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Record of a Habitats Regulations Assessment of a project

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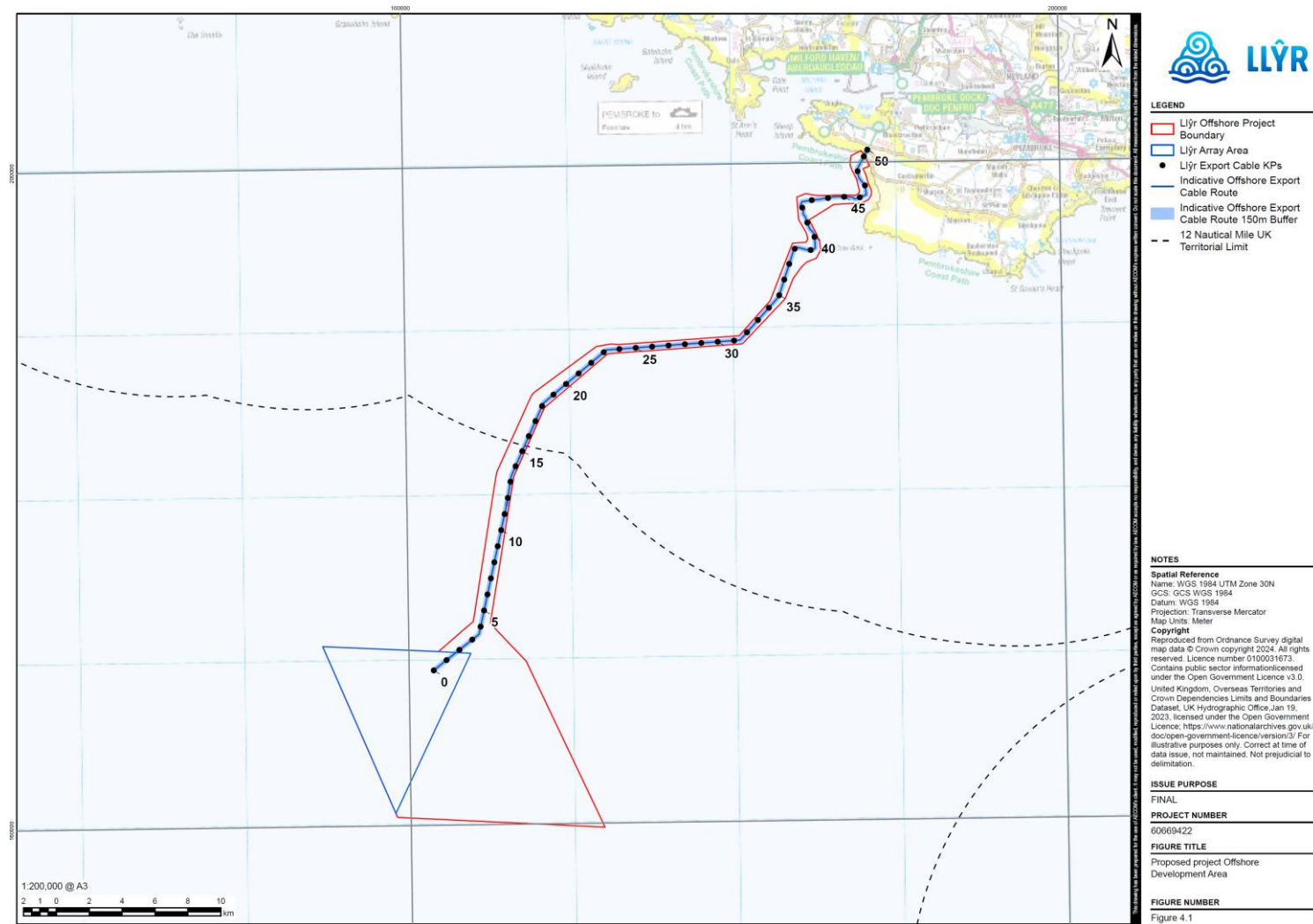
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Record of a Habitats Regulations Assessment of a project

1. Project Details

1(a): Project details where an external party has applied to NRW for any form of authorisation	
Application reference number (if applicable)	ORML2465
Date application received	29/08/2024
Applicant details	Llŷr Floating Wind Limited
Activity proposed	The Llŷr 1 Floating Offshore Wind Farm Project (hereafter the “Proposed Project”) will provide a facility to demonstrate floating offshore wind technology in Welsh territorial waters. The Project comprises of the construction, installation, operation, maintenance and subsequent decommissioning of up to 10 floating offshore wind turbine generators located approximately 35 km from the Pembrokeshire coast in the Celtic Sea. The offshore infrastructure will include semi-submersible floating platforms and export cables. The offshore Array Area (within which the wind turbine generators, the floating substructures, mooring and the inter array cable arrangements will be installed) comprises of an area of 45 km² and at its closest point, is 35 kilometres (km) from Linney Head (the closest location on the coast of Pembrokeshire) in the Celtic Sea. Water depths across the Array Area range from 65 m to 75 m below Lowest Astronomical Tide (LAT). The proposed project comprises: • Up to 10 Wind Turbine Generators (WTGs), each with a maximum rotor diameter of 285 m with a maximum turbine tip height to 300 meters above Highest Astronomical Tide (HAT). • Up to 10 associated floating platforms. • Up to eight mooring lines, for each floating platform (up to 80 in total). • Up to eight anchors or piles for each floating platform (up to 80 in total). • Up to 11 offshore Inter array cables (IACs), up to 66 kiloVolts (kV) High Voltage Alternating Current (HVAC) (dynamic but with the potential to touch the seabed).

	- Up to two offshore export cable circuits, up to 132 kV HVAC and approximately 49 km long, will achieve landfall via Horizontal Directional Drilling (HDD) at Freshwater West. - All associated works required to operate, maintain, repair and decommission the proposed project; and - Associated scour and cable protection (if required). This HRA covers all components of the project from mean high-water springs (MHWS) at landfall at Freshwater West, the export cable corridor and the array area. Furthermore, seismic and geophysical surveys are not marine licensable activities and are therefore not considered in this HRA. UXO clearance is not considered in this HRA. Whilst UXO clearance forms part of the EIA, UXO clearance will not be permitted under licence ORML2465. If UXO clearance is required an application for a separate Marine Licence in respect of UXO clearance will be made at a later date, when the exact number and type of detonations have been established, were a separate HRA will be carried out. A separate consent under Section 36 of the Electricity Act with deemed planning permission for the associated onshore infrastructure will be sought. A further detailed description of the proposed Project, including estimated timescales of construction and operation, dimensions of project, quantity of material being deposited and removed is provided within Volume 1 Chapter 4: Description of the Proposed Project, of the Environment Statement (Document Reference ORML2465 - Llyr ES_Ch 04_Project Description_FINAL.pdf)
Relevant legislation	A marine licence is required before carrying out any licensable marine activity under the Marine and Coastal Access Act 2009. The Marine Works (Environmental Impact Assessment) Regulations 2007, (for projects requiring a marine licence under the MCAA). This was amended by the Marine Works (Environmental Impact Assessment (Amendment) Regulations 2017. A Section 36 (s.36) consent is required to construct and operate an offshore generating station, under the Electricity Act 1989. This would include deemed planning permission for onshore works. Given that deemed planning permission is being sought, a separate planning application under the Town and Country Planning Act 1990 is not required. The s.36 application will be considered by Planning and Environment Decisions Wales (PEDW), administering consent on behalf of the Welsh Ministers.
Location	The coordinates for the offshore Development Area have been provided with the Marine Licence application as Latitude and Longitude in decimal degrees to four decimal places. See Document Reference ORML2465 - Continuation sheet 1.pdf. The coordinates are provided in the WGS 84 system. A map of the proposed project offshore Development Area is shown below and provided in Volume 5 Figure 04.1 of the Environment Statement (Document Reference ORML2465 - Figure 04.1 Proposed project Offshore Development Area.pdf).



Application documents

- The application documents that have informed this HRA are as follows:
- Application for a Marine Licence for Marine Works (ORML2465 - Llyn OWF_marine-works-application-form-21 March 2024_V01.pdf)

	• Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 6: Appendix 8D – Habitats Regulations Assessment Screening • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 6: Appendix 8E – Habitats Regulations Assessment – Report to Inform Appropriate Assessment • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 1: Chapter 01: Introduction • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 1: Chapter 03: Alternatives • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 1: Chapter 04: Project Description • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 5: Figure 1-1, Site Location • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 3: Chapter 18: Marine Water and Sediment Quality • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 3: Chapter 17: Physical Environment • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 3: Chapter 19: Benthic Ecology • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 3: Chapter 20: Fish and Shellfish Ecology • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 3: Chapter 21: Marine Mammals • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 3: Chapter 22: Ornithology • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 4: Chapter 33: Inter-related and Cumulative Effects • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 6, Appendix 04B: INNS Plan; • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 6, Appendix 08A: Chough Survey Report; • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 6, Appendix 08D: Habitats Regulations Assessment Report to Inform Appropriate Assessment; and • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 6, Appendix 22B: Marine Ornithology Colony Apportioning. • Liÿr 1 Floating Offshore Wind Farm. Addendum to the Environmental Statement • Liÿr ES Consultation Report FINAL • Liÿr ES Appendix 5C: Scoping Opinion Response • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 1: Chapter 06: Consultation and Stakeholder Engagement • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 3, Chapter 28: Shipping and Navigation; • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 6, Appendix 04A: Outline CEMP • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 6, Appendix 04B: INNS Plan; • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 6, Appendix 19A: Nearshore 2023 Benthic Survey Report; • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 6, Appendix 19B: Offshore 2023 Benthic Survey Report; • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 6, Appendix 19C: EMF Assessment; • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 6, Appendix 19D: 2024 DDV Survey Report • Liÿr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 6, Appendix 19E: 2024 Habitat Assessment Report
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	• Llŷr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 6, Appendix 21A: Marine Mammals and Megafauna Baseline; • Llŷr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 6, Appendix 21B: Marine Mammals Noise Modelling; • Llŷr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 6: Appendix 21C: Marine Mammal Underwater Noise Assessment; • Llŷr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 6: Appendix 22A: Marine Ornithology Baseline; • Llŷr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 6: Appendix 22C: Marine Ornithology Collision Risk Modelling; • Llŷr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 6: Appendix 22D: Marine Ornithology Displacement Assessment; • Llŷr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 6: Appendix 22E: Marine Ornithology Project Alone and Cumulative Impact Scenarios; and • Llŷr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 6: Appendix 22F: Marine Ornithology Population Modelling. • ORML2465 P11-LYR-3.4.3-PAP-Rev01-Marine Licence Application Clarifications A2 • ORML2465 2025 03 28 - Llŷr - marine ornithology - clarification note 1 - cumulative & in-combination • ORML2465 2025 03 28 - Llŷr - marine ornithology - clarification note 2 - auk non-ID apportioning 2 • ORML2465 2025 05 21 - Llŷr - marine ornithology - clarification note 3 - further info on cumulative & in-combination – final • ORML2465 2025 05 22 - Llŷr - marine ornithology - clarification note 4 - auk non-ID apportioning - further info - vs3 • ORML2465 P11-LYR-3.4.3-PAP-Rev01-Marine Licence Application Clarifications A3- Public.pdf • ORML2465 P11-LYR-3.4.3-PAP-Rev3-Clarifications 2 • ORML2465 P11-LYR-4.2.3-PLA-002 – Bat Mitigation Scheme • ORML2465 P11-LYR-4.2.3-REP-003 – Llŷr Onshore Otter Survey • ORML2465 251107 – Llŷr – Marine Ornithology – Clarification note 3 - FINAL • ORML2465 260416 Llŷr Marine Mammal Mitigation Plan A2
Environmental Statement	An ES has been prepared for the Llŷr 1 Floating Offshore Wind Farm Project and is structured as follows: • Non-Technical Summary (NTS); • Volume 1 – The Proposed Project (Introductory Chapters); • Volume 2 – Terrestrial Baselines; • Volume 3 – Marine Baselines; • Volume 4 – Project-wide Effects; • Volume 5 – Figures; and • Volume 6 – Technical Appendices.
Pre-application correspondence	Extensive consultation has been undertaken with NRW as set out in the following document:

	• Llŷr 1 Floating Offshore Wind Farm. Environmental Statement, Volume 1: Chapter 06: Consultation and Stakeholder Engagement. Specifically: • Early engagement was undertaken with NRW in 2018-2021 to inform the proposed Project site selection and options development process (described further in Llŷr ES Chapter 03: Alternatives); • A Scoping Report was submitted to NRW in April 2022, to define and agree the approach to the EIA and technical content of the ES; and • EIA technical engagement was undertaken between May 2022 and March 2024 to address concerns and queries raised during the Scoping consultation phase and confirm the approach to the EIA (described further in Llŷr ES Appendix 5C: EIA Scoping Opinion Responses and Llŷr ES Chapter 06: Consultation and Stakeholder Engagement).
NRW team responsible for drafting this HRA report, and name of lead officer	Marine Licensing Team: Joe Thomas (supported by Anastasia Charalampopoulou – ABPmer)

2. Determining the need for a Habitats Regulations Assessment

2.1 Is the whole of the project directly connected with or necessary to the management of one or more Natura 2000 sites, for the purposes of conserving the habitats or species for which the Natura 2000 site(s) is/are designated?	NO
2.2 Is there a possibility that the project could affect a different Natura 2000 site to the one(s) the project is intended to conserve?	N/A
2.3 Is it necessary to carry out an HRA?	YES

3. Considering the likelihood of a significant effect (LSE)

3.1 Renewal of a permission on the same or more restrictive terms as the extant permission

Is this project a renewal of a current permission which complies with NRW approved criteria for ruling out significant effects of renewals (see section 6.2A of OGN 200) without conducting a project-specific LSE test?	NO
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3.2 Likelihood of significant effects (LSE) test

3.2.1 Which Natura 2000 sites might be affected by the proposal?

Based on the project specification or information provided in the application, it is considered that the following Natura 2000 sites have features which could be affected by the project:

1. Pembrokeshire Marine / Sir Benfro Forol SAC (UK0013116)
2. Limestone Coast of South West Wales / Arfordir Calchfaen de Orllewin Cymru SAC (UK0014787)
3. Cleddau Rivers / Afonydd Cleddau SAC (UK0030074)
4. Carmarthen Bay and Estuaries / Bae Caerfyddin ac Aberoedd SAC (UK0020020)
5. Cardigan Bay / Bae Ceredigion SAC (UK0012712)
6. Afon Teifi / River Teifi SAC (UK0012670)
7. River Tywi / Afon Tywi SAC (UK0013010)
8. River Usk / Afon Wysg SAC (UK0013007)
9. Severn Estuary Ramsar (UK11081)
10. Severn Estuary / Môr Hafren SAC (UK0013030)
11. River Wye / Afon Gwy SAC (UK0012642)
12. West Wales Marine / Gorllewin Cymru Forol SAC (UK0030397)
13. Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC (UK0030396)
14. North Anglesey / Gogledd Môn Forol SAC (UK0030398)
15. Rockabill to Dalkey Island SAC (IE0003000)
16. Nord Bretagne DH SAC (FR2502022)
17. Mers Celtiques – Talus du golfe de Gascogne SAC (FR5302015)
18. Roaringwater Bay and Islands SAC (IE0000101)
19. Côte de Granit rose-Sept-Iles SAC (FR5300009)
20. North Channel SAC (UK0030399)
21. Tregor Goëlo SAC (FR5300010)
22. Baie de Morlaix SAC (FR5300015)
23. Abers - Côte des légendes SAC (FR5300017)
24. Ouessant-Molène SAC (FR5300018)
25. Blasket Islands SAC (IE0002172)
26. Chaussée de Sein SAC (FR5302007)
27. Récifs du talus du golfe de Gascogne SAC (FR5302016)
28. Lundy SAC (UK0013114)
29. Saltee Islands SAC (IE0000707)
30. Llyn Peninsula and the Sarnau / Pen Llyn a'r Sarnau SAC (UK0013117)
31. Isles of Scilly Complex SAC (UK0013694)

32. Lambay Island SAC (IE000204)
33. The Maidens SAC (UK0030384)
34. Slyne Head Islands SAC (IE000328)
35. Inishbofin and Inishshark SAC (IE000278)
36. Slieve Tooley / Tormore Island / Loughros Beg Bay SAC (IE000190)
37. Duvillaun Islands SAC (IE000495)
38. Horn Head and Rinclevan SAC (IE000147)
39. Inishkea Islands SAC (IE000507)
40. Treshnish Isles SAC (UK0030289)
41. Monach Isles SAC (UK0012694)
42. North Rona SAC (UK0012696)
43. Skomer, Skokholm and the Seas off Pembrokeshire / Sgomer, Sgogwm a Moroedd Penfro SPA (UK9014051)
44. Saltee Islands SPA (IE004002)
45. Wicklow Head SPA (IE004127)
46. Helvick Head to Ballyquin SPA (IE004192)
47. Howth Head Coast SPA (IE004113)
48. Ireland's Eye SPA (IE004117)
49. Lambay Island SPA (IE004069)
50. Old Head of Kinsale SPA (IE0040210)
51. Côte de Granit Rose-Sept-Iles SPA (FR5310011)
52. Isles of Scilly SPA (UK9020288)
53. Baie de Morlaix SPA (FR5300015)
54. Ouessant-Molène SPA (FR5310072)
55. Glannau Aberdaron ac Ynys Enlli / Aberdaron Coast and Bardsey Island SPA (UK9013121)
56. Irish Sea Front SPA (UK9020328)
57. Deenish Island and Scariff Island SPA (IE004175)
58. Puffin Island SPA (IE004003)
59. Skelligs SPA (IE004007)
60. Blasket Islands SPA (IE004008)
61. Cruagh Island SPA (IE004170)
62. Rum SPA (UK9001341)
63. St Kilda SPA (UK9001031)
64. Cap d'Erquy-Cap Fréhel SPA (FR5300011)
65. Dunes et côtes de Trévignon SPA (FR5312010)
66. Archipel de Glenan SPA (FR5310057)
67. Littoral seino-marin SPA (FR2310045)
68. Baie de Quiberon SPA (FR5310093)

69. Rivière de Pénerf SPA (FR5310092)
70. Iles Houat-Hoedic SPA (FR5300033)
71. Baie de Vilaine SPA (FR5310074)
72. Estuaire de la Loire SPA (FR5210103)
73. Urdaibaiko itsasadarra / Ría de Urdaibai SPA (ES0000144)
74. Estuaire de la Bidassoa et baie de Fontarabie SPA (FR7212013)
75. Maciço Montanhoso Oriental da Ilha da Madeira SPA (PTZPE0041)
76. Grassholm / Ynys Gwales SPA (UK9014041)
77. The Bull and The Cow Rocks SPA (IE004066)
78. Ailsa Craig SPA (UK9003091)
79. Pembrokeshire Bat Sites and Bosherton Lakes / Safleoedd Ystlum Sir Benfro a Llynnoedd Bosherton SAC (UK0014793)

The potential for the project to affect the following features of Natura 2000 sites was also initially considered, but can be ruled out without further consideration:

Harbour seal have been screened out of the assessment as they are rare in Welsh waters and only incidentally haul out along the Welsh coast. This is supported by very low counts and at-sea usage estimates (SCOS, 2021; Carter, et al., 2022) and a lack of observations in site-specific digital aerial surveys (DAS) (Pavat, et al., In Prep.). Furthermore, the nearest SAC for harbour seals is Slaney River Valley SAC near Wexford Ireland. This is greater than 100 km from the proposed Project location. Harbour seals tend to remain within ~50 km from the SAC boundary (Carter, et al., 2022) therefore there is no LSE for this species.

Balearic shearwaters were not detected during the two-year of Digital Aerial Survey (DAS). Therefore, this species has not been considered further within the HRA screening. Due to their conservation value (including red-listed as a Bird of Conservation Concern in Wales, International Union for Conservation of Nature (IUCN) Critically Endangered and a UK Biodiversity Action Plan (UKBAP) Priority species, Section 7 species of principal importance under the Environment (Wales) Act 2016 and listed on Annex I of the EU Birds Directive (2009 / 147 / EEC)) this species is considered in the Environmental Statement Volume 3, Chapter 22: Ornithology.

The following marine ornithology species have also been screened out of the HRA due to the very low numbers recorded during the DAS (between 0 and 4 individuals recorded in 2 years of surveys): **Black-headed gull; Common gull; Great black-backed gull; Sandwich tern; Common tern; Arctic tern; Great skua; Northern fulmar; and European shag.**

The SPAs presented in the above list represent the long list of SPA breeding colonies after applying an initial 'coarse filter' HRA screening process. This list was further refined by the applicant after impact modelling was completed. The

	refinement method is further detailed in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llŷr ES - HRA RIAA.pdf). Following this refinement, only three of the above SPAs were taken forward to the Appropriate Assessment stage (Section 4 of this form): 1. Skomer, Skokholm and the Seas off Pembrokeshire SPA (37.16 km from the Llŷr Array Area) 2. Grassholm SPA (37.29 km from the Llŷr Array Area) 3. Irish Sea Front SPA (248.49 km from the Llŷr Array Area) For all other SPAs no LSE was concluded following impact modelling either because of zero breeding season mortalities assigned against the SPA populations, or non-significant levels of such mortality. Further explanation has been provided by the applicant in the <i>Addendum to the Environmental Statement</i>; it is stated that for all other SPAs, apportioned impacts for their qualifying interests are significantly less than a single bird (in every instance bar one, less than half a bird) so clearly do not exceed any 1% baseline mortality thresholds because these will never be less than a single bird.	
Key for table below:	There is no impact pathway from the proposal to the designated feature (green)	
	There is an impact pathway in principle, but significant effects from the proposal when considered alone can be ruled out (blue)	
	There is an impact pathway and significant effects cannot be ruled out (red)	
3.2.2 Screening assessment		
	Assessment of likelihood of significant effect	
	I Relevant conservation objectives	II Potential impact pathway

1. Pembrokeshire Marine SAC (0.00 km – throughout the screening tables this is the distance to the Offshore Export Cable Corridor as this is a shorter distance compared to the Llŷr Array Area for all protected sites)

All Benthic Habitat features: • Estuaries • Large shallow inlets and bays	NRW conservation objectives: Contents (cyfoethnaturiol.cymru)	Temporary loss and physical disturbance to benthic habitats and species (construction and decommissioning)
		Temporary increase in SSC and sediment deposition leading to contaminant mobilisation, turbidity, and smothering effects (construction, maintenance and decommissioning activities)
		Impact of changes to marine water quality from the use of HDD drilling fluids

• Reefs • Sandbanks which are slightly covered by sea water all the time • Mudflats and sandflats not covered by seawater at low tide • Coastal lagoons • Atlantic salt meadows • Glauco-Puccinellietalia maritima • Submerged or partially submerged sea caves		Impact of changes to marine water quality from accidental leaks and spills from vessels, including loss of fuel oils Introduction and spread of INNS via vessel hull or ballast water; the placement of cable and scour protection during construction and maintenance activities; and during removal of proposed Project infrastructure. Underwater noise impacts on marine invertebrates (construction and operation/ maintenance): There is currently very limited evidence to suggest that the type and duration of underwater noise that will be generated by the proposed Project such as from dredging, ploughing, jetting, piling and associated vessel movements, as well as from operation and maintenance activities will have any significant effect on benthic invertebrates or benthic communities. Thus, underwater noise disturbance in relation to benthic ecology is screened out from requiring further assessment. Permanent direct loss and physical disturbance to benthic habitats and species Alteration and / or indirect loss of habitat during the operational lifetime of the proposed Project Changes to habitats due to on-going scour, changes in hydrodynamics, increased sedimentation and smothering, and abrasions, from the movement of mooring chains Disturbance to benthic habitats during planned maintenance and instances of cable failure and excavation Disturbance to benthic habitats and species due to subsea cable thermal emissions Effects of electromagnetic field (EMF) emissions Potential 'blockage' impacts to bedload sediment transport processes via cable crossings requiring cable protection measures.
All Annex II migratory fish: • River lamprey • Sea lamprey	NRW conservation objectives: Contents (cyfoethnaturiol.cymru)	Temporary direct loss and physical disturbance to fish habitats: There are a number of route preparation and installation activities that will temporarily disturb and result in short-term loss of seabed habitats that could be important for fish habitat.

