species to withstand naturally high mortality rates (ranging between 50% and 90%) (Ref 12-101).

12.6.39 A recent assessment of entrainment effects conducted by Centre for Environment, Fisheries and Aquaculture Science (Cefas) for the Sizewell C Project (Ref 12-99) concluded effects to marine fish and benthic species to be negligible, partly due to the total number of fish likely to be entrained compared to total populations. Furthermore, as outlined above and in Section 12.1, the upgrade works to the intake would include installation of new screens which shall be compliant with the Eels (England and Wales) Regulations 2009. This measure aims to minimise the entrapment risk to European eel although it would also afford benefits to other fish species and life stages.

12.6.40 In light of the mitigation measures being implemented, the magnitude of impact to migratory fish is predicted to be very low (**beneficial**[19]). Furthermore, the BAEP assessment will be undertaken. This assessment will be carried out in consultation with relevant stakeholders and will adhere to best practice guidance for eel screening (Ref 12-9), as well as guidance for other sensitive species or life stages, such as salmonid smolts and lamprey, known to occur in the River Dee. Entrapment is therefore unlikely to have any discernible impact on populations at the local level or across wider geographical scales and therefore, the impact of entrainment and impingement on marine ecology, which are of low to high sensitivity, has been assessed as having a magnitude of very low (**beneficial**) which results in a **minor** effect, which is considered to be **not significant**.

Effects on marine ecology from long-term changes in existing lighting conditions during operation

12.6.41 As set out in the **Lighting Strategy** (**EN010166/APP/7.22**) operational lighting would be required to carry out specific tasks safely, however this is

[19] This assessment has used a non-matrix approach, and the 'beneficial' effect relates to the impacts of a smaller mesh size during operation having a minor beneficial effect to marine ecology receptors by reducing the overall numbers of species which may be at risk of entrainment and impingement. Please see Appendix 12A: Marine Ecology Assessment Methodology for more information.

expected to be restricted to the central portion of the Main Development Area which sit toward the north and west within the Construction and Operation Area. To mitigate any potential lighting effects on ecological receptors, lighting will be directed away from habitats surrounding the Proposed Development (ecological safeguard zone, ensuring waterways are not directly lit), and will have higher mounting and narrow beams to prevent light overspill. Additionally, lights will have a warmer colour and composition, in line with ecological recommendations, to minimise any potential disturbance to species utilizing the surrounding habitats. Therefore, given these measures lighting is considered to have a low magnitude, and considering the existing presence of lighting in the area it is anticipated that there will be **no significant adverse effects (minor adverse)** on migratory fish due to changes in existing lighting conditions during the operation phase.

12.7 Additional Mitigation and Enhancement Measures

12.7.1 Additional mitigation measures have been proposed to reduce likely significant effects on designated sites and sensitive receptors during both construction and operation. These measures are fully detailed in **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**) and the **Report to Inform Habitat Regulations Assessment (EN010166/APP/6.12**). A summary is provided here as it relates specifically to marine ecology receptors.

Migratory Fish

12.7.2 Works during the construction phase would preferably be carried out during daylight hours to avoid the need to use ALAN. Where this is not possible then lights should be directed away from watercourses and bodies as far as reasonably practicable so that fish migration, spawning and feeding is not disrupted.

12.7.3 Where only daylight working is not feasible, or ALAN cannot be directed entirely away from waterbodies it is advised that key migration periods are avoided.

12.7.4 By avoiding the possibility of ALAN affecting migratory fish, the magnitude of impact would be reduced to be negligible. This would be considered to have **no significant effect** (**minor adverse**).

12.8 Summary of Residual Effects

12.8.1 An assessment of cumulative effects with other proposed developments that could interact with the effects of this Proposed Development have been carried out in this chapter, based on the final short-list of other developments, as shown in **Chapter 24: Cumulative and Combined Effects** (**EN010166/APP/6.2.24**). **Chapter 24: Cumulative and Combined Effects** (**EN010166/APP/6.2.24**) also assess the in-combination effects of multiple aspects on one receptor. A summary table has not been provided for decommissioning as it has been scoped out of the assessment.

Table 12-14: Summary of Potential Significant Residual Effects (Construction)

Receptor	Sensitivity (value)	Description of Impact	Magnitude of Impact	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect after Additional Mitigation
Benthic habitats and species	Low	Temporary direct loss and physical disturbance from the use of vessels to benthic habitats and species	Low	Negligible (not significant)	N/A	N/A	Negligible (not significant)
	Low	Introduction and spread of INNS from any in-river works	Very low	Negligible (not significant)	N/A	Negligible (not significant)	Negligible (not significant)
Migratory Fish	High	Effects on marine ecology from changes in existing lighting conditions	Medium	Moderate adverse (significant)	Timing of works to avoid key migration periods Works carried out during daylight hours to minimise lighting.	Negligible	Negligible (not significant)

Receptor	Sensitivity (value)	Description of Impact	Magnitude of Impact	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect after Additional Mitigation
		during construction					
	Low	Temporary direct loss and physical disturbance from the use of vessels to benthic habitats and species	Low	Negligible (not significant)	N/A	N/A	Negligible (not significant)
Marine mammals	High	Collisions between any project vessels and marine mammals	Very low	Minor adverse (not significant)	N/A	Very low	Minor adverse (not significant)
All marine ecological receptors	High	Indirect effects to marine ecology from changes in marine	Very low	Minor adverse (not significant)	N/A	N/A	Minor adverse (not significant)

Receptor	Sensitivity (value)	Description of Impact	Magnitude of Impact	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect after Additional Mitigation
		water quality (excluding turbidity) within the ZoI					

Table 12-15: Summary of Significant Residual Effects (Operation)

Receptor	Sensitivity (value)	Description of Impact	Magnitude of Impact	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect after Additional Mitigation
Migratory Fish	High	Effects on marine ecology from long-term changes in existing lighting conditions during operation	Low	Minor adverse (not significant)	N/A		
Marine ecology receptors	Low to high	Physical disturbance and potential mortality to marine ecology from entrainment and impingement within the cooling water abstraction and	Low	Minor adverse (not significant)	N/A	Very low (beneficial)	Minor adverse (not significant)

Receptor	Sensitivity (value)	Description of Impact	Magnitude of Impact	Classification of Effect (prior to Additional Mitigation)	Additional Mitigation / Enhancement Measure	Magnitude of Impact after Additional Mitigation	Residual Effect after Additional Mitigation
		discharge infrastructure within the Water Connection Corridor					

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