• <i>Allis shad</i> • <i>Twaite shad</i>		Sensitivity to effects of habitat disturbance varies between receptors. Less mobile species / life stages are far less tolerant of disturbance, which may result in physical damage in some instances. Mobile species and life stages have a greater capacity to accommodate such changes through movement to undisturbed areas. However, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential effects of temporary direct loss and physical disturbance to fish habitats are screened out of further assessment. Temporary physical disturbance to fish and shellfish habitats and species from increased SSC and sediment deposition (construction and decommissioning) Impact of changes to marine water quality from the mobilisation of contaminants Impact of changes to marine water quality from the use of drilling fluids at HDD break-out points Impact of changes to marine water quality from accidental leaks and spills from vessels, including loss of fuel oils (construction and decommissioning) Underwater noise and vibration (construction, operation/ maintenance and decommissioning) Permanent direct loss of fish habitats: The placement of hard substrates on the seafloor, including cable and scour protection, can result in the permanent loss of fish and shellfish habitats and species. Permanent loss of will occur through the placement of turbine anchors. Moreover, cable and scour protection are likely to be needed at some locations where the minimum cable burial depth of 0.8 m cannot be achieved or at locations where third-party cables are crossed. Introduction of hard substrate would replace existing bedrock or otherwise soft substrates, leading to permanent loss of these habitats and species.
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		However, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential effects of habitat permanent direct loss and physical disturbance to fish habitats are screened out of further assessment. Increase in thermal emissions from cable operation: Subsea cables associated with the proposed Project, including both IAC and offshore export cables are known to produce heat during operation which, when buried in the seabed, can increase the temperature of surrounding sediment up to 70°. Research indicates that there may be some increase in substratum temperature which could affect marine receptors. Fish species are expected to be at lower risk of thermal effects from the buried cable, as any heat would be instantly dissipated by currents. Moreover, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential impact of thermal emissions from cable operation is screened out of further assessment.
Grey seal	NRW conservation objectives: Contents (cyfoethnaturiol.cymru)	Effects of EMF emissions Disturbance effects to fish (such as barrier effects, collision and entanglement) from the presence of floating offshore structures and associated tethering systems Potential effects to fish from maintenance activities Effects of underwater noise (construction and decommissioning) Potential effects to supporting habitats and species Collision with Project vessels (construction, operation and decommissioning) Accidental pollution or contamination (construction and decommissioning) Potential for indirect effects through impacts upon prey species (construction and decommissioning) Effects of underwater noise from floating turbines Barrier effects from mooring lines and cables between platform and anchor Entanglement with mooring lines and cables

		Effects of EMF emissions
		Airborne sound and visual disturbance
Otter	NRW conservation objectives: Contents (cyfoethnaturiol.cymru)	The laying of the cable, will have a short-term impact on otters through visual and noise disturbance during the Construction Phase

2. Limestone Coast of South West Wales SAC (0.00 km)

Submerged or partially submerged sea caves	NRW conservation objectives: https://nrwcmsv13-a3hwecacajb3frbw.a02.azurefd.net/672656/Limestone%20Coast%20of%20South%20West%20Wales%20English.pdf	Temporary loss and physical disturbance to benthic habitats and species (construction and decommissioning)
		Temporary increase in SSC and sediment deposition leading to contaminant mobilisation, turbidity, and smothering effects (construction, maintenance and decommissioning activities)
		Impact of changes to marine water quality from the use of HDD drilling fluids
		Impact of changes to marine water quality from accidental leaks and spills from vessels, including loss of fuel oils
		Introduction and spread of INNS via vessel hull or ballast water; the placement of cable and scour protection during construction and maintenance activities; and during removal of proposed Project infrastructure.
		Underwater noise impacts on marine invertebrates (construction and operation/ maintenance):
		There is currently very limited evidence to suggest that the type and duration of underwater noise that will be generated by the proposed Project such as from dredging, ploughing, jetting, piling and associated vessel movements, as well as from operation and maintenance activities will have any significant effect on benthic invertebrates or benthic communities.
		Thus, underwater noise disturbance in relation to benthic ecology is screened out from requiring further assessment.
		Permanent direct loss and physical disturbance to benthic habitats and species
		Alteration and / or indirect loss of habitat during the operational lifetime of the proposed Project

		Changes to habitats due to on-going scour, changes in hydrodynamics, increased sedimentation and smothering, and abrasions, from the movement of mooring chains
		Disturbance to benthic habitats during planned maintenance and instances of cable failure and excavation
		Disturbance to benthic habitats and species due to subsea cable thermal emissions
		Effects of electromagnetic field (EMF) emissions

3. Cleddau Rivers SAC (16.52 km)

All Annex II migratory fish: • <i>River lamprey</i> • <i>Sea lamprey</i>	NRW conservation objectives: https://nrwcmsv13-a3hwekacajb3frbw.a02.azurefd.net/682866/afonydd-cleddau-plan-english.pdf	Temporary direct loss and physical disturbance to fish habitats:
		There are a number of route preparation and installation activities that will temporarily disturb and result in short-term loss of seabed habitats that could be important for fish habitat.
		Sensitivity to effects of habitat disturbance varies between receptors. Less mobile species / life stages are far less tolerant of disturbance, which may result in physical damage in some instances. Mobile species and life stages have a greater capacity to accommodate such changes through movement to undisturbed areas.
		However, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential effects of temporary direct loss and physical disturbance to fish habitats are screened out of further assessment.
		Temporary physical disturbance to fish and shellfish habitats and species from increased SSC and sediment deposition (construction and decommissioning)
		Impact of changes to marine water quality from the mobilisation of contaminants
		Impact of changes to marine water quality from the use of drilling fluids at HDD break-out points
		Impact of changes to marine water quality from accidental leaks and spills from vessels, including loss of fuel oils (construction and decommissioning)

		Underwater noise and vibration (construction, operation/ maintenance and decommissioning) Permanent direct loss of fish habitats: The placement of hard substrates on the seafloor, including cable and scour protection, can result in the permanent loss of fish and shellfish habitats and species. Permanent loss of will occur through the placement of turbine anchors. Moreover, cable and scour protection are likely to be needed at some locations where the minimum cable burial depth of 0.8 m cannot be achieved or at locations where third-party cables are crossed. Introduction of hard substrate would replace existing bedrock or otherwise soft substrates, leading to permanent loss of these habitats and species. However, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential effects of habitat permanent direct loss and physical disturbance to fish habitats are screened out of further assessment. Increase in thermal emissions from cable operation: Subsea cables associated with the proposed Project, including both IAC and offshore export cables are known to produce heat during operation which, when buried in the seabed, can increase the temperature of surrounding sediment up to 70°C. Research indicates that there may be some increase in substratum temperature which could affect marine receptors. Fish species are expected to be at lower risk of thermal effects from the buried cable, as any heat would be instantly dissipated by currents. Moreover, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential impact of in thermal emissions from cable operation is screened out of further assessment. Effects of EMF emissions
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		Disturbance effects to fish (such as barrier effects, collision and entanglement) from the presence of floating offshore structures and associated tethering systems
		Potential effects to fish from maintenance activities
• Brook lamprey • Bullhead	NRW conservation objectives: https://nrwcmstv13-a3hwekacajb3frbw.a02.azurefd.net/682866/afonydd-cleddau-plan-english.pdf	Brook lamprey and bullhead are not migratory species and therefore would not be affected by the proposed marine activities during construction, operation/ maintenance and decommissioning.

4. Carmarthen Bay and Estuaries SAC (24.63 km)

All Annex II migratory fish: • Twaite shad • River lamprey • Sea lamprey • Allis shad	NRW conservation objectives: https://nrwcmstv13-a3hwekacajb3frbw.a02.azurefd.net/688104/sac_uk0020020_enr_eg_37.pdf	Temporary direct loss and physical disturbance to fish habitats: There are a number of route preparation and installation activities that will temporarily disturb and result in short-term loss of seabed habitats that could be important for fish habitat. Sensitivity to effects of habitat disturbance varies between receptors. Less mobile species / life stages are far less tolerant of disturbance, which may result in physical damage in some instances. Mobile species and life stages have a greater capacity to accommodate such changes through movement to undisturbed areas. However, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential effects of temporary direct loss and physical disturbance to fish habitats are screened out of further assessment. Temporary physical disturbance to fish and shellfish habitats and species from increased SSC and sediment deposition (construction and decommissioning) Impact of changes to marine water quality from the mobilisation of contaminants Impact of changes to marine water quality from the use of drilling fluids at HDD break-out points
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		Impact of changes to marine water quality from accidental leaks and spills from vessels, including loss of fuel oils (construction and decommissioning) Underwater noise and vibration (construction, operation/maintenance and decommissioning) Permanent direct loss of fish habitats: The placement of hard substrates on the seafloor, including cable and scour protection, can result in the permanent loss of fish and shellfish habitats and species. Permanent loss of will occur through the placement of turbine anchors. Moreover, cable and scour protection are likely to be needed at some locations where the minimum cable burial depth of 0.8 m cannot be achieved or at locations where third-party cables are crossed. Introduction of hard substrate would replace existing bedrock or otherwise soft substrates, leading to permanent loss of these habitats and species. However, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential effects of habitat permanent direct loss and physical disturbance to fish habitats are screened out of further assessment. Increase in thermal emissions from cable operation: Subsea cables associated with the proposed Project, including both IAC and offshore export cables are known to produce heat during operation which, when buried in the seabed, can increase the temperature of surrounding sediment up to 70°. Research indicates that there may be some increase in substratum temperature which could affect marine receptors. Fish species are expected to be at lower risk of thermal effects from the buried cable, as any heat would be instantly dissipated by currents. Moreover, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential impact of in thermal
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		emissions from cable operation is screened out of further assessment.
		Effects of EMF emissions
		Disturbance effects to fish (such as barrier effects, collision and entanglement) from the presence of floating offshore structures and associated tethering systems
		Potential effects to fish from maintenance activities

5. Cardigan Bay SAC (50.18 km)

All Annex II migratory fish: • Sea lamprey • River lamprey	NRW conservation objectives: https://nrwcmstv13-a3hwekacajb3frbw.a02.azurefd.net/688099/sac_uk0012712_enr_eg_37.pdf	Temporary direct loss and physical disturbance to fish habitats:
		There are a number of route preparation and installation activities that will temporarily disturb and result in short-term loss of seabed habitats that could be important for fish habitat.
		Sensitivity to effects of habitat disturbance varies between receptors. Less mobile species / life stages are far less tolerant of disturbance, which may result in physical damage in some instances. Mobile species and life stages have a greater capacity to accommodate such changes through movement to undisturbed areas.
		However, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential effects of temporary direct loss and physical disturbance to fish habitats are screened out of further assessment.
		Temporary physical disturbance to fish and shellfish habitats and species from increased SSC and sediment deposition (construction and decommissioning)
		Impact of changes to marine water quality from the mobilisation of contaminants
		Impact of changes to marine water quality from the use of drilling fluids at HDD break-out points
		Impact of changes to marine water quality from accidental leaks and spills from vessels, including loss of fuel oils (construction and decommissioning)

		Underwater noise and vibration (construction, operation/ maintenance and decommissioning) Permanent direct loss of fish habitats: The placement of hard substrates on the seafloor, including cable and scour protection, can result in the permanent loss of fish and shellfish habitats and species. Permanent loss of will occur through the placement of turbine anchors. Moreover, cable and scour protection are likely to be needed at some locations where the minimum cable burial depth of 0.8 m cannot be achieved or at locations where third-party cables are crossed. Introduction of hard substrate would replace existing bedrock or otherwise soft substrates, leading to permanent loss of these habitats and species. However, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential effects of habitat permanent direct loss and physical disturbance to fish habitats are screened out of further assessment. Increase in thermal emissions from cable operation: Subsea cables associated with the proposed Project, including both IAC and offshore export cables are known to produce heat during operation which, when buried in the seabed, can increase the temperature of surrounding sediment up to 70°. Research indicates that there may be some increase in substratum temperature which could affect marine receptors. Fish species are expected to be at lower risk of thermal effects from the buried cable, as any heat would be instantly dissipated by currents. Moreover, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential impact of in thermal emissions from cable operation is screened out of further assessment. Effects of EMF emissions
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		Disturbance effects to fish (such as barrier effects, collision and entanglement) from the presence of floating offshore structures and associated tethering systems
		Potential effects to fish from maintenance activities
Grey seal	NRW conservation objectives: https://nrwcmstv13-a3hwekacajb3frbw.a02.azurefd.net/688099/sac_uk0012712_enr_eg_37.pdf	Effects of underwater noise (construction and decommissioning)
		Potential effects to supporting habitats and species
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions
		Airborne sound and visual disturbance
Bottlenose Dolphin	NRW conservation objectives: https://nrwcmstv13-a3hwekacajb3frbw.a02.azurefd.net/688099/sac_uk0012712_enr_eg_37.pdf	Bottlenose dolphin have been screened out, as the proposed Project is located within the Offshore Channel, Celtic Sea, and SW England MMMU for the species, inside which there are no SACs designated for their protection. This is consistent with the advice received from NRW (NRW scoping opinion, received 23rd May 2022) which stated: 'We do not consider that the bottlenose dolphin are likely to be found within the project impact area and therefore advise that there is no LSE on this feature.'

6. River Teifi SAC (51.22 km)

All Annex II migratory fish: • <i>River lamprey</i> • <i>Sea lamprey</i> • <i>Atlantic salmon</i>	NRW conservation objectives: https://nrwcmstv13-a3hwekacajb3frbw.a02.azurefd.net/3ggnrkv0/core-management-plan-afon-teifi-river-teifi-sac.pdf	Temporary direct loss and physical disturbance to fish habitats: There are a number of route preparation and installation activities that will temporarily disturb and result in short-term loss of seabed habitats that could be important for fish habitat. Sensitivity to effects of habitat disturbance varies between receptors. Less mobile species / life stages are far less tolerant of disturbance, which may result in physical damage in some instances. Mobile species and life stages have a greater
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		capacity to accommodate such changes through movement to undisturbed areas. However, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential effects of temporary direct loss and physical disturbance to fish habitats are screened out of further assessment. Temporary physical disturbance to fish and shellfish habitats and species from increased SSC and sediment deposition (construction and decommissioning) Impact of changes to marine water quality from the mobilisation of contaminants Impact of changes to marine water quality from the use of drilling fluids at HDD break-out points Impact of changes to marine water quality from accidental leaks and spills from vessels, including loss of fuel oils (construction and decommissioning) Underwater noise and vibration (construction, operation/ maintenance and decommissioning) Permanent direct loss of fish habitats: The placement of hard substrates on the seafloor, including cable and scour protection, can result in the permanent loss of fish and shellfish habitats and species. Permanent loss of will occur through the placement of turbine anchors. Moreover, cable and scour protection are likely to be needed at some locations where the minimum cable burial depth of 0.8 m cannot be achieved or at locations where third-party cables are crossed. Introduction of hard substrate would replace existing bedrock or otherwise soft substrates, leading to permanent loss of these habitats and species. However, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential effects of habitat
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		permanent direct loss and physical disturbance to fish habitats are screened out of further assessment. Increase in thermal emissions from cable operation: Subsea cables associated with the proposed Project, including both IAC and offshore export cables are known to produce heat during operation which, when buried in the seabed, can increase the temperature of surrounding sediment up to 70°. Research indicates that there may be some increase in substratum temperature which could affect marine receptors. Fish species are expected to be at lower risk of thermal effects from the buried cable, as any heat would be instantly dissipated by currents. Moreover, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential impact of in thermal emissions from cable operation is screened out of further assessment. Effects of EMF emissions Disturbance effects to fish (such as barrier effects, collision and entanglement) from the presence of floating offshore structures and associated tethering systems Potential effects to fish from maintenance activities
• Brook lamprey • Bullhead	NRW conservation objectives: https://nrwcmstv13-a3hwekacajb3frbw.a02.azurefd.net/3ggnrkv0/core-management-plan-afon-teifi-river-teifi-sac.pdf	Brook lamprey and bullhead are not migratory species and therefore would not be affected by the proposed marine activities during construction, operation/ maintenance and decommissioning.

7. River Tywi SAC (55.07 km)

All Annex II migratory fish: • River lamprey • Sea lamprey	NRW conservation objectives: https://nrwcmstv13-a3hwekacajb3frbw.a02.azurefd.net/670732/afon_tywi_man-plan-english.pdf	Temporary direct loss and physical disturbance to fish habitats: There are a number of route preparation and installation activities that will temporarily disturb and result in short-term loss of seabed habitats that could be important for fish habitat.
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• <i>Allis shad</i> • <i>Twaite shad</i>		Sensitivity to effects of habitat disturbance varies between receptors. Less mobile species / life stages are far less tolerant of disturbance, which may result in physical damage in some instances. Mobile species and life stages have a greater capacity to accommodate such changes through movement to undisturbed areas. However, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential effects of temporary direct loss and physical disturbance to fish habitats are screened out of further assessment. Temporary physical disturbance to fish and shellfish habitats and species from increased SSC and sediment deposition (construction and decommissioning) Impact of changes to marine water quality from the mobilisation of contaminants Impact of changes to marine water quality from the use of drilling fluids at HDD break-out points Impact of changes to marine water quality from accidental leaks and spills from vessels, including loss of fuel oils (construction and decommissioning) Underwater noise and vibration (construction, operation/ maintenance and decommissioning) Permanent direct loss of fish habitats: The placement of hard substrates on the seafloor, including cable and scour protection, can result in the permanent loss of fish and shellfish habitats and species. Permanent loss of will occur through the placement of turbine anchors. Moreover, cable and scour protection are likely to be needed at some locations where the minimum cable burial depth of 0.8 m cannot be achieved or at locations where third-party cables are crossed. Introduction of hard substrate would replace existing bedrock or otherwise soft substrates, leading to permanent loss of these habitats and species.
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		However, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential effects of habitat permanent direct loss and physical disturbance to fish habitats are screened out of further assessment. Increase in thermal emissions from cable operation: Subsea cables associated with the proposed Project, including both IAC and offshore export cables are known to produce heat during operation which, when buried in the seabed, can increase the temperature of surrounding sediment up to 70°. Research indicates that there may be some increase in substratum temperature which could affect marine receptors. Fish species are expected to be at lower risk of thermal effects from the buried cable, as any heat would be instantly dissipated by currents. Moreover, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential impact of in thermal emissions from cable operation is screened out of further assessment.
		Effects of EMF emissions
		Disturbance effects to fish (such as barrier effects, collision and entanglement) from the presence of floating offshore structures and associated tethering systems
		Potential effects to fish from maintenance activities
• Brook lamprey • Bullhead	NRW conservation objectives: https://nrwcmsv13-a3hwecacajb3frbw.a02.azurefd.net/670732/afon_tywi_-_man-plan-english.pdf	Brook lamprey and bullhead are not migratory species and therefore would not be affected by the proposed marine activities during construction, operation/ maintenance and decommissioning.

8. River Usk SAC (98.15 km)

	NRW conservation objectives:	Temporary direct loss and physical disturbance to fish habitats:
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All Annex II migratory fish: • <i>River lamprey</i> • <i>Sea lamprey</i> • <i>Atlantic salmon</i> • <i>Allis shad</i> • <i>Twaite shad</i>	https://nrwcmsv13-a3hwekacajb3frbw.a02.azurefd.net/673384/river_usk-sac-core-plan.pdf	There are a number of route preparation and installation activities that will temporarily disturb and result in short-term loss of seabed habitats that could be important for fish habitat. Sensitivity to effects of habitat disturbance varies between receptors. Less mobile species / life stages are far less tolerant of disturbance, which may result in physical damage in some instances. Mobile species and life stages have a greater capacity to accommodate such changes through movement to undisturbed areas. However, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential effects of temporary direct loss and physical disturbance to fish habitats are screened out of further assessment. Temporary physical disturbance to fish and shellfish habitats and species from increased SSC and sediment deposition (construction and decommissioning) Impact of changes to marine water quality from the mobilisation of contaminants Impact of changes to marine water quality from the use of drilling fluids at HDD break-out points Impact of changes to marine water quality from accidental leaks and spills from vessels, including loss of fuel oils (construction and decommissioning) Underwater noise and vibration (construction, operation/ maintenance and decommissioning) Permanent direct loss of fish habitats: The placement of hard substrates on the seafloor, including cable and scour protection, can result in the permanent loss of fish and shellfish habitats and species. Permanent loss of will occur through the placement of turbine anchors. Moreover, cable and scour protection are likely to be needed at some locations where the minimum cable burial depth of 0.8 m cannot be achieved or at locations where third-party cables are crossed. Introduction of hard substrate would replace
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		existing bedrock or otherwise soft substrates, leading to permanent loss of these habitats and species. However, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential effects of habitat permanent direct loss and physical disturbance to fish habitats are screened out of further assessment. Increase in thermal emissions from cable operation: Subsea cables associated with the proposed Project, including both IAC and offshore export cables are known to produce heat during operation which, when buried in the seabed, can increase the temperature of surrounding sediment up to 70°. Research indicates that there may be some increase in substratum temperature which could affect marine receptors. Fish species are expected to be at lower risk of thermal effects from the buried cable, as any heat would be instantly dissipated by currents. Moreover, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential impact of in thermal emissions from cable operation is screened out of further assessment.
• Brook lamprey • Bullhead	NRW conservation objectives: https://nrwcmstv13-a3hwekacajb3frbw.a02.azurefd.net/673384/river_usk-sac-core-plan.pdf	Effects of EMF emissions Disturbance effects to fish (such as barrier effects, collision and entanglement) from the presence of floating offshore structures and associated tethering systems Potential effects to fish from maintenance activities Brook lamprey and bullhead are not migratory species and therefore would not be affected by the proposed marine activities during construction, operation/ maintenance and decommissioning.

9. Severn Estuary Ramsar (138.89 km)

All Annex II migratory fish: • • <i>River lamprey</i> • <i>Sea lamprey</i> • <i>Atlantic salmon</i> • <i>Allis shad</i> • <i>Twaite shad</i> • <i>Sea Trout</i> • <i>Eel</i>	NRW conservation objectives: https://nrwcmsv13-a3hwekacajb3frbw.a02.azurefd.net/673887/severn-estuary-sac-spa-and-ramsar-reg-33-advice-from-ne-and-ccw-june-09.pdf	Temporary direct loss and physical disturbance to fish habitats: There are a number of route preparation and installation activities that will temporarily disturb and result in short-term loss of seabed habitats that could be important for fish habitat. Sensitivity to effects of habitat disturbance varies between receptors. Less mobile species / life stages are far less tolerant of disturbance, which may result in physical damage in some instances. Mobile species and life stages have a greater capacity to accommodate such changes through movement to undisturbed areas. However, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential effects of temporary direct loss and physical disturbance to fish habitats are screened out of further assessment. Temporary physical disturbance to fish and shellfish habitats and species from increased SSC and sediment deposition (construction and decommissioning) Impact of changes to marine water quality from the mobilisation of contaminants Impact of changes to marine water quality from the use of drilling fluids at HDD break-out points Impact of changes to marine water quality from accidental leaks and spills from vessels, including loss of fuel oils (construction and decommissioning) Underwater noise and vibration (construction, operation/ maintenance and decommissioning) Permanent direct loss of fish habitats: The placement of hard substrates on the seafloor, including cable and scour protection, can result in the permanent loss of fish and shellfish habitats and species. Permanent loss of will occur through the placement of turbine anchors. Moreover, cable and scour protection are likely to be needed at some locations where the minimum cable burial depth
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		of 0.8 m cannot be achieved or at locations where third-party cables are crossed. Introduction of hard substrate would replace existing bedrock or otherwise soft substrates, leading to permanent loss of these habitats and species. However, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential effects of habitat permanent direct loss and physical disturbance to fish habitats are screened out of further assessment.
		Increase in thermal emissions from cable operation: Subsea cables associated with the proposed Project, including both IAC and offshore export cables are known to produce heat during operation which, when buried in the seabed, can increase the temperature of surrounding sediment up to 70°. Research indicates that there may be some increase in substratum temperature which could affect marine receptors. Fish species are expected to be at lower risk of thermal effects from the buried cable, as any heat would be instantly dissipated by currents. Moreover, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential impact of in thermal emissions from cable operation is screened out of further assessment.
		Effects of EMF emissions
		Disturbance effects to fish (such as barrier effects, collision and entanglement) from the presence of floating offshore structures and associated tethering systems
		Potential effects to fish from maintenance activities

10. Severn Estuary SAC (132.98 km)

	NRW conservation objectives:	Temporary direct loss and physical disturbance to fish habitats:
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All Annex II migratory fish: • <i>River lamprey</i> • <i>Sea lamprey</i> • <i>Twaite shad</i> In addition (notable species sub-feature of the estuary feature): • <i>Salmon</i> • <i>Eel</i> • <i>Sea trout</i> • <i>Allis shad</i>	https://nrwcmstv13-a3hwekacajb3frbw.a02.azurefd.net/673887/severn-estuary-sac-spa-and-ramsar-reg-33-advice-from-ne-and-ccw-june-09.pdf	There are a number of route preparation and installation activities that will temporarily disturb and result in short-term loss of seabed habitats that could be important for fish habitat. Sensitivity to effects of habitat disturbance varies between receptors. Less mobile species / life stages are far less tolerant of disturbance, which may result in physical damage in some instances. Mobile species and life stages have a greater capacity to accommodate such changes through movement to undisturbed areas. However, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential effects of temporary direct loss and physical disturbance to fish habitats are screened out of further assessment. Temporary physical disturbance to fish and shellfish habitats and species from increased SSC and sediment deposition (construction and decommissioning) Impact of changes to marine water quality from the mobilisation of contaminants Impact of changes to marine water quality from the use of drilling fluids at HDD break-out points Impact of changes to marine water quality from accidental leaks and spills from vessels, including loss of fuel oils (construction and decommissioning) Underwater noise and vibration (construction, operation/ maintenance and decommissioning) Permanent direct loss of fish habitats: The placement of hard substrates on the seafloor, including cable and scour protection, can result in the permanent loss of fish and shellfish habitats and species. Permanent loss of will occur through the placement of turbine anchors. Moreover, cable and scour protection are likely to be needed at some locations where the minimum cable burial depth of 0.8 m cannot be achieved or at locations where third-party cables are crossed. Introduction of hard substrate would replace
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		existing bedrock or otherwise soft substrates, leading to permanent loss of these habitats and species.
		However, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential effects of habitat permanent direct loss and physical disturbance to fish habitats are screened out of further assessment.
		Increase in thermal emissions from cable operation: Subsea cables associated with the proposed Project, including both IAC and offshore export cables are known to produce heat during operation which, when buried in the seabed, can increase the temperature of surrounding sediment up to 70°. Research indicates that there may be some increase in substratum temperature which could affect marine receptors. Fish species are expected to be at lower risk of thermal effects from the buried cable, as any heat would be instantly dissipated by currents. Moreover, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential impact of in thermal emissions from cable operation is screened out of further assessment.
		Effects of EMF emissions
		Disturbance effects to fish (such as barrier effects, collision and entanglement) from the presence of floating offshore structures and associated tethering systems
		Potential effects to fish from maintenance activities

11. River Wye SAC (141.17 km)

All Annex II migratory fish: <i>River lamprey</i> <i>Sea lamprey</i>	NRW conservation objectives: https://nrwcmsv13-a3hwekacajb3frbw.a02.azurefd.net/a0ooioqx/river-wye-sac-core-management-plan-approved.pdf	Temporary direct loss and physical disturbance to fish habitats: There are a number of route preparation and installation activities that will temporarily disturb and result in short-term loss of seabed habitats that could be important for fish habitat.
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• Atlantic salmon • Allis shad • Twaite shad		Sensitivity to effects of habitat disturbance varies between receptors. Less mobile species / life stages are far less tolerant of disturbance, which may result in physical damage in some instances. Mobile species and life stages have a greater capacity to accommodate such changes through movement to undisturbed areas. However, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential effects of temporary direct loss and physical disturbance to fish habitats are screened out of further assessment. Temporary physical disturbance to fish and shellfish habitats and species from increased SSC and sediment deposition (construction and decommissioning) Impact of changes to marine water quality from the mobilisation of contaminants Impact of changes to marine water quality from the use of drilling fluids at HDD break-out points Impact of changes to marine water quality from accidental leaks and spills from vessels, including loss of fuel oils (construction and decommissioning) Underwater noise and vibration (construction, operation/ maintenance and decommissioning) Permanent direct loss of fish habitats: The placement of hard substrates on the seafloor, including cable and scour protection, can result in the permanent loss of fish and shellfish habitats and species. Permanent loss of will occur through the placement of turbine anchors. Moreover, cable and scour protection are likely to be needed at some locations where the minimum cable burial depth of 0.8 m cannot be achieved or at locations where third-party cables are crossed. Introduction of hard substrate would replace existing bedrock or otherwise soft substrates, leading to permanent loss of these habitats and species.
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		However, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential effects of habitat permanent direct loss and physical disturbance to fish habitats are screened out of further assessment. Increase in thermal emissions from cable operation: Subsea cables associated with the proposed Project, including both IAC and offshore export cables are known to produce heat during operation which, when buried in the seabed, can increase the temperature of surrounding sediment up to 70°. Research indicates that there may be some increase in substratum temperature which could affect marine receptors. Fish species are expected to be at lower risk of thermal effects from the buried cable, as any heat would be instantly dissipated by currents. Moreover, migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Development Area. Therefore, potential impact of in thermal emissions from cable operation is screened out of further assessment.
		Effects of EMF emissions
		Disturbance effects to fish (such as barrier effects, collision and entanglement) from the presence of floating offshore structures and associated tethering systems
		Potential effects to fish from maintenance activities
• Brook lamprey • Bullhead	NRW conservation objectives: https://nrwcmsv13-a3hwekacajb3frbw.a02.azurefd.net/a0ooioqx/river-wye-sac-core-management-plan-approved.pdf	Brook lamprey and bullhead are not migratory species and therefore would not be affected by the proposed marine activities during construction, operation/ maintenance and decommissioning.

12. West Wales Marine SAC (0.00 km)

Harbour porpoise	NRW conservation objectives:	Effects of underwater noise (construction and decommissioning)
		Collision with Project vessels (construction, operation and decommissioning)

	https://nrwcmstv13-a3hwekacajb3frbw.a02.azurefd.net/691803/west-wales-marine-conservation-objectives-and-advice-on-operations.pdf	Accidental pollution or contamination (construction and decommissioning) Potential for indirect effects through impacts upon prey species (construction and decommissioning) Effects of underwater noise from floating turbines Barrier effects from mooring lines and cables between platform and anchor Entanglement with mooring lines and cables Effects of EMF emissions
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13. Bristol Channel Approaches SAC (1.94 km)

Harbour porpoise	NRW conservation objectives: https://nrwcmstv13-a3hwekacajb3frbw.a02.azurefd.net/691806/bristol-channel-approaches-conservation-objectives-and-advice-on-operations.pdf	Effects of underwater noise (construction and decommissioning) Collision with Project vessels (construction, operation and decommissioning) Accidental pollution or contamination (construction and decommissioning) Potential for indirect effects through impacts upon prey species (construction and decommissioning) Effects of underwater noise from floating turbines Barrier effects from mooring lines and cables between platform and anchor Entanglement with mooring lines and cables Effects of EMF emissions
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14. North Anglesey SAC (174.30 km)

Harbour porpoise	NRW conservation objectives: https://nrwcmstv13-a3hwekacajb3frbw.a02.azurefd.net/691805/north-anglesey-marine-conservation-objectives-and-advice-on-operations.pdf	Effects of underwater noise (construction and decommissioning) Collision with Project vessels (construction, operation and decommissioning) Accidental pollution or contamination (construction and decommissioning) Potential for indirect effects through impacts upon prey species (construction and decommissioning) Effects of underwater noise from floating turbines Barrier effects from mooring lines and cables between platform and anchor Entanglement with mooring lines and cables Effects of EMF emissions
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15. Rockabill to Dalkey Island SAC (186.52 km)

Harbour porpoise	National Parks and Wildlife Service (NPWS) conservation objectives: ConservationObjectives.rdl (npws.ie)	Effects of underwater noise (construction and decommissioning)
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions

16. Nord Bretagne DH SAC (214.09 km)

Harbour porpoise	Various conservation objectives for specific sites, however at a high level the sites will look to ensure that the harbour porpoise is a viable component of the site – therefore impacts at a population level are considered.	Effects of underwater noise (construction and decommissioning)
		Collision with Project vessels (construction and decommissioning)
		Accidental pollution or contamination (construction, operation and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions

17. Mers Celtiques – Talus du golfe de Gascogne SAC (246.15 km)

Harbour porpoise	Various conservation objectives for specific sites, however at a high level the sites will look to ensure that the harbour porpoise is a viable component of the site – therefore impacts at a population level are considered.	Effects of underwater noise (construction and decommissioning)
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)

		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions

18. Roaringwater Bay and Islands SAC (266.61 km)

Harbour porpoise Grey seal	National Parks and Wildlife Service (NPWS) conservation objectives: <u>Site specific cons obj (npws.ie)</u>	Effects of underwater noise (construction and decommissioning)
		Potential effects to supporting habitats and species
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions
		Airborne sound and visual disturbance (grey seal only)

19. Côte de Granit rose-Sept-Iles SAC (273.47 km)

Harbour porpoise	Various conservation objectives for specific sites, however at a high level the sites will look to ensure that the harbour porpoise is a viable component of the site – therefore impacts at a population level are considered.	Effects of underwater noise (construction and decommissioning)
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables

		Effects of EMF emissions
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20. North Channel SAC (279.66 km)

Harbour porpoise	JNCC conservation objectives: North Channel MPA: Conservation Objectives And Advice On Operations (jncc.gov.uk) 	Effects of underwater noise (construction and decommissioning)
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions

21. Tregor Goëlo SAC (284.63 km)

Harbour porpoise	Various conservation objectives for specific sites, however at a high level the sites will look to ensure that the harbour porpoise is a viable component of the site – therefore impacts at a population level are considered.	Effects of underwater noise (construction and decommissioning)
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions

22. Baie de Morlaix SAC (293.18 km)

Harbour porpoise	Various conservation objectives for specific sites, however at a high level the sites will look to ensure that the harbour porpoise	Effects of underwater noise (construction and decommissioning)
		Collision with Project vessels (construction, operation and decommissioning)

	is a viable component of the site – therefore impacts at a population level are considered.	Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions

23. Abers - Côte des légendes SAC (294.23 km)

Harbour porpoise	Various conservation objectives for specific sites, however at a high level the sites will look to ensure that the harbour porpoise is a viable component of the site – therefore impacts at a population level are considered.	Effects of underwater noise (construction and decommissioning)
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions

24. Ouessant-Molène SAC (308.53 km)

Harbour porpoise	Various conservation objectives for specific sites, however at a high level the sites will look to ensure that the harbour porpoise is a viable component of the site – therefore impacts at a population level are considered.	Effects of underwater noise (construction and decommissioning)
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions

25. Blasket Islands SAC (348.56 km)

• Harbour porpoise • Grey seal	National Parks and Wildlife Service (NPWS) conservation objectives: <u>ConservationObjectives.rdl (npws.ie)</u>	Effects of underwater noise (construction and decommissioning)
		Potential effects to supporting habitats and species
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions
		Airborne sound and visual disturbance (grey seal only)

26. Chaussée de Sein SAC (357.09 km)

• Harbour porpoise • Grey seal	Various conservation objectives for specific sites, however at a high level the sites will look to ensure that the harbour porpoise is a viable component of the site – therefore impacts at a population level are considered.	Effects of underwater noise (construction and decommissioning)
		Potential effects to supporting habitats and species
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions
		Airborne sound and visual disturbance (grey seal only)

27. Récifs du talus du golfe de Gascogne SAC (412.58 km)

	Effects of underwater noise (construction and decommissioning)
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Harbour porpoise	Various conservation objectives for specific sites, however at a high level the sites will look to ensure that the harbour porpoise is a viable component of the site – therefore impacts at a population level are considered.	Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions

28. Lundy SAC (40.72 km)

Grey seal	Natural England conservation objectives: European Site Conservation Objectives for Lundy SAC - UK0013114 (naturalengland.org.uk)	Effects of underwater noise (construction and decommissioning)
		Potential effects to supporting habitats and species
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions
		Airborne sound and visual disturbance

29. Saltee Islands SAC (99.94 km)

Grey seal	National Parks and Wildlife Service (NPWS) conservation objectives: Site specific cons_obj (npws.ie)	Effects of underwater noise (construction and decommissioning)
		Potential effects to supporting habitats and species
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)

		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions
		Airborne sound and visual disturbance

30. Lleyn Peninsula and the Sarnau SAC (100.38 km)

Grey seal	NRW conservation objectives: https://nrwcmstv13-a3hwekacajb3frbw.a02.azurefd.net/694977/pen-llyn-ar-sarnau-reg-37-report-2018-english.pdf	Effects of underwater noise (construction and decommissioning)
		Potential effects to supporting habitats and species
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions
Bottlenose Dolphin	NRW conservation objectives: https://nrwcmstv13-a3hwekacajb3frbw.a02.azurefd.net/694977/pen-llyn-ar-sarnau-reg-37-report-2018-english.pdf	Airborne sound and visual disturbance
		Bottlenose dolphin have been screened out, as the proposed Project is located within the Offshore Channel, Celtic Sea, and SW England MMMU for the species, inside which there are no SACs designated for their protection. This is consistent with the advice received from NRW (NRW scoping opinion, received 23rd May 2022) which stated: 'We do not consider that the bottlenose dolphin are likely to be found within the project impact area and therefore advise that there is no LSE on this feature.'

31. Isles of Scilly Complex SAC (153.86 km)

Grey seal	Natural England conservation objectives: European Site Conservation Objectives for Isles of Scilly Complex SAC - UK0013694 (naturalengland.org.uk)	Effects of underwater noise (construction and decommissioning)
		Potential effects to supporting habitats and species
		Collision with Project vessels (construction, operation and decommissioning)

		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions
		Airborne sound and visual disturbance

32. Lambay Island SAC (211.95 km)

Grey seal	National Parks and Wildlife Service (NPWS) conservation objectives: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000204.pdf	Effects of underwater noise (construction and decommissioning)
		Potential effects to supporting habitats and species
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions
		Airborne sound and visual disturbance

33. The Maidens SAC (359.08 km)

Grey seal	Department of Agriculture, Environment and Rural Affairs (DAERA) conservation objectives: Maidens SAC Conservation Objectives 2017 (daera-ni.gov.uk)	Effects of underwater noise (construction and decommissioning)
		Potential effects to supporting habitats and species
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)

		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions
		Airborne sound and visual disturbance

34. Slyne Head Islands SAC (388.93km)

Grey seal	National Parks and Wildlife Service (NPWS) conservation objectives: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000328.pdf	Effects of underwater noise (construction and decommissioning)
		Potential effects to supporting habitats and species
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions
		Airborne sound and visual disturbance

35. Inishbofin and Inishshark SAC (398.14 km)

Grey seal	National Parks and Wildlife Service (NPWS) conservation objectives: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000278.pdf	Effects of underwater noise (construction and decommissioning)
		Potential effects to supporting habitats and species
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables

		Effects of EMF emissions
		Airborne sound and visual disturbance

36. Slieve Tooley / Tormore Island / Loughros Beg Bay SAC (410.42 km)

Grey seal	National Parks and Wildlife Service (NPWS) conservation objectives: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000190.pdf	Effects of underwater noise (construction and decommissioning)
		Potential effects to supporting habitats and species
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions
		Airborne sound and visual disturbance

37. Duvillaun Islands SAC (430.07 km)

Grey seal	National Parks and Wildlife Service (NPWS) conservation objectives: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000495.pdf	Effects of underwater noise (construction and decommissioning)
		Potential effects to supporting habitats and species
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions
		Airborne sound and visual disturbance

38. Horn Head and Rinclevan SAC (434.12 km)

Grey seal	National Parks and Wildlife Service (NPWS) conservation objectives: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000147.pdf	Effects of underwater noise (construction and decommissioning)
		Potential effects to supporting habitats and species
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions
		Airborne sound and visual disturbance

39. Inishkea Islands SAC (435.18 km)

Grey seal	National Parks and Wildlife Service (NPWS) conservation objectives: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000507.pdf	Effects of underwater noise (construction and decommissioning)
		Potential effects to supporting habitats and species
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions
		Airborne sound and visual disturbance

40. Treshnish Isles SAC (542.03 km)

Grey seal	NatureScot conservation objectives:	Effects of underwater noise (construction and decommissioning)
		Potential effects to supporting habitats and species

	https://www.nature.scot/sites/default/files/special-area-conservation/8398/conservation-objectives.pdf	Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions
		Airborne sound and visual disturbance

41. Monach Isles SAC (669.59 km)

Grey seal	NatureScot conservation objectives: https://www.nature.scot/sites/default/files/special-area-conservation/8322/conservation-objectives.pdf	Effects of underwater noise (construction and decommissioning)
		Potential effects to supporting habitats and species
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)
		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions
		Airborne sound and visual disturbance

42. North Rona SAC (830.31 km)

Grey seal	NatureScot conservation objectives: https://www.nature.scot/sites/default/files/special-area-conservation/8340/conservation-and-management-advice.pdf	Effects of underwater noise (construction and decommissioning)
		Potential effects to supporting habitats and species
		Collision with Project vessels (construction, operation and decommissioning)
		Accidental pollution or contamination (construction and decommissioning)

		Potential for indirect effects through impacts upon prey species (construction and decommissioning)
		Effects of underwater noise from floating turbines
		Barrier effects from mooring lines and cables between platform and anchor
		Entanglement with mooring lines and cables
		Effects of EMF emissions
		Airborne sound and visual disturbance

43. Skomer, Skokholm and the Seas off Pembrokeshire SPA (0.00 km)

<i>Kittiwake (named components of the seabird assemblage Qualifying Features)</i>	NRW and JNCC draft conservation objectives: Microsoft Word - Skomer.Skokholm management plan 07.doc (naturalresources.wales)	Disturbance and / or displacement associated with vessels and other offshore activities (construction and decommissioning): Birds may be disturbed and / or displaced from foraging or resting areas, which could lead to a temporary reduction in foraging opportunities or an increase in energy expenditure, resulting in a decrease in survival or productivity. Disturbance and / or displacement may be caused by the presence of vessels, as well as above water noise and visual disturbance associated with other construction and decommissioning activities including pre-installation surveys, route preparation, cable installation* and piling or drilling. The species concern index from Furness et al., (2013), presented in Table 8D-15 of the HRA Screening (Volume 6: Appendix 8D - Habitats Regulations Assessment Screening), has been used to determine species-specific vulnerability to this impact. Species which have been assigned a score lower than eight have been screened out from further assessment for this impact. This applies to all other SPAs presented in this section of the HRA (Section 3.2) and only impact pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature.
		Effects of underwater noise on diving seabirds (construction and decommissioning): Underwater noise may be generated by a range of proposed Project activities, including piling or drilling, cable installation and

		vessel traffic. Diving seabirds may be temporarily displaced and / or disturbed by underwater noise generating activities, which could result in behavioural changes, such as changes in swimming direction, diving duration and / or avoidance of the area and reduce foraging success. There is potential for impact on seabirds which typically dive for prey as part of their foraging behaviour, which includes gannet, Manx shearwater, common guillemot, razorbill and puffin. Kittiwake, lesser black-backed gull and European storm-petrel typically feed at the water surface so are unlikely to be affected by underwater noise impacts (Flood, 2009; Mitchell, et al., 2018; Schwimmer & Garthe, 2005). This applies to all other SPAs presented in this section of the HRA (Section 3.2) and only impact pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature. Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning) Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities: Birds may be disturbed and / or displaced from foraging or resting areas, which could lead to a reduction in foraging opportunities or an increase in energy expenditure, resulting in a decrease in survival or productivity. Disturbance and / or displacement may be caused by the presence of WTGs, or by associated maintenance activities such as the presence of vessels. Gull species, such as lesser black-backed gull are not considered to be sensitive to the effects of displacement from offshore wind farms (Furness et al., 2013). Despite a 'disturbance susceptibility' score below eight in Furness et al., (2013) (Table 8D-15), there is evidence that gannets, Manx shearwaters and European storm-petrels may be sensitive to displacement and barrier effects from offshore wind farms (Wade, et al., 2016; SNCB, 2022). Therefore, there is potential for impact from this impact on all seabird species which have been screened in, with the exception of lesser black-backed gull and kittiwake which are not considered sensitive to disturbance (SNCB, 2022). This applies to all other SPAs presented in this section of the HRA (Section 3.2) and only impact
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		pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature.
		Barrier effect due to presence of WTGs
		Collision risk with WTGs
		Entanglement with mooring lines and cables:
		The floating configuration of the array requires long mooring lines to connect turbines with their anchors, thus posing an entanglement risk for diving seabirds, with potential to cause injury or mortality. These lines may also ensnare derelict fishing gear, which pose an additional entanglement risk. There is potential for impact on seabirds which typically dive for prey as part of their foraging behaviour, which includes gannet, Manx shearwater, common guillemot, razorbill and puffin. Kittiwake, lesser black-backed gull and European storm-petrel typically feed at the water surface so are unlikely to be at risk of entanglement with mooring lines and cables. This applies to all other SPAs presented in this section of the HRA (Section 3.2) and only impact pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature.
		Attraction of nocturnal seabirds to proposed Project infrastructure lighting:
Guillemot (named components of the seabird assemblage Qualifying Features)	NRW and JNCC draft conservation objectives: Microsoft Word - Skomer.Skokholm management plan 07.doc (naturalresources.wales)	No potential for impact as not a nocturnal seabird. This applies to all other SPAs presented in this section of the HRA (Section 3.2) and only impact pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature.
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)
		Disturbance and / or displacement associated with vessels and other offshore activities (construction and decommissioning)
		Effects of underwater noise on diving seabirds (construction and decommissioning)
		Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)

		Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities
		Barrier effect due to presence of WTGs
		Collision risk with WTGs:
		Birds in flight are at direct risk of injury or mortality due to collision with the offshore WTGs. The risk is greatest for species which fly at higher altitude (e.g., kittiwake, gulls, and gannet) as they are more likely to fly at a height that overlaps with the rotor blade swept area, while species that remain at low altitude in flight (e.g., auks, storm petrels and shearwaters) have a very low risk of collision. The species-specific vulnerability to this impact has been determined using the collision risk calculated in Furness et al., (2013), presented in Table 8D-15 of the HRA Screening (Volume 6: Appendix 8D - Habitats Regulations Assessment Screening). Species which have been assigned a score lower than 100 have been screened out from further assessment for this impact. This applies to all other SPAs presented in this section of the HRA (Section 3.2) and only impact pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature.
		Entanglement with mooring lines and cables
		Attraction of nocturnal seabirds to proposed Project infrastructure lighting:
Lesser Black-backed Gull	NRW and JNCC draft conservation objectives: Microsoft Word - Skomer.Skokholm management plan 07.doc (naturalresources.wales)	No potential for impact as not a nocturnal seabird. This applies to all other SPAs presented in this section of the HRA (Section 3.2) and only impact pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature.
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)
		Disturbance and / or displacement associated with vessels and other offshore activities (construction and decommissioning):
		Birds may be disturbed and / or displaced from foraging or resting areas, which could lead to a temporary reduction in

		foraging opportunities or an increase in energy expenditure, resulting in a decrease in survival or productivity. Disturbance and / or displacement may be caused by the presence of vessels, as well as above water noise and visual disturbance associated with other construction and decommissioning activities including pre-installation surveys, route preparation, cable installation and piling or drilling. The species concern index from Furness et al., (2013), presented in Table 8D-15 of the HRA Screening (Volume 6: Appendix 8D - Habitats Regulations Assessment Screening), has been used to determine species-specific vulnerability to this impact. Species which have been assigned a score lower than eight have been screened out from further assessment for this impact. This applies to all other SPAs presented in this section of the HRA (Section 3.2) and only impact pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature. Effects of underwater noise on diving seabirds (construction and decommissioning): Underwater noise may be generated by a range of proposed Project activities, including piling or drilling, cable installation and vessel traffic. Diving seabirds may be temporarily displaced and / or disturbed by underwater noise generating activities, which could result in behavioural changes, such as changes in swimming direction, diving duration and / or avoidance of the area and reduce foraging success. There is potential for impact on seabirds which typically dive for prey as part of their foraging behaviour, which includes gannet, Manx shearwater, common guillemot, razorbill and puffin. Kittiwake, lesser black-backed gull and European storm-petrel typically feed at the water surface so are unlikely to be affected by underwater noise impacts (Flood, 2009; Mitchell, et al., 2018; Schwimmer & Garthe, 2005). This applies to all other SPAs presented in this section of the HRA (Section 3.2) and only impact pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature.
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		Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning) Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities: Birds may be disturbed and / or displaced from foraging or resting areas, which could lead to a reduction in foraging opportunities or an increase in energy expenditure, resulting in a decrease in survival or productivity. Disturbance and / or displacement may be caused by the presence of WTGs, or by associated maintenance activities such as the presence of vessels. Gull species, such as lesser black-backed gull are not considered to be sensitive to the effects of displacement from offshore wind farms (Furness et al., 2013). Despite a 'disturbance susceptibility' score below eight in Furness et al., (2013) (Table 8D-15), there is evidence that gannets, Manx shearwaters and European storm-petrels may be sensitive to displacement and barrier effects from offshore wind farms (Wade, et al., 2016; SNCB, 2022). Therefore, there is potential for impact from this impact on all seabird species which have been screened in, with the exception of lesser black-backed gull and kittiwake which are not considered sensitive to disturbance (SNCB, 2022). This applies to all other SPAs presented in this section of the HRA (Section 3.2) and only impact pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature. Barrier effect due to presence of WTGs Collision risk with WTGs Entanglement with mooring lines and cables: The floating configuration of the array requires long mooring lines to connect turbines with their anchors, thus posing an entanglement risk for diving seabirds, with potential to cause injury or mortality. These lines may also ensnare derelict fishing gear, which pose an additional entanglement risk. There is potential for impact on seabirds which typically dive for prey as part of their foraging behaviour, which includes gannet, Manx shearwater, common guillemot, razorbill and puffin. Kittiwake, lesser black-backed gull and European storm-petrel typically feed at the water surface so are unlikely to be at risk of entanglement with mooring lines and cables. This applies to all
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		other SPAs presented in this section of the HRA (Section 3.2) and only impact pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature. Attraction of nocturnal seabirds to proposed Project infrastructure lighting: No potential for impact as not a nocturnal seabird. This applies to all other SPAs presented in this section of the HRA (Section 3.2) and only impact pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature. Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)
<i>Razorbill (named components of the seabird assemblage Qualifying Features)</i>	NRW and JNCC draft conservation objectives: Microsoft Word - Skomer.Skokholm management plan 07.doc (naturalresources.wales)	Disturbance and / or displacement associated with vessels and other offshore activities (construction and decommissioning) Effects of underwater noise on diving seabirds (construction and decommissioning) Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning) Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities Barrier effect due to presence of WTGs Collision risk with WTGs: Birds in flight are at direct risk of injury or mortality due to collision with the offshore WTGs. The risk is greatest for species which fly at higher altitude (e.g., kittiwake, gulls, and gannet) as they are more likely to fly at a height that overlaps with the rotor blade swept area, while species that remain at low altitude in flight (e.g., auks, storm petrels and shearwaters) have a very low risk of collision. The species-specific vulnerability to this impact has been determined using the collision risk calculated in Furness et al., (2013), presented in Table 8D-15 of the HRA Screening (Volume 6: Appendix 8D - Habitats Regulations Assessment Screening). Species which have been assigned a score lower than 100 have been screened out from further assessment for this impact. This applies to all other SPAs

		presented in this section of the HRA (Section 3.2) and only impact pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature. Entanglement with mooring lines and cables Attraction of nocturnal seabirds to proposed Project infrastructure lighting: No potential for impact as not a nocturnal seabird. This applies to all other SPAs presented in this section of the HRA (Section 3.2) and only impact pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature. Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)
<i>Atlantic puffin</i>	NRW and JNCC draft conservation objectives: Microsoft Word - Skomer.Skokholm management plan 07.doc (naturalresources.wales)	Disturbance and / or displacement associated with vessels and other offshore activities (construction and decommissioning) Effects of underwater noise on diving seabirds (construction and decommissioning) Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning) Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities Barrier effect due to presence of WTGs Collision risk with WTGs: Birds in flight are at direct risk of injury or mortality due to collision with the offshore WTGs. The risk is greatest for species which fly at higher altitude (e.g., kittiwake, gulls, and gannet) as they are more likely to fly at a height that overlaps with the rotor blade swept area, while species that remain at low altitude in flight (e.g., auks, storm petrels and shearwaters) have a very low risk of collision. The species-specific vulnerability to this impact has been determined using the collision risk calculated in Furness et al., (2013), presented in Table 8D-15 of the HRA Screening (Volume 6: Appendix 8D - Habitats Regulations Assessment Screening). Species which have been assigned a score lower than 100 have been screened out from further

		assessment for this impact. This applies to all other SPAs presented in this section of the HRA (Section 3.2) and only impact pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature. Entanglement with mooring lines and cables Attraction of nocturnal seabirds to proposed Project infrastructure lighting: No potential for impact as not a nocturnal seabird. This applies to all other SPAs presented in this section of the HRA (Section 3.2) and only impact pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature. Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)
European storm petrel	NRW and JNCC draft conservation objectives: Microsoft Word - Skomer.Skokholm management plan 07.doc (naturalresources.wales)	Disturbance and / or displacement associated with vessels and other offshore activities (construction and decommissioning): Birds may be disturbed and / or displaced from foraging or resting areas, which could lead to a temporary reduction in foraging opportunities or an increase in energy expenditure, resulting in a decrease in survival or productivity. Disturbance and / or displacement may be caused by the presence of vessels, as well as above water noise and visual disturbance associated with other construction and decommissioning activities including pre-installation surveys, route preparation, cable installation* and piling or drilling. The species concern index from Furness et al., (2013), presented in Table 8D-15 of the HRA Screening (Volume 6: Appendix 8D - Habitats Regulations Assessment Screening), has been used to determine species-specific vulnerability to this impact. Species which have been assigned a score lower than eight have been screened out from further assessment for this impact. This applies to all other SPAs presented in this section of the HRA (Section 3.2) and only impact pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature.

		Effects of underwater noise on diving seabirds (construction and decommissioning): Underwater noise may be generated by a range of proposed Project activities, including piling or drilling, cable installation and vessel traffic. Diving seabirds may be temporarily displaced and / or disturbed by underwater noise generating activities, which could result in behavioural changes, such as changes in swimming direction, diving duration and / or avoidance of the area and reduce foraging success. There is potential for impact on seabirds which typically dive for prey as part of their foraging behaviour, which includes gannet, Manx shearwater, common guillemot, razorbill and puffin. Kittiwake, lesser black-backed gull and European storm-petrel typically feed at the water surface so are unlikely to be affected by underwater noise impacts (Flood, 2009; Mitchell, et al., 2018; Schwimmer & Garthe, 2005). This applies to all other SPAs presented in this section of the HRA (Section 3.2) and only impact pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature. Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning) Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities Barrier effect due to presence of WTGs Collision risk with WTGs: Birds in flight are at direct risk of injury or mortality due to collision with the offshore WTGs. The risk is greatest for species which fly at higher altitude (e.g., kittiwake, gulls, and gannet) as they are more likely to fly at a height that overlaps with the rotor blade swept area, while species that remain at low altitude in flight (e.g., auks, storm petrels and shearwaters) have a very low risk of collision. The species-specific vulnerability to this impact has been determined using the collision risk calculated in Furness et al., (2013), presented in Table 8D-15 of the HRA Screening (Volume 6: Appendix 8D - Habitats Regulations Assessment Screening). Species which have been assigned a score lower than 100 have been screened out from further
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		assessment for this impact. This applies to all other SPAs presented in this section of the HRA (Section 3.2) and only impact pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature. Entanglement with mooring lines and cables: The floating configuration of the array requires long mooring lines to connect turbines with their anchors, thus posing an entanglement risk for diving seabirds, with potential to cause injury or mortality. These lines may also ensnare derelict fishing gear, which pose an additional entanglement risk. There is potential for impact on seabirds which typically dive for prey as part of their foraging behaviour, which includes gannet, Manx shearwater, common guillemot, razorbill and puffin. Kittiwake, lesser black-backed gull and European storm-petrel typically feed at the water surface so are unlikely to be at risk of entanglement with mooring lines and cables. This applies to all other SPAs presented in this section of the HRA (Section 3.2) and only impact pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature. Attraction of nocturnal seabirds to proposed Project infrastructure lighting Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)
Manx shearwater	NRW and JNCC draft conservation objectives: Microsoft Word - Skomer.Skokholm management plan 07.doc (naturalresources.wales)	Disturbance and / or displacement associated with vessels and other offshore activities (construction and decommissioning): Birds may be disturbed and / or displaced from foraging or resting areas, which could lead to a temporary reduction in foraging opportunities or an increase in energy expenditure, resulting in a decrease in survival or productivity. Disturbance and / or displacement may be caused by the presence of vessels, as well as above water noise and visual disturbance associated with other construction and decommissioning activities including pre-installation surveys, route preparation, cable installation* and piling or drilling.

		The species concern index from Furness et al., (2013), presented in Table 8D-15 of the HRA Screening (Volume 6: Appendix 8D - Habitats Regulations Assessment Screening), has been used to determine species-specific vulnerability to this impact. Species which have been assigned a score lower than eight have been screened out from further assessment for this impact. This applies to all other SPAs presented in this section of the HRA (Section 3.2) and only impact pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature. Effects of underwater noise on diving seabirds (construction and decommissioning) Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning) Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities Barrier effect due to presence of WTGs Collision risk with WTGs: Birds in flight are at direct risk of injury or mortality due to collision with the offshore WTGs. The risk is greatest for species which fly at higher altitude (e.g., kittiwake, gulls, and gannet) as they are more likely to fly at a height that overlaps with the rotor blade swept area, while species that remain at low altitude in flight (e.g., auks, storm petrels and shearwaters) have a very low risk of collision. The species-specific vulnerability to this impact has been determined using the collision risk calculated in Furness et al., (2013), presented in Table 8D-15 of the HRA Screening (Volume 6: Appendix 8D - Habitats Regulations Assessment Screening). Species which have been assigned a score lower than 100 have been screened out from further assessment for this impact. This applies to all other SPAs presented in this section of the HRA (Section 3.2) and only impact pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature. Entanglement with mooring lines and cables Attraction of nocturnal seabirds to proposed Project infrastructure lighting
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		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)

44. Saltee Islands SPA (108.12 km)

No LSE was concluded for all bird features of this SPA following impact modelling either because of zero breeding season mortalities assigned against the SPA populations (lesser black-backed gull and puffin), or non-significant levels of such mortality (kittiwake, razorbill and gannet). Further information is provided in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf) and in the Addendum to the Environmental Statement.

Kittiwake	NPWS conservation objectives: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004002.pdf	Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Barrier effect due to presence of WTGs
		Collision risk with WTGs
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)
Lesser Black-backed Gull	NPWS conservation objectives: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004002.pdf	Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Barrier effect due to presence of WTGs
		Collision risk with WTGs
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)
Razorbill	NPWS conservation objectives: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004002.pdf	Disturbance and / or displacement associated with vessels and other offshore activities (construction and decommissioning)
		Effects of underwater noise on diving seabirds (construction and decommissioning)
		Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities
		Barrier effect due to presence of WTGs
		Entanglement with mooring lines and cables

		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)
Atlantic puffin	NPWS conservation objectives: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004002.pdf	Disturbance and / or displacement associated with vessels and other offshore activities (construction and decommissioning)
		Effects of underwater noise on diving seabirds (construction and decommissioning)
		Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities
		Barrier effect due to presence of WTGs
		Entanglement with mooring lines and cables
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)
Gannet	NPWS conservation objectives: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004002.pdf	Disturbance and / or displacement associated with vessels and other offshore activities (construction and decommissioning): Birds may be disturbed and / or displaced from foraging or resting areas, which could lead to a temporary reduction in foraging opportunities or an increase in energy expenditure, resulting in a decrease in survival or productivity. Disturbance and / or displacement may be caused by the presence of vessels, as well as above water noise and visual disturbance associated with other construction and decommissioning activities including pre-installation surveys, route preparation, cable installation* and piling or drilling. The species concern index from Furness et al., (2013), presented in Table 8D-15 of the HRA Screening (Volume 6: Appendix 8D - Habitats Regulations Assessment Screening), has been used to determine species-specific vulnerability to this impact. Species which have been assigned a score lower than eight have been screened out from further assessment for this impact. This applies to all other SPAs presented in this section of the HRA (Section 3.2) and only impact pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature.

		Effects of underwater noise on diving seabirds (construction and decommissioning)
		Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities
		Barrier effect due to presence of WTGs
		Collision risk with WTGs
		Entanglement with mooring lines and cables
		Attraction of nocturnal seabirds to proposed Project infrastructure lighting:
		No potential for impact as not a nocturnal seabird. This applies to all other SPAs presented in this section of the HRA (Section 3.2) and only impact pathways for which significant effects cannot be ruled out will be presented hereon for each ornithology feature.
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)

45. Wicklow Head SPA (157.01 km)

No LSE was concluded for the kittiwake feature of this SPA following impact modelling because of non-significant levels of breeding season mortality assigned against the SPA population. Further information is provided in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf) and in the Addendum to the Environmental Statement.

Kittiwake	NPWS conservation objectives: <u>Wicklow Head SPA National Parks & Wildlife Service</u>	Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Barrier effect due to presence of WTGs
		Collision risk with WTGs
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)

46. Helvick Head to Ballyquin SPA (157.07 km)

No LSE was concluded for the kittiwake feature of this SPA following impact modelling because of zero breeding season mortalities assigned against the SPA population. Further information is provided in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf) and in the Addendum to the Environmental Statement.

Kittiwake	NPWS conservation objectives: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004192.pdf	Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Barrier effect due to presence of WTGs
		Collision risk with WTGs
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)

47. Howth Head Coast SPA (199.83 km)

No LSE was concluded for the kittiwake feature of this SPA following impact modelling because of non-significant levels of breeding season mortality assigned against the SPA population. Further information is provided in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf) and in the Addendum to the Environmental Statement.

Kittiwake	NPWS conservation objectives: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004113.pdf	Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Barrier effect due to presence of WTGs
		Collision risk with WTGs
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)

48. Ireland's Eye SPA (203.94 km)

No LSE was concluded for the kittiwake feature of this SPA following impact modelling because of non-significant levels of breeding season mortality assigned against the SPA population. Further information is provided in Section 8.5.4 of the HRA – Report to

Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf) and in the Addendum to the Environmental Statement.

Kittiwake	NPWS conservation objectives: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004117.pdf	Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Barrier effect due to presence of WTGs
		Collision risk with WTGs
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)

49. Lambay Island SPA (211.62 km)

No LSE was concluded for all bird features of this SPA following impact modelling either because of zero breeding season mortalities assigned against the SPA populations (puffin), or non-significant levels of such mortality (kittiwake). Further information is provided in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf) and in the Addendum to the Environmental Statement.

Kittiwake	NPWS conservation objectives: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004069.pdf	Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Barrier effect due to presence of WTGs
		Collision risk with WTGs
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)
Atlantic puffin	NPWS conservation objectives: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004069.pdf	Disturbance and / or displacement associated with vessels and other offshore activities (construction and decommissioning)
		Effects of underwater noise on diving seabirds (construction and decommissioning)
		Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities
		Barrier effect due to presence of WTGs
		Entanglement with mooring lines and cables

		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)

50. Old Head of Kinsale SPA (211.01 km)

No LSE was concluded for the kittiwake feature of this SPA following impact modelling because of non-significant levels of breeding season mortality assigned against the SPA population. Further information is provided in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf) and in the Addendum to the Environmental Statement.

Kittiwake	NPWS conservation objectives: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004021.pdf	Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Barrier effect due to presence of WTGs
		Collision risk with WTGs
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)

51. Côte de Granit Rose-Sept-Iles SPA (273.47 km)

Kittiwake	Marine Protected Areas Database Natura 2000	No LSE has been determined for kittiwake from Côte de Granit Rose-Sept-Iles SPA, on the basis that the most recent available data form for this SPA estimates the population size of kittiwake at this SPA to be zero (EEA, 2017).
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<i>European storm petrel</i>	<u>Marine Protected Areas Database Natura 2000</u>	For European storm-petrel, the foraging range in Woodward et al., (2019) has poor confidence as the only available foraging range data in the UK was unpublished GPS data from one study in County Galway, Ireland. Telemetry data from tagged birds at Ouessant-Molène SPA recorded a maximum foraging distance of 240 km to the Isles of Scilly, with individuals mostly foraging closer to the colony (Mahéo & Cadiou, 2021). Therefore, whilst there is potential for European storm-petrel from French SPAs to have connectivity with the proposed Project based on Woodward et al., (2019), local telemetry data suggest that it is unlikely that a significant number of birds from these SPAs will be within the proposed Project area. Therefore, there is no potential for LSE to the European storm-petrel feature of the Côte de Granit Rose-Sept-Iles SPA.
<i>Manx shearwater</i>	<u>Marine Protected Areas Database Natura 2000</u>	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for Manx shearwater. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 136.1 km (± 88.7 SD) for Manx shearwater (Woodward, et al., 2019). Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 9,517,105 km ² (at Estuaire de la Bidassoa et Baie de Fontarabie SPA) and 12,042,948 km ² (at Maciço Montanhoso Oriental da Ilha da Madeira SPA) for Manx shearwater. The LIÿr Array Area with a 4 km buffer therefore constitutes between 0.003% and 0.004 % of the marine habitat available for Manx shearwater from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the LIÿr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.

Gannet	Marine Protected Areas Database Natura 2000	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for gannet. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 120.4 km (± 50.0 SD) for gannet (Woodward, et al., 2019). None of the SPAs located in French, Spanish or Portuguese waters are within these distances. Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 348,853 km² (at Littoral seino-marin SPA) and 628,149 km² (at Ouessant-Molène SPA) for gannet. The Llŷr Array Area with a 4 km buffer therefore constitutes between 0.066% and 0.119% for gannet from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the proposed Llŷr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.
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52. Isles of Scilly SPA (156.98 km)

No LSE was concluded for the lesser black-backed gull feature of this SPA following impact modelling because of non-significant levels of breeding season mortality assigned against the SPA population. Storm petrel was qualitatively assessed as requested by NRW and JNCC, because digital aerial surveys may potentially under record them (see Section 22.6.2 of ES Chapter 22: Marine Ornithology). In this regard, there is no reason to think this species is at any more risk from the proposed Project than the others for which quantitative assessment has been possible and therefore no LSE was concluded for the storm petrel feature of this SPA. Further information is provided in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llŷr ES - HRA RIAA.pdf) and in the Addendum to the Environmental Statement.

Lesser Black-backed Gull	Natural England conservation objectives: European Site Conservation Objectives for Isles of Scilly SPA - UK9020288	Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning) Barrier effect due to presence of WTGs Collision risk with WTGs Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)
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European storm petrel	Natural England conservation objectives: <u>European Site Conservation Objectives for Isles of Scilly SPA - UK9020288</u>	Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities
		Barrier effect due to presence of WTGs
		Attraction of nocturnal seabirds to proposed Project infrastructure lighting
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)

53. Baie de Morlaix SPA (293.18 km)

European storm petrel	<u>Marine Protected Areas Database Natura 2000</u>	For European storm-petrel, the foraging range in Woodward et al., (2019) has poor confidence as the only available foraging range data in the UK was unpublished GPS data from one study in County Galway, Ireland. Telemetry data from tagged birds at Ouessant-Molène SPA recorded a maximum foraging distance of 240 km to the Isles of Scilly, with individuals mostly foraging closer to the colony (Mahéo & Cadiou, 2021). Therefore, whilst there is potential for European storm-petrel from French SPAs to have connectivity with the proposed Project based on Woodward et al., (2019), local telemetry data suggest that it is unlikely that a significant number of birds from these SPAs will be within the proposed Project area. Therefore, there is no potential for LSE to the European storm-petrel feature of the Baie de Morlaix SPA.
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<i>Manx shearwater</i>	<u>Marine Protected Areas Database Natura 2000</u>	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for Manx shearwater. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 136.1 km (± 88.7 SD) for Manx shearwater (Woodward, et al., 2019). Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 9,517,105 km² (at Estuaire de la Bidassoa et Baie de Fontarabie SPA) and 12,042,948 km² (at Maciço Montanhoso Oriental da Ilha da Madeira SPA) for Manx shearwater. The LIÿr Array Area with a 4 km buffer therefore constitutes between 0.003% and 0.004 % of the marine habitat available for Manx shearwater from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the LIÿr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.
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54. Ouessant-Molène SPA (308.53 km)

<i>European storm petrel</i>	<u>Marine Protected Areas Database Natura 2000</u>	For European storm-petrel, the foraging range in Woodward et al., (2019) has poor confidence as the only available foraging range data in the UK was unpublished GPS data from one study in County Galway, Ireland. Telemetry data from tagged birds at Ouessant-Molène SPA recorded a maximum foraging distance of 240 km to the Isles of Scilly, with individuals mostly foraging closer to the colony (Mahéo & Cadiou, 2021). Therefore, whilst there is potential for European storm-petrel from French SPAs to have connectivity with the proposed Project based on Woodward et al., (2019), local telemetry data suggest that it is unlikely that a significant number of birds from these SPAs will be within the proposed Project area. Therefore, there is no potential for LSE to the European storm-petrel feature of the Ouessant-Molène SPA.
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<i>Manx shearwater</i>	<u>Marine Protected Areas Database Natura 2000</u>	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for Manx shearwater. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 136.1 km (± 88.7 SD) for Manx shearwater (Woodward, et al., 2019). Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 9,517,105 km² (at Estuaire de la Bidassoa et Baie de Fontarabie SPA) and 12,042,948 km² (at Maciço Montanhoso Oriental da Ilha da Madeira SPA) for Manx shearwater. The LIÿr Array Area with a 4 km buffer therefore constitutes between 0.003% and 0.004 % of the marine habitat available for Manx shearwater from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the LIÿr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.
<i>Gannet</i>	<u>Marine Protected Areas Database Natura 2000</u>	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for gannet. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 120.4 km (± 50.0 SD) for gannet (Woodward, et al., 2019). None of the SPAs located in French, Spanish or Portuguese waters are within these distances. Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 348,853 km² (at Littoral seino-marin SPA) and 628,149 km² (at Ouessant-Molène SPA) for gannet. The LIÿr Array Area with a 4 km buffer therefore constitutes between 0.066% and 0.119% for gannet from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the proposed LIÿr Array Area and the area of marine habitat available to the species will not be significantly

		reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.
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55. Aberdaron Coast and Bardsey Island SPA (111.64 km)

No LSE was concluded for the Manx Shearwater feature of this SPA following impact modelling because of non-significant levels of breeding season mortality assigned against the SPA population. Further information is provided in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf) and in the Addendum to the Environmental Statement.

Manx shearwater	NRW conservation objectives: Glannau Aberdaron Plan (naturalresources.wales)	Effects of underwater noise on diving seabirds (construction and decommissioning)
		Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities
		Barrier effect due to presence of WTGs
		Entanglement with mooring lines and cables
		Attraction of nocturnal seabirds to proposed Project infrastructure lighting
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)

56. Irish Sea Front SPA (216.39 km)

Manx shearwater	JNCC conservation objectives: <u>Irish Sea Front SPA – Conservation Advice JNCC Resource Hub</u>	Effects of underwater noise on diving seabirds (construction and decommissioning)
		Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities
		Barrier effect due to presence of WTGs
		Entanglement with mooring lines and cables
		Attraction of nocturnal seabirds to proposed Project infrastructure lighting
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)

57. Deenish Island and Scariff Island SPA (327.31 km)

No LSE was concluded for the Manx Shearwater feature of this SPA following impact modelling because of zero breeding season mortalities assigned against the SPA population. Further information is provided in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf) and in the Addendum to the Environmental Statement.

Manx shearwater	NPWS conservation objectives: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004175.pdf	Effects of underwater noise on diving seabirds (construction and decommissioning)
		Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities
		Barrier effect due to presence of WTGs
		Entanglement with mooring lines and cables
		Attraction of nocturnal seabirds to proposed Project infrastructure lighting
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)

58. Puffin Island SPA (341.30 km)

No LSE was concluded for the Manx Shearwater feature of this SPA following impact modelling because of zero breeding season mortalities assigned against the SPA population. Further information is provided in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf) and in the Addendum to the Environmental Statement.

Manx shearwater	NPWS conservation objectives: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004003.pdf	Effects of underwater noise on diving seabirds (construction and decommissioning)
		Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities
		Barrier effect due to presence of WTGs
		Entanglement with mooring lines and cables
		Attraction of nocturnal seabirds to proposed Project infrastructure lighting
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)

59. Skelligs SPA (347.88 km)

No LSE was concluded for all bird features of this SPA following impact modelling either because of zero breeding season mortalities assigned against the SPA populations (Manx Shearwater), or non-significant levels of such mortality (gannet). Further information is provided in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf) and in the Addendum to the Environmental Statement.

Manx shearwater	NPWS conservation objectives: <u>Skelligs SPA National Parks & Wildlife Service</u>	Effects of underwater noise on diving seabirds (construction and decommissioning)
		Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities
		Barrier effect due to presence of WTGs
		Entanglement with mooring lines and cables

		Attraction of nocturnal seabirds to proposed Project infrastructure lighting
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)
Gannet	NPWS conservation objectives:	Effects of underwater noise on diving seabirds (construction and decommissioning)
	<u>Skelligs SPA National Parks & Wildlife Service</u>	Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities
		Barrier effect due to presence of WTGs
		Collision risk with WTGs
		Entanglement with mooring lines and cables
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)

60. Blasket Islands SPA (353.01 km)

No LSE was concluded for the Manx Shearwater feature of this SPA following impact modelling because of zero breeding season mortalities assigned against the SPA population. Further information is provided in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf) and in the Addendum to the Environmental Statement.

Manx shearwater	NPWS conservation objectives:	Effects of underwater noise on diving seabirds (construction and decommissioning)
	https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004008.pdf	Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities
		Barrier effect due to presence of WTGs
		Entanglement with mooring lines and cables
		Attraction of nocturnal seabirds to proposed Project infrastructure lighting
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure

		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)
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61. Cruagh Island SPA (397.30 km)

No LSE was concluded for the Manx Shearwater feature of this SPA following impact modelling because of zero breeding season mortalities assigned against the SPA population. Further information is provided in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf) and in the Addendum to the Environmental Statement.

Manx shearwater	NPWS conservation objectives: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004170.pdf	Effects of underwater noise on diving seabirds (construction and decommissioning)
		Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities
		Barrier effect due to presence of WTGs
		Entanglement with mooring lines and cables
		Attraction of nocturnal seabirds to proposed Project infrastructure lighting
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)

62. Rum SPA (587.27 km)

No LSE was concluded for the Manx Shearwater feature of this SPA following impact modelling because of non-significant levels of breeding season mortality assigned against the SPA population. Further information is provided in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf) and in the Addendum to the Environmental Statement.

Manx shearwater	NatureScot and JNCC conservation objectives: conservation-and-management-advice.pdf	Effects of underwater noise on diving seabirds (construction and decommissioning)
		Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities

		Barrier effect due to presence of WTGs
		Entanglement with mooring lines and cables
		Attraction of nocturnal seabirds to proposed Project infrastructure lighting
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)

63. St Kilda SPA (711.99 km)

No LSE was concluded for the Manx Shearwater feature of this SPA following impact modelling because of non-significant levels of breeding season mortality assigned against the SPA population. Further information is provided in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf) and in the Addendum to the Environmental Statement.

Manx shearwater	NatureScot and JNCC conservation objectives: conservation-and-management-advice.pdf	Effects of underwater noise on diving seabirds (construction and decommissioning)
		Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities
		Barrier effect due to presence of WTGs
		Entanglement with mooring lines and cables
		Attraction of nocturnal seabirds to proposed Project infrastructure lighting
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)

64. Cap d'Erquy-Cap Fréhel SPA (341.10 km)

Manx shearwater	Marine Protected Areas Database Natura 2000	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and
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		designated for Manx shearwater. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 136.1 km (± 88.7 SD) for Manx shearwater (Woodward, et al., 2019). Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 9,517,105 km² (at Estuaire de la Bidassoa et Baie de Fontarabie SPA) and 12,042,948 km² (at Maciço Montanhoso Oriental da Ilha da Madeira SPA) for Manx shearwater. The Liÿr Array Area with a 4 km buffer therefore constitutes between 0.003% and 0.004 % of the marine habitat available for Manx shearwater from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the Liÿr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.
Gannet	<u>Marine Protected Areas Database Natura 2000</u>	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for gannet. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 120.4 km (± 50.0 SD) for gannet (Woodward, et al., 2019). None of the SPAs located in French, Spanish or Portuguese waters are within these distances. Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 348,853 km² (at Littoral seino-marin SPA) and 628,149 km² (at Ouessant-Molène SPA) for gannet. The Liÿr Array Area with a 4 km buffer therefore constitutes between 0.066% and 0.119% for gannet from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the proposed Liÿr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.

65. Dunes et côtes de Trévignon SPA (388.47 km)

<i>Manx shearwater</i>	<u>Marine Protected Areas Database Natura 2000</u>	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for Manx shearwater. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 136.1 km (± 88.7 SD) for Manx shearwater (Woodward, et al., 2019). Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 9,517,105 km² (at Estuaire de la Bidassoa et Baie de Fontarabie SPA) and 12,042,948 km² (at Maciço Montanhoso Oriental da Ilha da Madeira SPA) for Manx shearwater. The LIÿr Array Area with a 4 km buffer therefore constitutes between 0.003% and 0.004 % of the marine habitat available for Manx shearwater from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the LIÿr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.
<i>Gannet</i>	<u>Marine Protected Areas Database Natura 2000</u>	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for gannet. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 120.4 km (± 50.0 SD) for gannet (Woodward, et al., 2019). None of the SPAs located in French, Spanish or Portuguese waters are within these distances. Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 348,853 km² (at Littoral seino-marin SPA) and 628,149 km² (at Ouessant-Molène SPA) for gannet. The LIÿr Array Area with a 4 km buffer therefore constitutes between 0.066% and 0.119% for gannet from these SPAs.

		There is unlikely to be a significant portion of individuals from these SPAs within the proposed LIÿr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.
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66. Archipel de Glenan SPA (388.54 km)

<i>Manx shearwater</i>	Marine Protected Areas Database Natura 2000	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for Manx shearwater. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 136.1 km (± 88.7 SD) for Manx shearwater (Woodward, et al., 2019). Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 9,517,105 km² (at Estuaire de la Bidassoa et Baie de Fontarabie SPA) and 12,042,948 km² (at Maciço Montanhoso Oriental da Ilha da Madeira SPA) for Manx shearwater. The LIÿr Array Area with a 4 km buffer therefore constitutes between 0.003% and 0.004 % of the marine habitat available for Manx shearwater from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the LIÿr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.
<i>Gannet</i>	Marine Protected Areas Database Natura 2000	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for gannet. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 120.4 km (± 50.0 SD) for gannet (Woodward, et al., 2019). None of the SPAs located in French, Spanish or Portuguese waters are within these distances. Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 348,853

		km2 (at Littoral seino-marin SPA) and 628,149 km2 (at Ouessant-Molène SPA) for gannet. The LIÿr Array Area with a 4 km buffer therefore constitutes between 0.066% and 0.119% for gannet from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the proposed LIÿr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.
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67. Littoral seino-marin SPA (400.98 km)

Manx shearwater	Marine Protected Areas Database Natura 2000	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for Manx shearwater. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 136.1 km (± 88.7 SD) for Manx shearwater (Woodward, et al., 2019). Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 9,517,105 km2 (at Estuaire de la Bidassoa et Baie de Fontarabie SPA) and 12,042,948 km2 (at Maciço Montanhoso Oriental da Ilha da Madeira SPA) for Manx shearwater. The LIÿr Array Area with a 4 km buffer therefore constitutes between 0.003% and 0.004 % of the marine habitat available for Manx shearwater from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the LIÿr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.
Gannet	Marine Protected Areas Database Natura 2000	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for gannet. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 120.4 km (± 50.0 SD) for gannet (Woodward,

		et al., 2019). None of the SPAs located in French, Spanish or Portuguese waters are within these distances. Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 348,853 km² (at Littoral seino-marin SPA) and 628,149 km² (at Ouessant-Molène SPA) for gannet. The LIÿr Array Area with a 4 km buffer therefore constitutes between 0.066% and 0.119% for gannet from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the proposed LIÿr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.
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68. Baie de Quiberon SPA (438.95 km)

<i>Manx shearwater</i>	Marine Protected Areas Database Natura 2000	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for Manx shearwater. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 136.1 km (± 88.7 SD) for Manx shearwater (Woodward, et al., 2019). Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 9,517,105 km² (at Estuaire de la Bidassoa et Baie de Fontarabie SPA) and 12,042,948 km² (at Maciço Montanhoso Oriental da Ilha da Madeira SPA) for Manx shearwater. The LIÿr Array Area with a 4 km buffer therefore constitutes between 0.003% and 0.004 % of the marine habitat available for Manx shearwater from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the LIÿr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.
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Gannet	Marine Protected Areas Database Natura 2000	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for gannet. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 120.4 km (± 50.0 SD) for gannet (Woodward, et al., 2019). None of the SPAs located in French, Spanish or Portuguese waters are within these distances. Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 348,853 km² (at Littoral seino-marin SPA) and 628,149 km² (at Ouessant-Molène SPA) for gannet. The Liÿr Array Area with a 4 km buffer therefore constitutes between 0.066% and 0.119% for gannet from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the proposed Liÿr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.
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69. Rivière de Pénerf SPA (456.89 km)

Manx shearwater	Marine Protected Areas Database Natura 2000	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for Manx shearwater. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 136.1 km (± 88.7 SD) for Manx shearwater (Woodward, et al., 2019). Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 9,517,105 km² (at Estuaire de la Bidassoa et Baie de Fontarabie SPA) and 12,042,948 km² (at Maciço Montanhoso Oriental da Ilha da Madeira SPA) for Manx shearwater. The Liÿr Array Area with a 4 km buffer therefore constitutes between 0.003% and 0.004 % of the marine habitat available for
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		Manx shearwater from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the LIÿr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.
Gannet	Marine Protected Areas Database Natura 2000	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for gannet. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 120.4 km (± 50.0 SD) for gannet (Woodward, et al., 2019). None of the SPAs located in French, Spanish or Portuguese waters are within these distances. Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 348,853 km² (at Littoral seino-marin SPA) and 628,149 km² (at Ouessant-Molène SPA) for gannet. The LIÿr Array Area with a 4 km buffer therefore constitutes between 0.066% and 0.119% for gannet from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the proposed LIÿr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.

70. Iles Houat-Hoedic SPA (457.20 km)

Manx shearwater	Marine Protected Areas Database Natura 2000	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for Manx shearwater. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 136.1 km (± 88.7 SD) for Manx shearwater (Woodward, et al., 2019). Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 9,517,105 km² (at Estuaire de la Bidassoa et Baie de Fontarabie SPA) and
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		12,042,948 km² (at Maciço Montanhoso Oriental da Ilha da Madeira SPA) for Manx shearwater. The LIÿr Array Area with a 4 km buffer therefore constitutes between 0.003% and 0.004 % of the marine habitat available for Manx shearwater from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the LIÿr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.
Gannet	Marine Protected Areas Database Natura 2000	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for gannet. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 120.4 km (± 50.0 SD) for gannet (Woodward, et al., 2019). None of the SPAs located in French, Spanish or Portuguese waters are within these distances. Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 348,853 km² (at Littoral seino-marin SPA) and 628,149 km² (at Ouessant-Molène SPA) for gannet. The LIÿr Array Area with a 4 km buffer therefore constitutes between 0.066% and 0.119% for gannet from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the proposed LIÿr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.

71. Baie de Vilaine SPA (459.53 km)

Manx shearwater	Marine Protected Areas Database Natura 2000	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for Manx shearwater. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range
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		plus 1 SD of the SPAs, which is 136.1 km (± 88.7 SD) for Manx shearwater (Woodward, et al., 2019). Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 9,517,105 km² (at Estuaire de la Bidassoa et Baie de Fontarabie SPA) and 12,042,948 km² (at Maciço Montanhoso Oriental da Ilha da Madeira SPA) for Manx shearwater. The Liÿr Array Area with a 4 km buffer therefore constitutes between 0.003% and 0.004 % of the marine habitat available for Manx shearwater from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the Liÿr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.
Gannet	<u>Marine Protected Areas Database Natura 2000</u>	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for gannet. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 120.4 km (± 50.0 SD) for gannet (Woodward, et al., 2019). None of the SPAs located in French, Spanish or Portuguese waters are within these distances. Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 348,853 km² (at Littoral seino-marin SPA) and 628,149 km² (at Ouessant-Molène SPA) for gannet. The Liÿr Array Area with a 4 km buffer therefore constitutes between 0.066% and 0.119% for gannet from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the proposed Liÿr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.

72. Estuaire de la Loire SPA (496.02 km)

<i>Manx shearwater</i>	<u>Marine Protected Areas Database Natura 2000</u>	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for Manx shearwater. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 136.1 km (± 88.7 SD) for Manx shearwater (Woodward, et al., 2019). Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 9,517,105 km² (at Estuaire de la Bidassoa et Baie de Fontarabie SPA) and 12,042,948 km² (at Maciço Montanhoso Oriental da Ilha da Madeira SPA) for Manx shearwater. The Llŷr Array Area with a 4 km buffer therefore constitutes between 0.003% and 0.004 % of the marine habitat available for Manx shearwater from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the Llŷr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.
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73. Urdaibaiko itsasadarra / Ría de Urdaibai SPA (891.04 km)

<i>Manx shearwater</i>	<u>Marine Protected Areas Database Natura 2000</u>	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for Manx shearwater. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 136.1 km (± 88.7 SD) for Manx shearwater (Woodward, et al., 2019). Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 9,517,105 km² (at Estuaire de la Bidassoa et Baie de Fontarabie SPA) and 12,042,948 km² (at Maciço Montanhoso Oriental da Ilha da Madeira SPA) for Manx shearwater. The Llŷr Array Area with a 4 km buffer therefore constitutes between 0.003% and 0.004 % of the marine habitat available for
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		Manx shearwater from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the LIÿr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.
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74. Estuaire de la Bidassoa et baie de Fontarabie SPA (907.95 km)

Manx shearwater	Marine Protected Areas Database Natura 2000	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for Manx shearwater. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 136.1 km (± 88.7 SD) for Manx shearwater (Woodward, et al., 2019). Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 9,517,105 km² (at Estuaire de la Bidassoa et Baie de Fontarabie SPA) and 12,042,948 km² (at Maciço Montanhoso Oriental da Ilha da Madeira SPA) for Manx shearwater. The LIÿr Array Area with a 4 km buffer therefore constitutes between 0.003% and 0.004 % of the marine habitat available for Manx shearwater from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the LIÿr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.
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75. Maciço Montanhoso Oriental da Ilha da Madeira SPA (2276.04 km)

Manx shearwater	Marine Protected Areas Database Natura 2000	No LSE has been concluded for transboundary SPAs which are located in French, Spanish and Portuguese waters and designated for Manx shearwater. Whilst there is potential for connectivity between the proposed Project and these SPAs, the majority of birds are likely to be within the mean foraging range plus 1 SD of the SPAs, which is 136.1 km (± 88.7 SD) for Manx shearwater (Woodward, et al., 2019).
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		Additionally, the area of marine habitat within mean maximum foraging range plus 1 SD from these SPAs is between 9,517,105 km² (at Estuaire de la Bidassoa et Baie de Fontarabie SPA) and 12,042,948 km² (at Maciço Montanhoso Oriental da Ilha da Madeira SPA) for Manx shearwater. The Llŷr Array Area with a 4 km buffer therefore constitutes between 0.003% and 0.004 % of the marine habitat available for Manx shearwater from these SPAs. There is unlikely to be a significant portion of individuals from these SPAs within the Llŷr Array Area and the area of marine habitat available to the species will not be significantly reduced. Therefore, there is no potential for LSE to the colonies from these SPAs.
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76. Grassholm SPA (21.23 km)

Gannet	NRW conservation objectives: Core Management Plan Including Conservation Objectives For Grassholm Spa (naturalresources.wales)	Effects of underwater noise on diving seabirds (construction and decommissioning)
		Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities
		Barrier effect due to presence of WTGs
		Collision risk with WTGs
		Entanglement with mooring lines and cables
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)

77. The Bull and The Cow Rocks SPA (330.33 km)

No LSE was concluded for the gannet feature of this SPA following impact modelling because of non-significant levels of breeding season mortality assigned against the SPA population. Further information is provided in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llŷr ES - HRA RIAA.pdf) and in the Addendum to the Environmental Statement.

Gannet	NPWS conservation objectives: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004066.pdf	Effects of underwater noise on diving seabirds (construction and decommissioning)
		Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities
		Barrier effect due to presence of WTGs
		Collision risk with WTGs
		Entanglement with mooring lines and cables
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)

78. Ailsa Craig SPA (396.60 km)

No LSE was concluded for the gannet feature of this SPA following impact modelling because of non-significant levels of breeding season mortality assigned against the SPA population. Further information is provided in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf) and in the Addendum to the Environmental Statement.

Gannet	NatureScot conservation objectives: https://apps.snh.gov.uk/sitelink-api/v1/sites/8463/documents/29	Effects of underwater noise on diving seabirds (construction and decommissioning)
		Indirect effects due to changes in habitat and / or prey availability and distribution (construction and decommissioning)
		Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities
		Barrier effect due to presence of WTGs
		Collision risk with WTGs
		Entanglement with mooring lines and cables
		Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure
		Indirect effects due to changes in habitat and / or prey availability and distribution (operation and maintenance)

79. Pembrokeshire Bat Sites and Bosherton Lakes (3 km)

Otter	NRW conservation objectives: Microsoft Word - Pembs Bat Sites & Bosh lakes English.doc	Otters are a feature associated specifically with the Bosherton Lakes part of the SAC (i.e. Management Units 1a, 1b and 1c), located approximately 7.5 km southeast of the Onshore Development Area, and so are not considered to be within connective distance of the proposed works. As such, there is no potential for LSE, and otter have been screened out of further assessment.
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3.2.3 Screening decision of the project 'alone'	
(a) If ALL rows in column II of Table 3.2.2 are GREEN	The project is not likely to have a significant effect on any Natura 2000 site, because there is no impact pathway from the project to any Natura 2000 features, and no further consideration under the Habitats Directive/Regulations is required in order to determine the application.
(b) If there are NO rows coloured RED in column II of Table 3.2.2, and there are ANY rows which are BLUE	The project is not likely to have a significant effect on any Natura 2000 sites when considered alone, but the possibility of significant effects in combination with other plans and projects needs to be considered.
(c) If ANY rows in Column II of Table 3.2.2 are RED	The project is likely have a significant effect on one or more Natura 2000 sites and therefore an appropriate assessment is required.

4. Appropriate assessment of the project when considered alone

4.1 Assessment of project as currently defined

1. Pembrokeshire Marine SAC

Natura 2000 site feature (from Table 3.2.2 – RED rows only)	Impact pathway(s) (from Table 3.2.2)	Description of impacts	Assessment in view of conservation objectives	Can adverse effect on site integrity be ruled out?
Pembrokeshire Marine SAC (23.04 km from Llŷr Array Area and overlap with Llŷr Offshore Export Cable Corridor (OfECC))				
• Estuaries • Large shallow inlets and bays • Reefs • Sandbanks which are slightly covered by sea water all the time • Mudflats and sandflats not covered by seawater at low tide • Coastal lagoons • Atlantic salt meadows • Glauco-Puccinellietalia maritimae • Submerged or partially submerged sea caves	Temporary loss and physical disturbance to benthic habitats and species (construction)	Several activities occurring within the Offshore Development Area during the Construction phase may cause temporary loss and / or physical disturbance to the seabed habitats and benthic species. The sources of temporary habitat loss include: • HDD breakout point for two bores (total footprint of 100 m²); • Sandwave levelling for a total length of 10,351 m and width of 30 m (total disturbance of 621,048 m² for two cables); • Disturbance swathe of 25 m for construction of two cables, including clearance activities such as pre-grapple run and boulder clearance over 49 km total length (total footprint 2,450,000 m²); and • If burial is possible, cable burial for 17.10 km of inter-array cable in a swathe of up to 25 m (total footprint of 427,500 m²). Any effect of temporary disturbance associated with these activities is anticipated to be highly localised at specific locations of installation activity within the Offshore Development Area.	A detailed assessment of effects on Annex I habitats is included in Section 8.5.1 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llŷr ES - HRA RIAA.pdf). The effect of any temporary disturbance is anticipated to be very localised and within the Offshore Development Area. As the Pembrokeshire Marine SAC is located 23.04 km from the Array Area, it is not anticipated that the temporary disturbance associated with Construction phase activities within the Array Area will result in an impact on the Annex I benthic habitat features of the SAC. The OfECC intersects Pembrokeshire Marine SAC for approximately 15.14 km between the KP 32.4 and KP 48 (see Figure 8-3 of the Llŷr ES - HRA RIAA), and thus there is potential for impacts on any of the Annex I benthic habitat features present at this location from Construction phase activities. The OfECC does not intersect the following Annex I benthic habitats, and thus there is considered to be no effect from temporary loss and physical disturbance to these features: • Estuaries; • Shallow inlets and bays; • Mudflats; • Sandflats;	YES

			• Coastal lagoons; • Salt meadows; • Sea caves. Additionally, the proposed Project has committed to routing the OfECC avoiding direct impacts on Annex I reef and the Turbot Bank designated area (see Llyr ES - Chapter 04: Description of the Proposed Project). Avoidance of these features is as follows: • Reef habitat in the nearshore region (between the HDD exit point at KP 48 and KP 41.5 at the top of Turbot Bank) (see Figure 8-4 of the Llyr ES - HRA RIAA) has been avoided by routing through sediment habitats east of the reef in Freshwater West and installation along an identified sediment channel in the reef with some micro-routing around small areas of outcropping rock that sits within a mosaic of rock and sediment habitats. • The cables will be surface laid, using iron articulated pipe protection, in a westerly direction for up to 4.2 km per cable, avoiding encroachment onto potential Annex I reef between KP 46 and KP 41.8. No other cable protection measures are proposed within this area. From KP41.8 to KP38, cable installation around Turbot Bank maintains a position outside of the designated Annex I sandbank feature and avoids encroachment onto potential Annex I reef (see Figure 8-4 of the Llyr ES - HRA RIAA). The intention is to bury the cable in this region but at this stage it has been assumed installation will be achieved via the laying of iron articulated pipe protected cable directly on the seabed and no	
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			other cable protection measures are proposed. Therefore, it is not anticipated that there will be any temporary loss or physical disturbance of the Annex I features of Pembrokeshire Marine SAC from Construction phase activities. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse effect on the integrity of the site through this impact pathway.</i>	
• Estuaries • Large shallow inlets and bays • Reefs • Sandbanks which are slightly covered by sea water all the time • Mudflats and sandflats not covered by seawater at low tide • Coastal lagoons • Atlantic salt meadows • Glaucopuccinellietalia maritima • Submerged or partially	Temporary increase in SSC and sediment deposition leading to contaminant mobilisation, turbidity, and smothering effects (construction, operation and maintenance, and decommissioning)	Construction activities associated with the proposed Project have the potential to temporarily increase SSC by creating sediment plumes in the water column which can travel away from the Offshore Development Area before depositing sediment elsewhere on the seabed. Increased SSC results in elevated turbidity, which can result in several potential effects to benthic receptors. The tidal excursion distance during a mean tide is approximately 8 km to 10 km in the middle of the OfECC and 14 km in the nearshore on approach to the landfall. However, based on modelling undertaken in Chapter 17: Physical Environment, any measurable change in SSC during construction will be temporary and localised, with the majority of sediment in the OfECC consisting of sands and gravels which are expected to have deposited in tens of centimetres thickness on the seabed between 50 m and 500 m away of the	A detailed assessment of effects on Annex I habitats is included in Section 8.5.1 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf). <u>Construction</u> <u>Annex I Reefs (1170)</u> Annex I Reef has been identified within the zone of influence for this impact pathway, within the OfECC in the nearshore area where the cable will be installed between the HDD exit point at KP48 and KP42 close to Turbot Bank. These habitats could, therefore, be at risk of an impact from increased SSC and deposition from cable construction activities. However, the method of construction in the region where Annex 1 reef is present will be the placement of iron articulated protected cable directly on the seabed, without the need for any sediment excavation. Therefore, any sediment disturbance will be minimal and not likely to result in SSC or deposition at a level	YES

submerged sea caves		source of disturbance. Only 6% of the surveyed sediments across nearshore and offshore sections of the Offshore Development Area consisted of mud and therefore there is the potential for a very fine layer of mud to be deposited beyond 500 m. No expected impact or change to SSC nor a measurable sediment deposition is anticipated beyond the tidal excursion distance. Therefore, the greatest tidal excursion distance of 14 km is considered to represent the maximum Zol. During cable repairs, which could include the remedial reburial of exposed cables, that may be required during the operational lifetime of the proposed Project, there is the potential for small, localised, temporary increases in SSC. Based on modelling undertaken in Chapter 17: Physical Environment, the Zol is considered to be a maximum of 14 km, as with the Construction phase. The removal of any infrastructure from the seabed during decommissioning will result in disturbance to the sediment that will temporarily increase the concentration of particles in the water column. However, the impact from a temporary increase in SSC and sediment deposition is expected to be similar or smaller than that for the Construction phase.	that would affect Annex 1 reef habitats in the vicinity of the cable. The magnitude of impact is therefore considered negligible and it is not anticipated that the placement of the iron articulated cable will result in sediment disturbance that would hinder the conservation objectives of the reef feature of Pembrokeshire Marine SAC. <u>Annex I Sandbanks which are slightly covered by sea water all the time (1110)</u> Annex I sandbank features of Pembrokeshire Marine SAC were identified within the zone of influence of potential SSC dispersion. However, the OfECC avoids direct impacts on the Annex I Turbot Bank as cable installation will be via lay of iron articulated cable directly on the seabed. Therefore, any increase in SSC is considered to be negligible and unlikely to affect sandbanks. Where burial is possible these activities will generate sediment plumes that are likely to be transitory in nature. Furthermore, the majority of the sediment consists of sand or gravel. Gravel and sand particles are expected to settle to the seabed very quickly, within 50 m – 500 m away of the source of disturbance. Therefore, an increase in SSC and deposition of sediment into Annex I sandbanks is not anticipated to result in considerable changes to the habitat. Sandbanks are dynamic features, therefore are regularly exposed to wave action, turbidity changes, and varying levels of energy. In addition, the majority of the sediment likely to be disturbed is sand, and thus, the addition of sediment from deposition following increased SSC is not expected to cause a deviation from baseline conditions. Therefore, it is not	
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			anticipated that temporary increase in SSC and deposition will hinder the conservation objectives of the sandbank feature of Pembrokeshire Marine SAC. <u>All other Annex I benthic features</u> All other Annex I benthic features are intertidal in nature: • Estuaries; • Shallow inlets and bays; • Mudflats; • Coastal lagoons; • Salt meadows; • Sea caves. These features are located beyond 500 m from the Offshore Development Area and since cable installation in the nearshore waters (KP48 to KP46) will be by direct lay on the seabed any sediment disturbance will be negligible and the potential for any sediment deposition in the vicinity of intertidal features can be ruled out. Furthermore, these features are predominantly located within the intertidal zone and are regularly exposed to wave action. Therefore, species and communities inhabiting these habitats are considered to have some habituation to increased SSC, and so any increase will not hinder the conservation objectives of these Annex I intertidal benthic habitat features of Pembrokeshire Marine SAC. <u>Operation and maintenance</u> Operational phase activities could lead to increases in turbidity and smothering and the remobilisation of contaminants.	
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			The remobilisation of contaminants is not a concern as the concentration of heavy metals, hydrocarbons and other pollutants in the sediments of the Offshore Development Area have been found to be consistent with the wider area. During the lifetime of the proposed Project, up to five cable repairs are expected, and it is anticipated that the duration and extent of any repairs would be a small portion of that proposed for the Construction phase. Due to the expected shorter period of time over which repairs would take place in comparison to the Construction phase activities, and the very localised nature of the works, any local increases in SSC and therefore contaminants, turbidity and smothering will be no greater than that associated with the Construction phase, and it is not anticipated that temporary loss and physical disturbance will hinder the conservation objectives of any of the Annex I features of Pembrokeshire Marine SAC. <u>Decommissioning</u> Due to the localised, limited extent of disturbance, and temporary nature of the effects, it is not anticipated that the temporary increase in SSC and sediment deposition will hinder the conservation of any of the Annex I benthic habitats, and there is no potential for an AEOI on the Pembrokeshire Marine SAC due to a temporary increase in SSC and sediment deposition during decommissioning. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse</i>	
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			<i>effect on the integrity of the site through this impact pathway.</i>	
• Estuaries • Large shallow inlets and bays • Reefs • Sandbanks which are slightly covered by sea water all the time • Mudflats and sandflats not covered by seawater at low tide • Coastal lagoons • Atlantic salt meadows • <i>Glaucopuccinellietalia maritima</i> • Submerged or partially submerged sea caves	Impact of changes to marine water quality from the use of HDD drilling fluids (construction)	The use of HDD and therefore the discharge of drilling fluids at the breakout location at the landfall has the potential to alter marine water quality and negatively affect benthic receptors within in the surrounding habitats. It has been estimated that up to 1,700 m ³ of drilling mud will be generated total for the two bores. Constituents of the drilling fluids, including silt-clay sized particles that have a maximum theoretical range of approximately 14 km, which is the tidal excursion on a mean tide in the nearshore area around the landfall and outside Milford Haven. However, discharged drilling fluid is expected to be subject to immediate dilution processes and rapid dispersal over this distance which will result in no detectable change from the baseline beyond 500 m.	A detailed assessment of effects on Annex I habitats is included in Section 8.5.1 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf). It has been estimated that up to 1,700 m³ of drilling mud will be generated. However, all drilling fluids used will be selected from the OSPAR List of Substances / Preparations Used and Discharged Offshore (2021) which are considered to PLONOR. Due to the small amounts of fluid likely to be released, and dynamic nature of the coastal environment, it is anticipated that only a short-term and temporary local reduction in water quality at the HDD breakout may occur. Much of the drilling mud will be released in sand dominated habitat where faunal communities are unlikely to significantly affected. Some particulates from the drilling muds may settle on bedrock but due to the dynamic nature of the shallow subtidal environment, any fluid is expected to be rapidly diluted and dispersed within the marine environment, with no detectable change from the baseline beyond 500 m (see Llyr ES - Chapter 18: Marine Water and Sediment Quality; Table 8-4). The HDD exit point is within largely sandy habitat. However, there are also areas of Annex I reef in the vicinity of the HDD exit point. These reef habitats may support epifaunal species that may have a high sensitivity to increase sediment load, but considering the low volume of drill arisings, the generally dynamic nature of the shallow	YES

			water environment, and the presence of sandy areas, there is likely to be some tolerance of natural resuspension of sediments occurring due to tides and wave action. All other Annex I benthic habitats of Pembrokeshire Marine SAC are over 500 m from the HDD exit point and thus are not anticipated to be impacted by changes water quality from HDD drilling fluids, and are not assessed further. Based on the above information, it is not anticipated that changes in water quality from the use of HDD will hinder the conservation objectives for the Annex I benthic habitat features, and thus there is no potential for an AEoSI of the Pembrokeshire Marine SAC due to changes to marine water quality from the use of HDD drilling fluids. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse effect on the integrity of the site through this impact pathway.</i>	
• Estuaries • Large shallow inlets and bays • Reefs • Sandbanks which are slightly covered by sea water all the time • Mudflats and sandflats not	Impact of changes to marine water quality from accidental leaks and spills from vessels, including loss of fuel oils (construction)	Up to 17 project vessels will be on site concurrently. A deterioration in water quality from the accidental release of pollutants (e.g., oil, fuels, lubricants, chemicals) and planned release of wastewater from any of the vessels associated with the Construction Phase activities could result in increased turbidity, deposition and contamination that could affect benthic habitats and species. Therefore, any effects are expected to be localised but considering the extent	A detailed assessment of effects on Annex I habitats is included in Section 8.5.1 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf). A deterioration in water quality from the accidental release of pollutants (e.g., oil, fuels, lubricants, chemicals) and planned release of wastewater from any of the vessels associated with the proposed Project activities could result in increased turbidity, deposition and contamination that could affect Annex I benthic habitats. Potential impacts	NO

covered by seawater at low tide • Coastal lagoons • Atlantic salt meadows • <i>Glaucopuccinellietalia maritimae</i> • Submerged or partially submerged sea caves		of tidal movement the Zol is considered to be 14 km.	can be temporary and short-term or more long-term, with the potential for contaminants to be present in the water column or settle into sediment, remaining there for prolonged periods of time. The applicant's assessment of effects takes account of best practice mitigation measures that will be adopted as part of the project. In the absence of any mitigation measures, however, there is a potential to compromise the site's conservation objectives.	
• Estuaries • Large shallow inlets and bays • Reefs • Sandbanks which are slightly covered by sea water all the time • Mudflats and sandflats not covered by seawater at low tide • Coastal lagoons • Atlantic salt meadows • <i>Glaucopuccinellietalia maritimae</i>	Introduction and spread of INNS via vessel hull or ballast water (construction), from installation of hard substrate onto the seabed (operation and maintenance), and during removal of infrastructure (decommissioning)	The accidental introduction of INNS could occur from the ballast water of the vessels that may be required during the Construction phase of the proposed Project. Up to 17 project vessels will be on site concurrently. Therefore, any impacts are considered to be localised to the Offshore Development Area. The introduction of additional cable protection, required during operation and maintenance will be lower than during the construction phase. The Zol is considered to be localised to the Offshore Development Area, as in the Construction phase. The full details of the decommissioning will not be agreed until towards the end of the 30-year operational lifetime of the proposed Project. However, the removal of all infrastructure from the seabed is	A detailed assessment of effects on Annex I habitats is included in Section 8.5.1 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf). The accidental introduction of INNS could occur from the vessels that will be required during the construction phase of the proposed Project. Whilst most non-native species are unlikely to become invasive, some species can out-compete native species and introduce diseases which could result in significant changes to community composition and mortality (Bax, et al., 2003). Any introduction of INNS therefore has the potential to cause detrimental changes to the Annex I benthic habitats features of Pembrokeshire Marine SAC. The sensitivity of benthic habitats and species to INNS can be high, particularly for native species that can be outcompeted by non-natives. The spread of INNS in intertidal	NO

<i>Puccinellietalia maritima</i> • <i>Submerged or partially submerged sea caves</i>		considered a worst-case scenario for this assessment. Therefore, the decommissioning phase is expected to largely mirror the construction process over a period of 12 months (see Chapter 04: Description of the Proposed Project). Therefore, the impact pathways and the associated Zol are anticipated to mirror those from the Construction phase.	habitats is more of a concern than subtidal zones (OSPAR, 2023). As HDD is being used, exiting in the shallow subtidal zone the intertidal area will be completely avoided. Moreover, no INNS were identified in the OfECC during the project-specific benthic survey (Llyr ES - Appendix 19A: Nearshore 2023 Benthic Survey Report; Appendix 19B: Offshore 2023 Benthic Survey Report). Moreover, to date, no spread of INNS caused by submarine cabling has been documented (Taormina, et al., 2018). The applicant's assessment of effects takes account of best practice mitigation measures that will be adopted as part of the project. In the absence of any mitigation measures, however, there is a potential to compromise the site's conservation objectives.	
• <i>Estuaries</i> • <i>Large shallow inlets and bays</i> • <i>Reefs</i> • <i>Sandbanks which are slightly covered by sea water all the time</i> • <i>Mudflats and sandflats not covered by seawater at low tide</i> • <i>Coastal lagoons</i>	Permanent direct loss and physical disturbance to benthic habitats and species (operation and maintenance)	The placement of hard substrates on the seafloor, including cable and scour protection, can result in the permanent loss of benthic habitats and species. Sources of permanent habitat loss associated with the proposed Project consist of: • 50 m² of protection, such as rock placement and/or concrete mattresses, per bore at HDD exit point (total footprint of 100 m²); • Cable protection (excluding crossings) in OfECC over a total distance of 1,600 m per cable, with a worst-case scenario berm width of 5 m (total footprint of 16,000 m² per export cable);	A detailed assessment of effects on Annex I habitats is included in Section 8.5.1 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf). The sources of permanent habitat loss in the Array Area are cable and scour protection, placement of clump weights for the mooring line, scour protection for the anchors, installation of drilled pile anchors and the presence of a subsea connector on the seabed. However, as Pembrokeshire Marine SAC is 23.04 km from the Array Area, it is not anticipated that any permanent loss at this location will result in an impact on the Annex I benthic habitat features of the SAC. Within the OfECC, cable and scour protection, in the form of rock berms or concrete mattresses are likely to be needed	NO

• Atlantic salt meadows <i>Glauco-Puccinellietalia maritimae</i> • Submerged or partially submerged sea caves		• Four cable crossings each requiring protection (none required for Greenlink) of 200 m length and 5 m width (footprint of 8,000 m² for two cables); • 11,000 m of articulated piping, 500 mm in diameter (total footprint of 11,000 m² for both cables); • Potential placement of anchor scour protection (total footprint 24,800 m²), placement of clump weights (total footprint 8,000 m²), and drag embedment anchor or drilled pile anchors (total footprint of 6,120 m²); and • Subsea connector 64 m². Introduction of hard substrate would replace the existing seabed, leading to the permanent loss of habitats and species, by nature, will be localised to the Offshore Development Area.	at some locations where a minimum cable burial depth of 0.8 m cannot be achieved. Introduction of hard substrate would replace the existing seabed, leading to the permanent loss of these habitats and species. Based on currently available data it has been estimated that a total distance of 1,600 m of the OfECC will require cable protection. However, no other cable protection is currently estimated for any areas where there are Annex I benthic habitats of the Pembrokeshire Marine SAC, including sandbanks and reef. Therefore, as the proposed Project has oriented the OfECC to avoid reef, sandbanks and other Annex I habitat types (see Figure 8-6 of the Llyr ES - HRA RIAA), no cable protection is anticipated for any areas where there are Annex I benthic habitats present, and there will be no permanent direct loss or physical disturbance of the Annex I benthic habitat features. However, the ability to micro-route to avoid all Annex 1 reef feature is questioned due to a paucity of data for some areas of the OfECC (e.g. Kilometre Point (KP) 46-48), it is not possible to say with absolute certainty that areas of the Pembrokeshire Marine SAC Annex 1 Reef feature can be avoided by the OfECC. Therefore cannot be rule out at this stage. Thus it cannot be concluded that there is no potential for an AEoSI of the Pembrokeshire Marine SAC due to direct permanent loss or physical disturbance.	
• Estuaries • Large shallow inlets and bays • Reefs	Alteration and / or indirect loss of habitat during the operational lifetime of the proposed Project	The placement of cable protection which would be left in place for the Operational phase of the proposed Project could result in the alteration and / or loss of habitat during its operational lifetime by facilitating the	A detailed assessment of effects on Annex I habitats is included in Section 8.5.1 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf).	YES

• Sandbanks which are slightly covered by sea water all the time • Mudflats and sandflats not covered by seawater at low tide • Coastal lagoons • Atlantic salt meadows • <i>Glauco-Puccinellietalia maritima</i> • Submerged or partially submerged sea caves	(operation and maintenance)	growth of new biological communities and / or changing the morphology of the seabed. These include: • The placement of protection for two cables in the OfECC (total footprint of 30,300 m²); and • The placement of cable and scour protection on IACs and associated mooring / anchoring systems and subsea connector (total footprint 56,084 m²). Therefore, effects will be localised to the Offshore Development Area.	The effect of any alteration and / or indirect loss of habitat is anticipated to be localised to the Offshore Development Area. As the Pembrokeshire Marine SAC is located 23.04 km from the Array Area, it is not anticipated that the alteration and / or indirect loss of habitat associated with operational activities within the Array Area will hinder the conservation objectives of the Annex I benthic habitat features of the SAC. Therefore, infrastructure within the Array Area is not considered further. The placement of cable protection, in the form of rock berms, grout bags or concrete mattresses, which would be left in place in the OfECC may lead to and increase heterogeneity of the seabed habitat and facilitating the growth of new biological communities. The OfECC intersects Pembrokeshire Marine SAC for approximately 15.14 km between the KP 32.4 and KP 48 (see Figure 8-3 of the Llyr ES - HRA RIAA), and thus there is potential for impacts on the benthic habitat features present at this location. However, as the proposed Project has oriented the OfECC to avoid reef and other Annex I habitat types, it is not anticipated that there will be any alteration and / or indirect loss of habitat of the Annex I features of Pembrokeshire Marine SAC. Therefore, it can be concluded that there is no potential for an AEOI of the Pembrokeshire Marine SAC due to alteration and / or indirect loss of habitat. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse</i>	
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			<i>effect on the integrity of the site through this impact pathway.</i>	
• Estuaries • Large shallow inlets and bays • Reefs • Sandbanks which are slightly covered by sea water all the time • Mudflats and sandflats not covered by seawater at low tide • Coastal lagoons • Atlantic salt meadows • <i>Glauco-Puccinellietalia maritima</i> • Submerged or partially submerged sea caves	Changes to habitats due to on-going scour, changes in hydrodynamics, increased sedimentation and smothering, and abrasions, from the movement of mooring chains (operation and maintenance)	Although scour protection will be in place, the mooring chains on the seabed throughout the Array Area can still lead to on-going scour, changes in hydrodynamics, increased sedimentation and smothering, and abrasions, throughout the operation and maintenance phase. Scour around these structures is considered to be very limited up to a few metres. Therefore, only habitats within, or within close proximity to the Array Area are considered to be at risk from impact.	A detailed assessment of effects on Annex I habitats is included in Section 8.5.1 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf). As the Pembrokeshire Marine SAC is located 23.04 km from the Array Area, it is not anticipated that effects within the Array Area will hinder the conservation objectives of the Annex I benthic habitat features of the SAC. Given this, the impact of these effects is not considered further in this assessment. Additionally, as discussed in further detail in Chapter 17: Physical Environment, any changes in hydrodynamics, sediment transport, or abrasions from movement of mooring chains are expected to be very small, with any changes to the seabed difficult to discern from those which may occur under baseline conditions. It is likely that mechanical protection will be required in several locations along the length of the OfECC where minimum burial depth of 0.8 m cannot be reached. As discussed in further detail in Chapter 17: Physical Environment, the design of the cable protection, based on a worst-case scenario of rock berms, is such that there is limited potential for flow disturbance and scour. However, the placement of cable protection, in the form of rock berms, grout bags, polyurethane material protection or concrete mattresses, may cause local elevations in turbulence which could cause secondary scour. All scour associated with the proposed Project is anticipated to be localised a few to	YES

			tens of metres from the structure and tens of centimetres deep, resulting in being highly localised. However, as the proposed Project has been oriented to avoid reef and other Annex I habitat types (see Figure 8-4 of the Llyr ES - HRA RIAA). it is not anticipated that there will be any impact to any of the Annex I features of Pembrokeshire Marine SAC from the movement of mooring chains. Therefore, it can be concluded that there is no potential for an AEoSI of the Pembrokeshire Marine SAC due to changes to habitats from the movement of mooring chains. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse effect on the integrity of the site through this impact pathway.</i>	
• Estuaries • Large shallow inlets and bays • Reefs • Sandbanks which are slightly covered by sea water all the time • Mudflats and sandflats not covered by seawater at low tide • Coastal lagoons	Disturbance to benthic habitats during planned maintenance and instances of cable failure and excavation (operation and maintenance)	Repair works are likely to be highly localised to the area of concern and therefore the spatial extent of any impacts would be small in extent, thus only impacting the features that overlap with the Offshore Development Area.	A detailed assessment of effects on Annex I habitats is included in Section 8.5.1 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf). During the lifetime of the proposed Project, up to five cable repairs are expected, and it is anticipated that the duration and extent of repair would be a small fraction of that proposed for the construction phase. Any repair works are likely to be highly localised to the area of concern and therefore the spatial extent of any impacts would be small in extent. Maintenance and unforeseen cable repair, although unlikely, are considered routine, and the procedures and processes are well defined and common in the industry.	YES

• Atlantic salt meadows <i>Glaucopuccinellietalia maritima</i> • Submerged or partially submerged sea caves			The OfECC intersects Pembrokeshire Marine SAC for approximately 15.14 km between the KP 32.4 and KP 48, and thus there is potential for impacts associated with repair works on the benthic habitat features present at this location. However, as the proposed Project has oriented the OfECC to avoid reef, sandbanks, and other Annex I habitat types (see Figure 8-4 of the Llyr ES - HRA RIAA), it is not anticipated that there will be any disturbance during planned maintenance works of the Annex I features of Pembrokeshire Marine SAC. Therefore, there is no potential for an AEOI on the Pembrokeshire Marine SAC due to disturbance during planned maintenance works. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse effect on the integrity of the site through this impact pathway.</i>	
• Estuaries • Large shallow inlets and bays • Reefs • Sandbanks which are slightly covered by sea water all the time • Mudflats and sandflats not covered by seawater at low tide	Disturbance to benthic habitats and species due to subsea cable thermal emissions (operation and maintenance)	Operation of electricity cables generates heat due to resistance in the conductor components, which can warm the cable surface and adjacent environment (i.e. sediments; Meissner et al. (2006)). Submarine power cables have been shown to generate and dissipate heat when active, with some reaching cable surface temperatures of up to 70°C (Emeana, et al., 2016). The proposed Project consists of two either 66 kV or 132 kV electricity export cables transmitting electricity from the wind turbines to the shore over a maximum estimated distance	A detailed assessment of effects on Annex I habitats is included in Section 8.5.1 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf). Within the OfECC, two 66 kV or 132 kV electricity export cables transmitting electricity from the wind turbines to the shore will cover a maximum estimated distance of 49 km. The export cables will be laid within separate trenches (which has a lower heat profile than bundled cables), or on the seabed surface, both with a minimum target separation of 50 m (which may decrease in the nearshore approach area) and a target cable burial	YES

• Coastal lagoons • Atlantic salt meadows • <i>Glauco-Puccinellietalia maritimae</i> • Submerged or partially submerged sea caves		of 49 km. The export cables will be laid within separate trenches (which has a lower heat profile than bundled cables), with a minimum target separation of 50 m (which may decrease in the nearshore approach area) and a target burial depth of 1.2 m (a minimum depth of 0.8 m). The total length of all inter-array cables will be 17.31 km, as a worst case 17.1 km of which will be surface laid and buried to a target depth of 1.2 m (0.8 m minimum) where possible. Sediment particle size composition has been found to influence heat transfer, with coarse silts experiencing the greatest temperature change, but to a shorter distance from the source, while fine and coarse sands had a lower temperature change but a greater affected distance (Emeana, et al., 2016). The sediments within Offshore Development Area predominantly consist of sand with varying percentages of mud and gravels, and therefore, the effect of temperature change is expected to vary. For unburied and dynamic cables within the Array Area, any temperature increase will be rapidly attenuated in water and unlikely to have an effect on benthic receptors. Therefore, the ZoI is anticipated to be localised to a few metres, dependent upon the heat carrying capacity of particular sediments.	depth of 1.2 m (minimum burial depth of 0.8 m). In the Array Area the 11 IACs will have a combined length of 17.31 km, and for the purpose of this assessment, it is assumed they will be surface laid. In water, heat will dissipate very quickly and therefore, as the Pembrokeshire Marine SAC is located 23.04 km from the Array Area, it is not anticipated that the disturbance due to subsea cable thermal emissions within the Array Area will result in an impact on the Annex I benthic habitat features of the SAC. Therefore, the impact of these effects is not considered further. The OfECC intersects Pembrokeshire Marine SAC for approximately 15.14 km between ~KP32 and KP48 at the HDD exit (see Figure 8-3 of the Llyr ES - HRA RIAA), and thus there is potential for impacts associated with thermal emissions on the benthic habitat features present at this location. However, the proposed Project has oriented the OfECC to avoid reef, sandbanks, and other Annex I habitats, avoiding any disturbance to Annex I habitat features from thermal emissions. Additionally, the cable will be protected by iron articulation and laid on the seabed for most of this section further minimising potential thermal effects. Additionally, sea water temperature in the Celtic Sea varies seasonally and therefore small variations due to thermal emissions from the cable are expected to be accommodated by benthic receptors. Although, thermal effects would be long-term and occurring continuously for the operational	
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			lifetime of the proposed Project, any impacts that do occur would be highly localised, with marginal increases on the sediment surface. Therefore, it is not anticipated that subsea cable thermal emissions will hinder the conservation objectives of any Annex I benthic habitats, and it can be concluded that there is no potential for an AEOI of the Pembrokeshire Marine SAC due to thermal emissions. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse effect on the integrity of the site through this impact pathway.</i>	
• Estuaries • Large shallow inlets and bays • Reefs • Sandbanks which are slightly covered by sea water all the time • Mudflats and sandflats not covered by seawater at low tide • Coastal lagoons • Atlantic salt meadows • <i>Glauco-Puccinellietalia maritima</i>	Effects of electromagnetic field (EMF) emissions (operation and maintenance)	Subsea cables associated with proposed Project, including both inter-array cables and export cables are known to produce EMF emissions (Hutchison, et al., 2020). EMF has the potential to affect the foraging and migratory success and behaviour of some marine species, particularly fish, but responses in some invertebrates have also been observed. EMF will be emitted for the duration of operational life of the proposed Project, from both the export and the inter-array cables. The target burial depth of subsea cables within the OfECC is 1.2 m (a minimum depth of 0.8 m) and potentially deeper in the OfECC region from KP42 to KP38 alongside the eastern boundary of Turbot Bank. Results from the project-specific EMF assessment (Appendix 19C: EMF Assessment) found that the maximum EMF strength predicted to result from the operation of the export	A detailed assessment of effects on Annex I habitats is included in Section 8.5.1 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf). For dynamic exposed cables in the water column, such as those within the Array Area, or those cables laid on the seabed surface, the maximum EMF strength at the surface of the cables has been calculated as ~5.2 mT (millitesla). This is significantly higher than the background level of geomagnetic field in the UK, which is around 50 µT, but the cable EMF decreases rapidly with distance. At a distance of 0.44 m from the cable surface EMF is approximately equal to background levels (see Appendix 19C: EMF Modelling Report). Therefore, EMF emissions associated with the IACs in the Array Area will be highly localised. The Pembrokeshire Marine SAC is located 23.04 km from the Array Area, and it is not anticipated that the temporary disturbance associated with	YES

• Submerged or partially submerged sea caves		cables at a target burial depth of 1.2 m, when a receptor is 0 m from the seabed, is 2.6 μT (microtesla). The effects of EMF reduce with distance from the cable, and the modelling shows negligible emissions beyond a distance of 2 m for this burial depth. For dynamic exposed cables in the water column, such as those within the Array Area, the maximum EMF strength at the surface of the cables has been calculated as ~5.2 mT (millitesla). This is significantly higher than the background level of geomagnetic field in the UK, which is around 50 μT but this also decreases rapidly with distance from the cable. At a distance of 0.44 m from the cable surface EMF is approximately equal to background levels (Appendix 19C: EMF Assessment).	construction activities within the Array Area will result in an impact on the Annex I benthic habitat features of the SAC. Therefore, the impact of these effects is not considered further. For buried cables, the target depth of subsea cables with the OfECC is 1.2 m, with a minimum depth of 0.8 m. Results from the project-specific EMF assessment (Appendix 19C: EMF Assessment) found that the maximum EMF strength predicted to result from the operation of the export cables at a buried depth of 1.2 m, when a receptor is 0 m from the seabed, is 2.6 μT (microtesla). The effects of EMF reduce with distance from the cable, and the modelling shows negligible emissions beyond a distance of 2 m for this burial depth. Where burial is greater this distance will be further reduced. Given the low level of EMF emissions predicted, if the burial depth is reduced to 0.8 m, any changes in EMF emissions are considered to be negligible and similar in effect to that provided in the modelling. At crossings with other power cables, the potential increase in EMF is higher. There are however, no crossings with other power cables. The Llyr export cable will be installed by HDD between the shallow subtidal and the land station, and whilst the Greenlink HVDC cable crosses the OfECC boundary (Figure 8-6) there is no actual physical crossing of the two cables and no potential for increased EMF. Therefore, as the effects of EMF are highly localised and reduce with distance from a cable, resulting in negligible emissions beyond 2 m, EMF emissions have the	
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			potential to impact features that overlap with the OfECC only. The OfECC intersects Pembrokeshire Marine SAC for approximately 15.14 km between the KP 32.4 and KP 48 (see Figure 8-3 of the Llyr ES - HRA RIAA), and consequently there is potential for impacts associated with EMF emissions on the benthic habitat features present at this location. However, the proposed Project has oriented the OfECC to avoid reef, sandbanks, and other Annex I habitat types (see Figure 8-4 of the Llyr ES - HRA RIAA). Therefore, it is not anticipated that EMF emissions will hinder the conservation objectives of any Annex I benthic habitat features of Pembrokeshire Marine SAC, and it can be concluded that there is no potential for an AEoSI of the Pembrokeshire Marine SAC due to EMF emissions. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse effect on the integrity of the site through this impact pathway.</i>	
• Estuaries • Large shallow inlets and bays • Reefs • Sandbanks which are slightly covered by sea water all the time • Mudflats and sandflats not covered by	Temporary disturbance to benthic habitats and species (decommissioning)	At the end of the operational life of the proposed Project, there will be a DEMP in place. Other proposed Project constraints will also be taken into consideration (e.g. safety and liability), with the least environmentally damaging option chosen if possible. The full details of the decommissioning will not be agreed until towards the end of the 30-year operational lifetime of the proposed Project. However, the removal of all infrastructure from the seabed is considered a worst-case scenario for this assessment. Therefore, the decommissioning phase is expected	Decommissioning will involve the removal of all infrastructure from the seabed, with the exception of the pin piles that will be cut off below the seabed surface. There are likely to be several methods required for the removal of infrastructure including the cable itself, cable and scour protection, anchors and mooring systems and the subsea connector. The Applicant intends to maximise burial during construction, wherever practically possible. During decommissioning both IAC and offshore export cables will be lifted from the water column or seabed using a grapnel and / or ROV and cables will be recovered to a vessel for onshore disposal. Therefore, the	YES

seawater at low tide • Coastal lagoons • Atlantic salt meadows • <i>Glauco-Puccinellietalia maritimae</i> • Submerged or partially submerged sea caves		to largely mirror the construction process over a period of 12 months (see Chapter 04: Description of the Proposed Project). Therefore, the impact pathways and the associated Zol are anticipated to mirror those from the Construction phase.	buried cable will result in disturbance to sediments as the cable is extracted. However, as the Pembrokeshire Marine SAC is located 23.04 km from the Array Area, it is not anticipated that the temporary disturbance associated with Decommissioning phase activities within the Array Area will result in an impact on the Annex I benthic habitat features of the SAC. The OfECC intersects Pembrokeshire Marine SAC for approximately 15.14 km between KP 32.4 and KP 48 (see Figure 8-3 of the Llyr ES - HRA RIAA), thus there is potential for impacts on any of the Annex I benthic habitat features present at this location from Decommissioning phase activities (see Figure 8-4 of the Llyr ES - HRA RIAA). However, as previously described for construction impacts, the proposed Project has committed to avoiding direct impacts on Annex I habitats, including reef and the Turbot Bank designated area (Chapter 04: Description of the Proposed Project). Therefore, it is anticipated that there will not be any temporary loss or physical disturbance of the Annex I features of Pembrokeshire Marine SAC from Decommissioning phase activities, and it can be concluded that there is no potential for an AEoSI of the Pembrokeshire Marine SAC due to temporary loss or physical disturbance as a result of Decommissioning phase activities of the proposed Project. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse effect on the integrity of the site through this impact pathway.</i>	
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All Annex II migratory fish: • River lamprey • Sea lamprey • Allis shad • Twaite shad	Temporary physical disturbance to migratory fish species from increased SSC and sediment deposition (construction and decommissioning)	<u>CONSTRUCTION</u> Construction activities associated with the proposed Project have the potential to temporarily increase SSC by creating sediment plumes in the water column which can travel away from the Offshore Development Area before depositing sediment elsewhere on the seabed. Several potential effects can arise from increased SSC and sediment deposition, including the clogging of gills and feeding apparatus, reduced feeding success of visual predators due to decreased visibility, and effects related to toxic conditions if sediment-bound contaminants are disturbed (Kjelland, et al., 2015). Fish migration and movement between important areas such as spawning and feeding rounds could also be impacted. The tidal excursion distance during a mean tide is approximately 8 - 10 km in the middle of the OfECC and 14 km in the nearshore on approach to the landfall. However, based on modelling undertaken, and presented in Chapter 17: Physical Environment, any measurable change in SSC during construction will be temporary and localised, with the majority of sediment in the OfECC consisting of sands and gravels which are expected to have deposited in tens of centimetres thickness on the seabed between 50 m – 500 m away of the source of disturbance. Only 6% of the surveyed sediments across nearshore and offshore sections of the Offshore Development Area consisted of mud	Several methods are incorporated into the cable layout design to minimise turbidity during the construction phase of the proposed Project. These are outlined in Section 8.1.2 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf) <u>River lamprey and Sea lamprey</u> Although the OfECC intersects Pembrokeshire Marine SAC for approximately 15 km between the HDD exit point at KP48 and KP 32.4 (see Figure 8-7 of the Llyr ES - HRA RIAA), lamprey migrate through the SAC to reach the Afonydd Cleddau on their spawning migration. Lamprey from the Rivers Usk, Wye and Teifi are also quite likely to use the inshore waters of the SAC during their migrations (NRW, 2018e). These rivers are located more than 500 m away from the Offshore Project Boundary and therefore fall outside of the zone where increased SSC is likely to be highest (greatest SSC and deposition to occur within 50 m of the OfECC). Additionally, as lamprey transit through the Offshore Development Area during their migrations, they are considered to be likely to avoid the zone where increased SSC is likely to be highest. Furthermore, impacts will be short-term and temporary, thus displaced individuals are likely to return once SSC have settled. Therefore, it is not considered that the impact of increased SSC and deposition will hinder the conservation objectives of either lamprey feature of Pembrokeshire Marine SAC.	YES
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		and therefore there is the potential for a very fine layer of mud to be deposited beyond 500 m. No expected impact or change to SSC nor a measurable sediment deposition is anticipated beyond the tidal excursion distance. Therefore, the greatest tidal excursion distance of 14 km is considered to represent the maximum Zol. <u>DECOMMISSIONING</u> The removal of any infrastructure during the decommissioning phase would result in increased SSC and sediment deposition and subsequent temporary disturbance to migratory fish. It is likely that the equipment used to remove any cables would be similar to that used during the Construction phase and as such, increased SSC is considered to be similar to that during the construction phase, with the majority of sediment expected to have deposited in tens of centimetres thickness on the seabed between 50 – 500 m away of the source of disturbance.	<u>Allis shad and Twaite shad</u> Although the OfECC intersects Pembrokeshire Marine SAC for approximately 15 km between the HDD exit point and KP 32.4, shad populations from the Rivers Tywi, Usk, Wye and Severn transit through the site (NRW, 2018e). These rivers are located more than 500 m away from the Offshore Project Boundary and therefore fall outside of the zone where increased SSC is likely to be highest (greatest SSC and deposition to occur within 50 m of the OfECC). As shad are mobile when transiting through the Offshore Development Area during their migrations, they are considered likely to avoid the zone where increased SSC is likely to be highest. Additionally, impacts will be short-term and temporary, thus displaced individuals are likely to return once SSC have settled. Moreover, during all stages of their life cycle, shad are pelagic fish and predominantly occur in the surface layers of the water column, so the shad features are unlikely to encounter mobilised sediment in the bottom 5m of the water column (Chapter 17: Physical Environment). Therefore, it is not considered that the impact of increased SSC and deposition will hinder the conservation objectives of either shad feature of Pembrokeshire Marine SAC. Based on the conclusions above, it is not anticipated that a potential increase in SSC and deposition will hinder the conservation objectives of any of the Annex II migratory fish features. This is due to the temporary and localised nature of any effects, distance from significant rivers and estuaries as well as the transitory nature of any migrating individuals	
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			(Chapter 20: Fish and Shellfish Ecology). Therefore, with adherence to the mitigation measures embedded into the cable construction methods (Section 8.1.2), there is no potential for an AEoSI on the Pembrokeshire Marine SAC due to a temporary increase in SSC and sediment deposition. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse effect on the integrity of the site through this impact pathway.</i>	
All Annex II migratory fish: • River lamprey • Sea lamprey • Allis shad • Twaite shad	Impact of changes to marine water quality from the mobilisation of contaminants (construction)	Sediment-bound contaminants including heavy metals and Polycyclic Aromatic Hydrocarbons (PAH) could have detrimental impacts on fish and shellfish when present in concentrations above relevant thresholds and resuspended during disturbance to the seabed. Impacts can include cell apoptosis in fish immune systems. Contaminants are expected to be associated with finer materials, such as silts and clays, which make up a very low percentage of the total sediment composition in the OfECC. Sediment-bound contaminants have a maximum theoretical dispersal range of approximately 14 km, which is the tidal excursion on a mean tide in the Study Area. However, the majority of the sediment disturbed by installation and pre-installation activities is sand and gravel and will be deposited within 50 m, with limited measurable deposition of fine sediments beyond	A detailed assessment of effects on Annex II migratory fish is included in Section 8.5.2 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf). Although the OfECC intersects Pembrokeshire Marine SAC for approximately 15 km between the HDD exit at KP48 and KP 32.4, migratory fish may transit through the SAC. Both lamprey species are understood to migrate to the Rivers Usk, Wye and Teifi (NRW, 2018e), and shad species to the Rivers Tywi, Usk, Wye and Severn (NRW, 2018e). All of these rivers are beyond 50 m away from the Offshore Development Area, at which point it is not expected that there will be detectable changes in sediment-bound contaminants. Moreover, as the Annex II migratory fish features of Pembrokeshire Marine SAC are only likely to be transiting the Offshore Development Area during their migrations, they are considered likely to be able to away from any affected area. Therefore, it is not	YES

		this distance and only a slight increase in SSC. The dilution processes over this distance are expected to result in very little or no detectable changes beyond 50 m.	considered that the impact of changes in marine quality due to the mobilisation of contaminants will hinder the conservation objectives of the Annex II migratory fish features of Pembrokeshire Marine SAC. Overall, contaminants are low in concentration and limited in extent and if disturbed are unlikely to be above these occurred under natural conditions. Therefore, it is not anticipated that changes in water quality due to the mobilisation of contaminants will have an effect on the conservation objectives of any of the Annex II migratory fish features, and thus there is no potential for an AEOI of the Pembrokeshire Marine SAC due to changes to marine water due to the mobilisation of contaminants. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse effect on the integrity of the site through this impact pathway.</i>	
All Annex II migratory fish: • River lamprey • Sea lamprey • Allis shad • Twaite shad	Impact of changes to marine water quality from the use of drilling fluids at HDD break-out points (construction)	The use of HDD and therefore the discharge of drilling fluids at the breakout location at the landfall has the potential to alter marine water quality and negatively affect benthic receptors within in the surrounding habitats. It has been estimated that up to 1,700 m³ of drilling mud will be generated. Constituents of the drilling fluids have a maximum theoretical range of approximately 14 km, which is the tidal excursion on a mean tide in the nearshore area around the landfall and outside Milford Haven. However, discharged drilling fluid is expected to be subject to immediate dilution processes and rapid dispersal over	A detailed assessment of effects on Annex II migratory fish is included in Section 8.5.2 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf). Although the OfECC intersects Pembrokeshire Marine SAC for approximately 15 km between the HDD exit at KP48 and KP 32.4, migratory fish may transit through the SAC. Both lamprey species are understood to migrate to the Rivers Usk, Wye and Teifi (NRW, 2018e), and shad species to the Rivers Tywi, Usk, Wye and Severn (NRW, 2018e). All of these rivers are beyond 500m from the HDD breakout point, at which point	YES

		this distance which will result in no detectable change from the baseline beyond 500 m. The HDD will punch out in the intertidal zone of Freshwater West, exiting at a water depth of around 3 to 8 m, up to 960 m seaward of MHWS and therefore in a dynamic area with considerable wave action and tidal water movement. Moreover, all drilling fluids used, such as bentonite, will be selected from the OSPAR List of Substances / Preparations Used and Discharged Offshore (2021) which are considered to PLONOR. The drilling fluid discharges from HDD operations will be a small number of single events over a short period of time and rapidly dispersed in an open sea coastal environment. Only receptors in the immediate vicinity of the HDD breakouts are likely to be in contact with drilling fluids, which pose little or no risk to the environment.	there will be no detectable change from the baseline. Moreover, as the Annex II migratory fish features of Pembrokeshire Marine SAC are only likely to be transiting the Offshore Development Area during their migrations, they are considered likely to be able to avoid any affected area. Therefore, it is not considered that the impact of changes in marine quality due to HDD will hinder the conservation objectives of the Annex II migratory fish features of Pembrokeshire Marine SAC. Therefore, as the drilling fluid used will be PLONAR, with the volume to be discharged being very small and is expected to be rapidly dispersed over a short period of time, it is not anticipated that changes in water quality from the use of HDD will have an effect on the conservation objectives of any of the Annex II migratory fish features, and thus is no potential for an AEoSI of the Pembrokeshire Marine SAC due to changes to water quality due to HDD. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse effect on the integrity of the site through this impact pathway.</i>	
All Annex II migratory fish: • River lamprey • Sea lamprey • Allis shad • Twaite shad	Impact of changes to marine water quality from accidental leaks and spills from vessels, including loss of fuel oils (construction, operation and	A deterioration in water quality from the accidental release of pollutants (e.g., oil, fuels, lubricants, chemicals) and planned release of wastewater from any of the vessels associated has the potential to negatively affect water quality, with subsequent impacts to fish and shellfish species and habitats. Changes in marine	A detailed assessment of effects on Annex II migratory fish is included in Section 8.5.2 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf). Minor spills could occur through several activities including leaking hydraulic hoses or during refuelling. However, such spills are	NO

	maintenance, and decommissioning)	water quality have a maximum theoretical range of approximately 14 km, which is the tidal excursion on a mean tide in the nearshore area around the landfall and outside Milford Haven. However, any effects are expected to be much more localised than this due to the small volumes that could be released.	expected to be small, consisting of only a few litres. If released into the marine environment these minor spills are expected to undergo rapid dispersion and evaporation when subjected to wave action, wind, currents and light, as well as degradation via bacterial action. Consequently, any small releases are likely to break up and disperse in a short space of time, resulting in little impact to the marine environment. Larger spills, such as during collisions between vessels, have the potential to impact fish and shellfish, particularly if the spill is in shallow water. The applicant's assessment of effects takes account of best practice mitigation measures that will be adopted as part of the project. In the absence of any mitigation measures, however, there is a potential to compromise the site's conservation objectives.	
All Annex II migratory fish: • River lamprey • Sea lamprey • Allis shad • Twaite shad	Underwater noise and vibration (construction)	Underwater noise and vibration will be generated by a range of project construction activities including the potential for impact piling for the installation of piles in the seabed, and cable lay activities such as dredging, ploughing, jetting, and from increased noise generated by vessels involved in construction. Fish use sound for communication, prey location and predator avoidance, and thus it is an important environmental cue (Fay & Popper, 2000). Fish ears and the lateral line perceive underwater noise through sensitivity to vibrations. Swim bladders, which are gas-filled sacs,	A detailed assessment of effects on Annex II migratory fish is included in Section 8.5.2 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf). The impact of underwater noise and vibration on migratory fish has been assessed in Llyr ES - Chapter 20: Fish and Shellfish Ecology. The OfECC intersects Pembrokeshire Marine SAC for approximately 15 km between the HDD exit point at KP48 and KP 32.4. Therefore, there is the potential for the migratory fish features to be potentially transiting the Array Area during migration where impact piling may be employed. <u>River lamprey and Sea lamprey</u>	NO

		are also used for sound detection in some teleost or bony fish (Hawkins, 1993). Sound sources, particularly of high intensity or long duration, have the potential to result in permanent and temporary injury and auditory effects and can result in masking and behavioural disturbance in fish. This includes the potential for underwater noise to act as a barrier to the movement of diadromous fish during key migratory periods. The sound characteristics of the proposed Project construction activities have been determined (Chapter 20: Fish and shellfish), with impact piling concluded to have the highest sound pressure level. Impact piling will be required to anchor the floating WTGs to the seabed, using pin-piles to attach the anchor chains within the Array Area. Impact piling will consist of pinpoint piling and each pile is expected to last for four hours. In a worst-case scenario there will be eight anchors per WTG, with a total of ten WTG. Mortality and recoverable injury for all fish species, is not predicted to occur even at the sound source, with behavioural disturbance could occur within a maximum distance of 30.7 km.	The OfECC intersects Pembrokeshire Marine SAC for approximately 15 km between the landfall and KP 32.4; lamprey migrate through SAC to reach the Afonydd Cleddau on their spawning migration. Lamprey from the Rivers Usk, Wye and Teifi are also likely to use the inshore waters of the SAC during their migrations (NRW, 2018e). However, both sea and river lamprey are considered to have a low hearing sensitivity, meaning they do not possess a swim bladder or other gas chamber and are less susceptible to barotrauma and behavioural disturbance. Based on the information provided within the RIAA and Chapter 20: Fish and Shellfish Ecology the below conclusions were reached with regards to impacts from specific construction activities: <u>Impact piling within the Array Area:</u> Mortality and recoverable injury for all fish species, is not predicted to occur even at the sound source. Moreover, behavioural disturbance could occur within a maximum distance of 30.7 km. Although there will be avoidance behaviour to the impact piling area of disturbance, and as lamprey are mobile species, they can move away from the sound source as it commences and return to the area once impact piling has stopped. Therefore, it is not considered that the impact of underwater noise and vibration associated with impact piling will hinder the conservation of either Annex II lamprey features of Pembrokeshire Marine SAC. <u>Allis shad and Twaite shad</u>	
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			The OfECC intersects Pembrokeshire Marine SAC for approximately 15 km between the landfall and KP 32.4; shad populations from the Rivers Tywi, Usk, Wye and Severn transit through the site. Both, Allis and Twaite shad are considered to have a high hearing sensitivity as they use a swim bladder (or another gas volume) for hearing. These species can detect sound pressure and particle motion and are susceptible to barotrauma and thus have the potential to be impacted by underwater noise and vibration associated with the proposed Project. Based on the information provided within the RIAA and Chapter 20: Fish and Shellfish Ecology the below conclusions were reached with regards to impacts from specific construction activities: <u>Impact piling within the Array Area:</u> Mortality and recoverable injury for all fish species, is not predicted to occur even at the sound source. Moreover, behavioural disturbance could occur within a maximum distance of 30.7 km. Although there will be avoidance behaviour to the impact piling area of disturbance and as shad are mobile species, they can move away from the sound source as it commences and return to the area once impact piling has stopped. Therefore, it is not considered that the impact of underwater noise and vibration associated with impact piling will hinder the conservation of either Annex II shad features of Pembrokeshire Marine SAC. The applicant's assessment of effects takes account of best practice mitigation measures that will be adopted as part of the project. In the absence of any mitigation measures,	
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			however, there is a potential to compromise the site's conservation objectives.	
All Annex II migratory fish: • River lamprey • Sea lamprey • Allis shad • Twaite shad	Effects of EMF emissions (operation and maintenance)	Subsea cables associated with the proposed Project, including both inter-array cables and export cables are known to produce EMF emissions (Hutchison, et al., 2020). EMF has the potential to affect the foraging and migratory success and behaviour of migratory fish. EMF will be emitted for the operational life of the proposed Project, from both the export and the inter array cables. The target depth of subsea cables with the OfECC is 1.2 m (a minimum depth of 0.8 m). Results from the project-specific EMF assessment (Appendix 19C: EMF Assessment) found that the maximum EMF strength predicted to result from the operation of the export cables at a target burial depth of 1.2 m, when a receptor is 0 m from the seabed, is 2.6 μT. The effects of EMF reduce with distance from the cable, and the modelling shows negligible emissions beyond 2 m distance from the cable for 1.2 m burial depth. For dynamic exposed cables in the water column, such as those within the Array Area, the maximum EMF strength at the surface of the cables has been calculated as ~5.2 mT. This is significantly higher than the background level of geomagnetic field in the UK, which is around 50 μT but this also decreases rapidly with distance from the cable. At a distance	A detailed assessment of effects on Annex II migratory fish is included in Section 8.5.2 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf). The increase in background EMF is considered to be restricted to a small area around the proposed Project cables. Therefore, any effects are only anticipated in the immediate area of the Offshore Development Area. The OfECC intersects Pembrokeshire Marine SAC for approximately 15 km between the HDD exit point and KP 32.4, and thus there is potential for impacts on Annex II migratory fish features at this location. <u>River lamprey and Sea lamprey</u> Although the exact path for migration for migratory fish features is not well understood, lamprey migrate through the Pembrokeshire Marine SAC to reach the Afonydd Cleddau on their spawning migration. Lamprey from the Rivers Usk, Wye and Teifi are also quite likely to use the inshore waters of the SAC during their migrations (NRW, 2018e). Migratory species spend a large amount of time in the upper reaches and given the majority of the proposed Project is in deep water, it is expected that any changes in behaviour are more likely to occur in shallower water on approach to the landfall at Freshwater west. Freshwater West is a bay and therefore is thought to be beyond the typical migratory paths for lamprey. As such,	YES

		of 0.44 m from the cable surface EMF is approximately equal to background levels (Appendix 19C: EMF Assessment).	the area where EMF emissions from the cables have the potential to affect lamprey is extremely limited. Furthermore, as lamprey are mobile when transiting through the Offshore Development Area during their migrations, they are considered likely to move away from any affected areas. Therefore, it is not considered that the impact of EMF emissions will hinder the conservation objectives of either lamprey feature of Pembrokeshire Marine SAC. <u><i>Allis shad and Twaite shad</i></u> Shad populations from the Rivers Tywi, Usk, Wye and Severn transit through the Pembrokeshire Marine SAC (NRW, 2018e). Although the exact path for migration for migratory fish features is not well understood, the shad features of the SAC have the potential to transit through the Offshore Development Area during their migrations. During all stages of their life cycle, shad are pelagic fish and in estuaries the juveniles predominantly occur in the surface layers of the water column. Given the majority of the proposed Project is in deep water, it is expected that any changes in behaviour are more likely to occur in shallower water on approach to the landfall at Freshwater west. Freshwater West is a bay and therefore is thought to be beyond the typical migratory paths for the shad. As such, the area where EMF emissions from the cables have the potential to affect shad is extremely limited. Additionally, as shad are mobile when transiting through the Offshore Development	
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			Area during their migrations, they are considered to be likely to move away from any affected areas. Therefore, it is not considered that the impact of EMF emissions will hinder the conservation objectives of either shad feature of Pembrokeshire Marine SAC. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse effect on the integrity of the site through this impact pathway.</i>	
All Annex II migratory fish: • River lamprey • Sea lamprey • Allis shad • Twaite shad	Disturbance effects to fish (such as barrier effects, collision and entanglement) from the presence of floating offshore structures and associated tethering systems (operation and maintenance)	Floating platforms may act as fish aggregating devices, changing species composition and abundance at localised scales and foraging pressure for example, from seals (e.g.Farr et al., (2021)). The physical presence of floating offshore wind infrastructure also has the potential, depending on design, to cause barrier effects, entanglement, or collisions either directly or indirectly. Therefore, as floating offshore structures will only be present within the Array Area, entanglement will only occur within the footprint of the Array Area.	The floating platforms and associated infrastructure on the seabed including chains and anchor points may act as aggregation devices for fish. The anchor chains which secure the turbines to the seafloor also provide a risk for entanglement for fish species. Therefore, the risk is considered to be localised the Array Area, and highest during periods of high flow, as the platforms will create an area of lower water velocity behind them, which may attract fish seeking refuge from the higher flows (Marine Space Ltd, 2019b). However, migratory fish are unlikely to aggregate at offshore structures due to their migratory instinct to swim upstream. In terms of collision and entanglement risk, there will be a maximum of eight mooring lines per WTG, for which there will be 10 WTGs (total of 80 mooring lines). The exact dimensions of mooring lines have not yet been determined; however, the diameter will be thin and therefore they are unlikely to act as a barrier to fish species. The additional mooring lines are also considered to be very small in number are not considered to greatly increase the risk of collision. In addition, the	YES

			mooring chains will be taught or semi-taut in the water column to maintain the position of the floating platform and is not considered to be capable of forming loops. The area of the Array Area is also very small and unlikely to act as a barrier to migrating fish species in the Celtic Sea, which is expansive. Therefore, it is not considered that Annex II migratory fish feature will aggregate, collide, or tangle with offshore structures, and thus the proposed Project will not hinder the conservation objectives of these features and there is no potential for an AEoSI on the Pembrokeshire Marine SAC due to the aggregation of fish and associated effects. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse effect on the integrity of the site through this impact pathway.</i>	
All Annex II migratory fish: • River lamprey • Sea lamprey • Allis shad • Twaite shad	Underwater noise and vibration (operation and maintenance)	During operation of the proposed Project, underwater noise can be produced from both the rotating machinery in the turbines (non-impulsive), and from cables that may 'snap' as cable tension is released in the mooring system (impulsive). Modelling of the impact of underwater noise as a result of turbine operation, including vibration from rotating machinery in the turbines, concluded that any sound produced is expected to be very low (see Appendix 21B: Marine Mammals Noise Modelling). Moreover, cable snapping can occur when tension which has built up in the mooring lines of the floating turbines is released. This can also generate	A detailed assessment of effects on Annex II migratory fish is included in Section 8.5.2 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf). Sound generated by mooring equipment noise is considered to be 167.2 SPLpeak (Burns, et al., 2022), falling outside of the hearing range of fish. This sound source is not considered to pose any risk to injury or disturbance, and the impact is not considered further. Cable snapping was not assessed in the modelling of impacts from underwater noise (Appendix 21B: Marine Mammals Noise Modelling) as the noise produced is considered to be below the threshold for any	YES

		particle motion, which is known to be a key acoustic stimulus in fish (Popper, et al., 2014) could act as a barrier to the movement of diadromous fish during key migratory periods. Therefore, by its very nature, underwater noise and vibration associated with operation will only occur within the footprint of the Array Area and will be limited to a maximum estimated distance of 1 km (based on Popper et al., 2014 thresholds).	impact in fish species (Marine Space Ltd, 2019b), and the impact is not considered further. Overall, the noise produced by the vibration from the rotating machinery in the WTGs, is not expected to be above ambient or above that produced by shipping vessel noise and would not elicit any behavioural responses from fish. Based on the conclusions above, it is not anticipated that the underwater noise and vibration associated with the operation and maintenance phase of the proposed Project will hinder the conservation objectives of the Annex II migratory fish features, thus there is no potential for an AEoSI on the Pembrokeshire Marine SAC due to underwater noise and vibration. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse effect on the integrity of the site through this impact pathway.</i>	
All Annex II migratory fish: • River lamprey • Sea lamprey • Allis shad • Twaite shad	Potential effects to fish from maintenance activities (operation and maintenance)	Cable maintenance activities of the OfECC and Array Area carried out during operation will be the same, or similar, to methods employed in cable installation and will use the same type and number of vessels. Up to five cable repairs assumed to be required over the lifetime of the proposed Project.	Maintenance activities and cable repair where required, will be carried out using the same or similar methods as cable construction, and therefore the potential pathways for impact to fish and shellfish ecology would be the same as those identified for the construction phase of the proposed Project. Repair works are likely to be highly localised to the area of concern and therefore the spatial extent of any impacts would be small in extent. Furthermore, any maintenance or repairs works would be of a significantly shorter duration. A WCS is for up to five cable	YES

			repairs assumed to be required over the lifetime of the proposed Project. The only exception is where cable protection would be required (where rock had not been placed previously) as part of maintenance and cable repair works to achieve cable retrenching and reburial. In this event, further permanent physical disturbance to and/or loss of fish and shellfish would arise. The OfECC will be routed to achieve the precautionary target depth of lowering as much as possible and a detailed review of cable protection requirements has already been undertaken. Maintenance and unforeseen cable repair (although unlikely) are routine, and the procedures and processes are well defined and is common in the industry. Impacts of maintenance and cable repair works would be of smaller magnitude than cable construction and likely small in extent and highly localised, only likely to be required for very small areas. There will also be regular maintenance within the Array Area, including the WTGs. Although this will consist of an increase in vessels, these will be limited and would not represent a significant change from baseline, with lots of vessels already transiting this area. Therefore, based on the conclusions associated with construction phase activities, there is no potential for an AEoSI on the Pembrokeshire Marine SAC due to maintenance activities. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse</i>	
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			<i>effect on the integrity of the site through this impact pathway.</i>	
All Annex II migratory fish: • River lamprey • Sea lamprey • Allis shad • Twaite shad	Underwater noise and vibration (decommissioning)	There is not considered to be a requirement for further impact piling associated with the Decommissioning phase (as any piles used as the anchor solution will be cut off below the seabed level and the remaining structure recovered to the surface for onshore disposal). However, there is the potential that further geophysical surveys may be required to assess the condition and location of the cable and any cable and scour protection as well as other physical environment information. As with construction, geophysical surveys are not a marine licensable activity and are not considered further in this assessment.	It is not considered that there will be a requirement for noise generating activities during decommissioning. Therefore, it is not anticipated that underwater noise and vibration will hinder the conservation objectives of any of the Annex II migratory fish features, and thus there is no potential for an AEoSI on the Pembrokeshire Marine SAC due to underwater noise and vibration. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse effect on the integrity of the site through this impact pathway.</i>	YES
Otter	Noise and visual disturbance during construction	The construction phase, specifically the cable burial activities, is likely to cause disturbance through noise and visually the feature.	A survey was carried out in November 2025 within the area likely to be affected by the cable burial activities which confirmed all networks of waterways near the proposed cable corridor are being or have been used by otters and it is likely that otters will use these features throughout the year, at any point in the year. Several Areas have been identified as having good potential within 200m of the cable route boundary (the green line) to be used as a breeding site by otters. All impacts will be temporary during the period of construction and will be confined to the section of cable run that is being worked on at that particular time. So, no long-term impact on otter habitat and commuting routes is envisaged as a result of the works, however adverse effect on site integrity cannot be ruled out.	NO

2. Limestone Coast of South West Wales SAC

Natura 2000 site feature (from Table 3.2.2 – RED rows only)	Impact pathway(s) (from Table 3.2.2)	Description of impacts	Assessment in view of conservation objectives	Can adverse effect on site integrity be ruled out?
Limestone Coast of South West Wales SAC (35.24 km from Llŷr Array Area and overlap with Llŷr Offshore Export Cable Corridor)				
Submerged or partially submerged sea caves	Temporary loss and physical disturbance to benthic habitats and species (construction)	Several activities occurring within the Offshore Development Area during the Construction phase may cause temporary loss and / or physical disturbance to the seabed habitats and benthic species. The sources of temporary habitat loss include: • HDD breakout point for two bores (total footprint of 100 m²); • Sandwave levelling for a total length of 10,351 m and width of 30 m (total disturbance of 621,048 m² for two cables); • Disturbance swathe of 25 m for construction of two cables, including clearance activities such as pre-grapple run and boulder clearance over 49 km total length (total footprint 2,450,000 m²); and • If burial is possible, cable burial for 17.10 km of inter-array cable in a swathe of up to 25 m (total footprint of 427,500 m²). Any effect of temporary disturbance associated with these activities is anticipated to be highly localised at specific locations of installation activity within the Offshore Development Area.	The Limestone Coast of South West Wales SAC encompasses Freshwater West where the OfECC makes landfall and transitions between the offshore and onshore elements (KP 48) (see Figure 8-3 of the Llŷr ES - HRA RIAA). As the cable will be installed via HDD between the shallow subtidal and the terrestrial environment, temporary loss and physical disturbance to intertidal habitats will be avoided. Therefore, it there will not be any temporary loss and physical disturbance to the Annex I sea cave feature, and thus no potential for an AEoSI of the Limestone Coast of South West Wales SAC due to temporary loss or physical disturbance. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse effect on the integrity of the site through this impact pathway.</i>	YES

Submerged or partially submerged sea caves	Temporary increase in SSC and sediment deposition leading to contaminant mobilisation, turbidity, and smothering effects (construction, operation and maintenance, and decommissioning activities)	Construction activities associated with the proposed Project have the potential to temporarily increase SSC by creating sediment plumes in the water column which can travel away from the Offshore Development Area before depositing sediment elsewhere on the seabed. Increased SSC results in elevated turbidity, which can result in several potential effects to benthic receptors. The tidal excursion distance during a mean tide is approximately 8 km to 10 km in the middle of the OfECC and 14 km in the nearshore on approach to the landfall. However, based on modelling undertaken in Chapter 17: Physical Environment, any measurable change in SSC during construction will be temporary and localised, with the majority of sediment in the OfECC consisting of sands and gravels which are expected to have deposited in tens of centimetres thickness on the seabed between 50 m and 500 m away of the source of disturbance. Only 6% of the surveyed sediments across nearshore and offshore sections of the Offshore Development Area consisted of mud and therefore there is the potential for a very fine layer of mud to be deposited beyond 500 m. No expected impact or change to SSC nor a measurable sediment deposition is anticipated beyond the tidal excursion distance. Therefore, the greatest tidal excursion distance of 14 km is considered to represent the maximum Zol. During cable repairs, which could include the remedial reburial of exposed	<u>Construction</u> The Annex I sea cave feature of the SAC is located beyond 500 m from the Offshore Development Area and therefore any sediment deposition is considered to be very low. Furthermore, the sea caves are located in the intertidal zone and are exposed to strong wave action which naturally disturbs coarse sediments in the region and on the cave floor. Moreover, sea cave communities often depend on a high degree of water movement and scour action (JNCC, 2023b) as these habitats are frequently subject to strong wave action and water surges. Therefore, the feature is not considered to be sensitive to increased SSC. The nearest project activity involving burial, such as jetting which could result in the greatest disturbance of sediments, to the sea caves is over 6 km away and so beyond any potential zone of influence. With adherence to the mitigation measures embedded into the cable construction methods, the location of installation activities that result in an increase in SSC, and due to the localised and temporary nature of the effects, it is very unlikely that the temporary increase in SSC and sediment deposition will hinder the conservation objectives of the Annex I sea cave feature. Therefore, there is no potential for an AEoSI on the Limestone Coast of South West Wales SAC due to increased SSC and sediment deposition. <u>Operation and maintenance</u> The remobilisation of contaminants is not a concern as the concentration of heavy metals, hydrocarbons and other pollutants in the sediments of the Offshore Development Area	YES
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		cables, that may be required during the operational lifetime of the proposed Project, there is the potential for small, localised, temporary increases in SSC. Based on modelling undertaken in Chapter 17: Physical Environment, the Zol is considered to be a maximum of 14 km, as with the Construction phase. The removal of any infrastructure from the seabed during decommissioning will result in disturbance to the sediment that will temporarily increase the concentration of particles in the water column. However, the impact from a temporary increase in SSC and sediment deposition is expected to be similar or smaller than that for the Construction phase.	have been found to be consistent with the wider area. During the lifetime of the proposed Project, up to five cable repairs are expected and it is anticipated that the duration and extent of repair would be a small portion of that proposed for the Construction phase. Due to the expected shorter period of time over which repairs would take place in comparison to the Construction phase activities, and the very localised nature of the works, any local increases in SSC and therefore turbidity and smothering will be no greater than that associated with the Construction phase, and it is not anticipated that temporary loss and physical disturbance will hinder the conservation objectives of the Annex I sea cave feature of Limestone Coast of South West Wales SAC. Therefore, with adherence to the embedded mitigation measures, and due to the localised and temporary nature of the effects, there is no potential for an AEoSI on the Limestone Coast of South West Wales SAC. <u>Decommissioning</u> The removal of any infrastructure from the seabed will result in disturbance to the sediment that will temporarily increase the concentration of particles in the water column. However, the impact from a temporary increase in SSC and sediment deposition is expected to be similar or smaller than that for the construction phase. Therefore, the temporary increase in SSC and sediment deposition will not hinder the conservation objectives of the Annex I sea cave feature, there is no potential for an AEoSI on the Limestone Coast of South West Wales SAC due to a temporary increase in SSC and sediment deposition.	
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			<i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse effect on the integrity of the site through this impact pathway.</i>	
Submerged or partially submerged sea caves	Impact of changes to marine water quality from the use of HDD drilling fluids (construction)	The use of HDD and therefore the discharge of drilling fluids at the breakout location at the landfall has the potential to alter marine water quality and negatively affect benthic receptors within in the surrounding habitats. It has been estimated that up to 1,700 m³ of drilling mud will be generated total for the two bores. Constituents of the drilling fluids, including silt-clay sized particles that have a maximum theoretical range of approximately 14 km, which is the tidal excursion on a mean tide in the nearshore area around the landfall and outside Milford Haven. However, discharged drilling fluid is expected to be subject to immediate dilution processes and rapid dispersal over this distance which will result in no detectable change from the baseline beyond 500 m.	Due to the small amounts of fluid likely to be released, and dynamic nature of the coastal environment, it is anticipated that only a temporary local reduction in water quality local to the HDD breakout may occur. Much of the mud will be released in sand dominated habitat where faunal communities are generally low in diversity and abundance, and made of predominantly of infaunal species, and so unlikely to be significantly affected. Some particulates from the drilling muds may settle on bedrock but due to the dynamic nature of the shallow subtidal environment, any drilling fluid is expected to be rapidly diluted and dispersed within the marine environment, with no detectable change from the baseline beyond 500 m (see Chapter 18: Marine Water and Sediment Quality; Table 8-4). The Annex I sea cave feature of Limestone Coast of South West Wales SAC is over 500 m from the HDD exit point and thus are not anticipated to be impacted by changes water quality from HDD drilling fluids. Therefore, it is not anticipated that changes in water quality from the use of HDD will hinder the conservation objectives for the Annex I sea cave feature, and thus there is no potential for an AEoSI of the Limestone Coast of South West Wales SAC due to changes to marine water quality from the use of HDD drilling fluids. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse effect on the integrity of the site through this impact pathway.</i>	YES

Submerged or partially submerged sea caves	Impact of changes to marine water quality from accidental leaks and spills from vessels, including loss of fuel oils (construction)	Up to 17 project vessels will be on site concurrently. A deterioration in water quality from the accidental release of pollutants (e.g., oil, fuels, lubricants, chemicals) and planned release of wastewater from any of the vessels associated with the Construction Phase activities could result in increased turbidity, deposition and contamination that could affect benthic habitats and species. Therefore, any effects are expected to be localised but considering the extent of tidal movement the Zol is considered to be 14 km.	A detailed assessment of effects on Annex I habitats is included in Section 8.5.1 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf). A deterioration in water quality from the accidental release of pollutants (e.g., oil, fuels, lubricants, chemicals) and planned release of wastewater from any of the vessels associated with the proposed Project activities could result in increased turbidity, deposition and contamination that could affect benthic habitats. For example, substances from leaks and spills could also accumulate in Annex I sea caves, disrupting the unique communities utilising the cave habitats. Potential impacts can be temporary and short-term or more long-term, with the potential for contaminants to be present in the water column or settle into sediment, remaining there for prolonged periods of time. The applicant's assessment of effects takes account of best practice mitigation measures that will be adopted as part of the project. In the absence of any mitigation measures, however, there is a potential to compromise the site's conservation objectives.	NO
Submerged or partially submerged sea caves	Introduction and spread of INNS via vessel hull or ballast water (construction), from installation of hard substrate onto the seabed (operation and maintenance), and during removal of infrastructure (decommissioning)	The accidental introduction of INNS could occur from the ballast water of the vessels that may be required during the Construction phase of the proposed Project. Up to 17 project vessels will be on site concurrently. Therefore, any impacts are considered to be localised to the Offshore Development Area. The introduction of additional cable protection, required during operation and maintenance will be lower than	A detailed assessment of effects on Annex I habitats is included in Section 8.5.1 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf). The accidental introduction of INNS could occur from the vessels that will be required during the construction phase of the proposed Project. Whilst most non-native species are unlikely to become invasive, some species can out-compete native species and introduce diseases which could result in significant changes to community	NO

		during the construction phase. The Zol is considered to be localised to the Offshore Development Area, as in the Construction phase. The full details of the decommissioning will not be agreed until towards the end of the 30-year operational lifetime of the proposed Project. However, the removal of all infrastructure from the seabed is considered a worst-case scenario for this assessment. Therefore, the decommissioning phase is expected to largely mirror the construction process over a period of 12 months (see Chapter 04: Description of the Proposed Project). Therefore, the impact pathways and the associated Zol are anticipated to mirror those from the Construction phase.	composition and mortality (Bax, et al., 2003). Any introduction of INNS therefore has the potential to cause detrimental changes to the communities of the Annex I sea cave feature of the Limestone Coast of South West Wales SAC. The sensitivity of benthic habitats and species to INNS can be high, particularly for native species that can be outcompeted by non-natives. The spread of INNS in intertidal habitats is more of a concern than subtidal zones (OSPAR, 2023). As HDD is being used, exiting in the shallow subtidal zone the intertidal area will be completely avoided. Moreover, no INNS were identified in the OfECC during the project-specific benthic survey (Llyr ES - Appendix 19A: Nearshore 2023 Benthic Survey Report; Appendix 19B: Offshore 2023 Benthic Survey Report). Moreover, to date, no spread of INNS caused by submarine cabling has been documented (Taormina, et al., 2018). The applicant's assessment of effects takes account of best practice mitigation measures that will be adopted as part of the project. In the absence of any mitigation measures, however, there is a potential to compromise the site's conservation objectives.	
Submerged or partially submerged sea caves	Permanent direct loss and physical disturbance to benthic habitats and species (operation and maintenance)	The placement of hard substrates on the seafloor, including cable and scour protection, can result in the permanent loss of benthic habitats and species. Sources of permanent habitat loss associated with the proposed Project consist of: • 50 m² of protection, such as rock placement and/or concrete mattresses, per bore at HDD exit point (total footprint of 100 m²);	Several activities during the operation and maintenance phase may cause permanent direct loss and physical disturbance to the seabed habitats and benthic species. The effect of any temporary disturbance is anticipated to be localised to the Offshore Development Area. The Limestone Coast of South West Wales SAC encompasses Freshwater West where the OfECC makes landfall and transitions between the offshore and onshore elements (KP 48) (see Figure 8-3 of the Llyr ES - HRA RIAA).	YES

		• Cable protection (excluding crossings) in OfECC over a total distance of 1,600 m per cable, with a worst-case scenario berm width of 5 m (total footprint of 16,000 m² per export cable); • Four cable crossings each requiring protection (none required for Greenlink) of 200 m length and 5 m width (footprint of 8,000 m² for two cables); • 11,000 m of articulated piping, 500 mm in diameter (total footprint of 11,000 m² for both cables); • Potential placement of anchor scour protection (total footprint 24,800 m²), placement of clump weights (total footprint 8,000 m²), and drag embedment anchor or drilled pile anchors (total footprint of 6,120 m²); and • Subsea connector 64 m². Introduction of hard substrate would replace the existing seabed, leading to the permanent loss of habitats and species, by nature, will be localised to the Offshore Development Area.	As the cable will be installed via HDD between the shallow subtidal and the terrestrial environment, permanent loss and physical disturbance to intertidal habitats will be avoided. Therefore, it there will not be any permanent direct loss and physical disturbance to the sea cave feature, and thus there is no potential for an AEoSI of the Limestone Coast of South West Wales SAC due to permanent direct loss or physical disturbance. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse effect on the integrity of the site through this impact pathway.</i>	
Submerged or partially submerged sea caves	Alteration and / or indirect loss of habitat during the operational lifetime of the proposed Project (operation and maintenance)	The placement of cable protection which would be left in place for the Operational phase of the proposed Project could result in the alteration and / or loss of habitat during its operational lifetime by facilitating the growth of new biological communities and / or changing the morphology of the seabed. These include:	The Limestone Coast of South West Wales SAC encompasses Freshwater West where the OfECC makes landfall and transitions between the offshore and onshore elements (KP 48) (see Figure 8-3 of the Llyr ES - HRA RIAA). Therefore, as cable protection will not be placed within the intertidal zone, it is not considered that there will be any alteration and / or indirect loss to the Annex I sea cave feature, and thus there is no potential for an AEoSI on the Limestone Coast of South West Wales SAC due to alteration and / or indirect loss of habitat.	YES

		• The placement of protection for two cables in the OfECC (total footprint of 30,300 m²); and • The placement of cable and scour protection on IACs and associated mooring / anchoring systems and subsea connector (total footprint 56,084 m²). Therefore, effects will be localised to the Offshore Development Area.	<i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse effect on the integrity of the site through this impact pathway.</i>	
Submerged or partially submerged sea caves	Changes to habitats due to on-going scour, changes in hydrodynamics, increased sedimentation and smothering, and abrasions, from the movement of mooring chains (operation and maintenance)	Although scour protection will be in place, the mooring chains on the seabed throughout the Array Area can still lead to on-going scour, changes in hydrodynamics, increased sedimentation and smothering, and abrasions, throughout the operation and maintenance phase. Scour around these structures is considered to be very limited up to a few metres. Therefore, only habitats within, or within close proximity to the Array Area are considered to be at risk from impact.	As the Limestone Coast of South West Wales SAC is located 35.24 km from the Array Area, it is not anticipated that effects within the Array Area will hinder the conservation objectives of the Annex I sea cave feature of the SAC. Given this, the impact of these effects is not considered further in this assessment. It is likely that mechanical protection will be required in several locations along the length of the OfECC where minimum burial depth of 0.8 m cannot be reached. As discussed in further detail in Chapter 17: Physical Environment, all scour associated with the proposed Project is anticipated to be localised a few to tens of metres from the structure and tens of centimetres deep, resulting in being highly localised. Therefore, as the cable will be installed via HDD between the shallow subtidal and the terrestrial environment, the Annex I sea cave feature is anticipated to be beyond the zone of influence of any impacts associated with scour, changes in hydrodynamics and sedimentation. Therefore, it can be concluded that there is no potential for an AEO SI of the Limestone Coast of South West Wales SAC due to changes to habitats from the movement of mooring chains.	YES

			<i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse effect on the integrity of the site through this impact pathway.</i>	
Submerged or partially submerged sea caves	Disturbance to benthic habitats during planned maintenance and instances of cable failure and excavation (operation and maintenance)	Repair works are likely to be highly localised to the area of concern and therefore the spatial extent of any impacts would be small in extent, thus only impacting the features that overlap with the Offshore Development Area.	During the lifetime of the proposed Project, up to five cable repairs are expected and it is anticipated that the duration and extent of repair would be a small fraction of that proposed for the construction phase. Any repair works are likely to be highly localised to the area of concern and therefore the spatial extent of any impacts would be small in extent. Maintenance and unforeseen cable repair, although unlikely, are considered routine, and the procedures and processes are well defined and common in the industry. As the cable will be installed via HDD between the shallow subtidal and the terrestrial environment, construction in the intertidal will be avoided. Therefore, it is not considered that there will be any planned maintenance associated with the intertidal sea cave feature, and thus there is no potential for an AEoSI on the Limestone Coast of South West Wales SAC due to disturbance during planned maintenance works. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse effect on the integrity of the site through this impact pathway.</i>	YES
Submerged or partially submerged sea caves	Disturbance to benthic habitats and species due to subsea cable thermal emissions (operation and maintenance)	Operation of electricity cables generates heat due to resistance in the conductor components, which can warm the cable surface and adjacent environment (i.e. sediments; Meissner et al. (2006)). Submarine power cables have been shown to generate and dissipate heat when active, with some reaching cable surface temperatures of up to 70°C (Emeana, et al., 2016).	Operation of electricity cables generates heat due to resistance in the conductor components, which can warm the cable surface and adjacent environment (i.e. sediments; Meissner et al. (2006)). As previously discussed for the Pembrokeshire Marine SAC, any effects of thermal emissions are anticipated to be localised to within a few metres of the of the cable. The Limestone Coast of South West Wales SAC is located 35.24 km from the Array Area, and the	YES

		The proposed Project consists of two either 66 kV or 132 kV electricity export cables transmitting electricity from the wind turbines to the shore over a maximum estimated distance of 49 km. The export cables will be laid within separate trenches (which has a lower heat profile than bundled cables), with a minimum target separation of 50 m (which may decrease in the nearshore approach area) and a target burial depth of 1.2 m (a minimum depth of 0.8 m). The total length of all inter-array cables will be 17.31 km, as a worst case 17.1 km of which will be surface laid and buried to a target depth of 1.2 m (0.8 m minimum) where possible. Sediment particle size composition has been found to influence heat transfer, with coarse silts experiencing the greatest temperature change, but to a shorter distance from the source, while fine and coarse sands had a lower temperature change but a greater affected distance (Emeana, et al., 2016). The sediments within Offshore Development Area predominantly consist of sand with varying percentages of mud and gravels, and therefore, the effect of temperature change is expected to vary. For unburied and dynamic cables within the Array Area, any temperature increase will be rapidly attenuated in water and unlikely to have an effect on benthic receptors. Therefore, the Zol is anticipated to be localised to a few metres, dependent	cable will be installed via HDD between the shallow subtidal and the terrestrial environment. Therefore, it is not considered that there will be any disturbance from thermal emissions to the Annex I sea cave feature, and thus there is no potential for an AEOI Limestone Coast of South West Wales SAC due to thermal emissions. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse effect on the integrity of the site through this impact pathway.</i>	
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		upon the heat carrying capacity of particular sediments.		
Submerged or partially submerged sea caves	Effects of electromagnetic field (EMF) emissions (operation and maintenance)	Subsea cables associated with proposed Project, including both inter-array cables and export cables are known to produce EMF emissions (Hutchison, et al., 2020). EMF has the potential to affect the foraging and migratory success and behaviour of some marine species, particularly fish, but responses in some invertebrates have also been observed. EMF will be emitted for the duration of operational life of the proposed Project, from both the export and the inter-array cables. The target burial depth of subsea cables within the OfECC is 1.2 m (a minimum depth of 0.8 m) and potentially deeper in the OfECC region from KP42 to KP38 alongside the eastern boundary of Turbot Bank. Results from the project-specific EMF assessment (Appendix 19C: EMF Assessment) found that the maximum EMF strength predicted to result from the operation of the export cables at a target burial depth of 1.2 m, when a receptor is 0 m from the seabed, is 2.6 μT (microtesla). The effects of EMF reduce with distance from the cable, and the modelling shows negligible emissions beyond a distance of 2 m for this burial depth. For dynamic exposed cables in the water column, such as those within the Array Area, the maximum EMF strength at the surface of the cables has been calculated as ~5.2 mT (millitesla). This is significantly higher than the background level of geomagnetic field in the UK,	The Limestone Coast of South West Wales SAC encompasses Freshwater West where the OfECC makes landfall and transitions between the offshore and onshore elements. As the cable will be installed via HDD between the shallow subtidal and the terrestrial environment, intertidal habitats will be avoided. Therefore, it is not considered that there will be any disturbance to the Annex I sea cave feature, and thus there is no potential for an AEoSI on the Limestone Coast of South West Wales SAC due to thermal emissions. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised and there will be no adverse effect on the integrity of the site through this impact pathway.</i>	YES

		which is around 50 μ T but this also decreases rapidly with distance from the cable. At a distance of 0.44 m from the cable surface EMF is approximately equal to background levels (Appendix 19C: EMF Assessment).		
Submerged or partially submerged sea caves	Temporary disturbance to benthic habitats and species (decommissioning)	At the end of the operational life of the proposed Project, there will be a DEMP in place. Other proposed Project constraints will also be taken into consideration (e.g. safety and liability), with the least environmentally damaging option chosen if possible. The full details of the decommissioning will not be agreed until towards the end of the 30-year operational lifetime of the proposed Project. However, the removal of all infrastructure from the seabed is considered a worst-case scenario for this assessment. Therefore, the decommissioning phase is expected to largely mirror the construction process over a period of 12 months (see Chapter 04: Description of the Proposed Project). Therefore, the impact pathways and the associated Zol are anticipated to mirror those from the Construction phase.	Decommissioning will involve the removal of all infrastructure from the seabed, with the exception of the pin piles that will be cut off below the seabed surface. There are likely to be several methods required for the removal of infrastructure including the cable itself, cable and scour protection, anchors and mooring systems and the subsea connector. The Applicant intends to maximise burial during construction, wherever practically possible. During decommissioning both IAC and offshore export cables will be lifted from the water column or seabed using a grapnel and / or ROV and cables will be recovered to a vessel for onshore disposal. Therefore, the buried cable will result in disturbance to sediments as the cable is extracted. However, as the Limestone Coast of South West Wales SAC encompasses Freshwater West where the OfECC makes landfall and transitions between the offshore and onshore elements (KP 48) (see Figure 8-3 of the Llyr ES - HRA RIAA), it is not anticipated that there will be any temporary loss or physical disturbance of the Annex I sea cave feature from Decommissioning phase activities, and it can be concluded that there is no potential for an AEoSI of the Limestone Coast of South West Wales SAC due to temporary loss or physical disturbance as a result of decommissioning phase activities of the proposed Project. <i>It is concluded that the achievement of this site's conservation objectives will not be compromised</i>	YES

			and there will be no adverse effect on the integrity of the site through this impact pathway.	
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3. All Other European sites with Annex II migratory fish features

Natura 2000 site feature (from Table 3.2.2 – RED rows only)	Impact pathway(s) (from Table 3.2.2)	Description of impacts	Assessment in view of conservation objectives	Can adverse effect on site integrity be ruled out?
Cleddau Rivers SAC (55.03 km from Llŷr Array Area and 16.52 km from Llŷr Offshore Export Cable Corridor) Carmarthen Bay and Estuaries SAC (55.94 km from Llŷr Array Area and 24.63 km from Llŷr Offshore Export Cable Corridor) Cardigan Bay SAC (88.42 km from Llŷr Array Area and 50.18 km from Llŷr Offshore Export Cable Corridor) River Teifi SAC (89.87 km from Llŷr Array Area and 51.22 km from Llŷr Offshore Export Cable Corridor) River Tywi SAC (90.19 km from Llŷr Array Area and 55.07 km from Llŷr Offshore Export Cable Corridor) River Usk SAC (131.13 km from Llŷr Array Area and 98.15 km from Llŷr Offshore Export Cable Corridor) Severn Estuary Ramsar (155.94 km from Llŷr Array Area and 138.89 km from Llŷr Offshore Export Cable Corridor) Severn Estuary SAC (154.78 km from Llŷr Array Area and 132.98 km from Llŷr Offshore Export Cable Corridor) River Wye SAC (174.80 km from Llŷr Array Area and 141.17 km from Llŷr Offshore Export Cable Corridor)				
All Annex II migratory fish: River lamprey Sea lamprey Allis shad Twaite shad Atlantic salmon Sea Trout Eel	Temporary physical disturbance to migratory fish species from increased SSC and sediment deposition (construction and decommissioning)	<u>CONSTRUCTION</u> Construction activities associated with the proposed Project have the potential to temporarily increase SSC by creating sediment plumes in the water column which can travel away from the Offshore Development Area before depositing sediment elsewhere on the seabed. Several potential effects can arise from increased SSC and sediment deposition, including the clogging of gills and feeding apparatus, reduced feeding success of visual predators due to decreased visibility, and effects related to toxic conditions if sediment-bound contaminants are disturbed (Kjelland, et al., 2015). Fish migration and movement between important areas such as spawning and feeding rounds could also	The Cleddau Rivers, Carmarthen Bay and Estuaries, Cardigan Bay, Afon Teifi, River Tywi, River Usk, Severn Estuary Ramsar, Severn Estuary, and River Wye SACs are located more than 500 m away from the Offshore Project Boundary and therefore fall outside of the area where increased SSC is likely to be highest (greatest SSC and deposition to occur within 50 m of the OfECC). Moreover, the migratory fish features associated with these sites are only expected to transit through the Offshore Development Area during their migrations, and thus are considered likely to move away from any areas that are affected, returning once SSC has settled. Additionally, migratory fish tend to be pelagic, predominantly occurring in the surface layers of the water column, thus are unlikely to encounter	YES

		be impacted. The tidal excursion distance during a mean tide is approximately 8 - 10 km in the middle of the OfECC and 14 km in the nearshore on approach to the landfall. However, based on modelling undertaken, and presented in Chapter 17: Physical Environment, any measurable change in SSC during construction will be temporary and localised, with the majority of sediment in the OfECC consisting of sands and gravels which are expected to have deposited in tens of centimetres thickness on the seabed between 50 m – 500 m away of the source of disturbance. Only 6% of the surveyed sediments across nearshore and offshore sections of the Offshore Development Area consisted of mud and therefore there is the potential for a very fine layer of mud to be deposited beyond 500 m. No expected impact or change to SSC nor a measurable sediment deposition is anticipated beyond the tidal excursion distance. Therefore, the greatest tidal excursion distance of 14 km is considered to represent the maximum Zol. <u>DECOMMISSIONING</u> The removal of any infrastructure during the decommissioning phase would result in increased SSC and sediment deposition and subsequent temporary disturbance to migratory fish. It is likely that the equipment used to remove any cables would be similar to that used during the Construction phase and as such, increased SSC is considered to be similar to that during the construction	mobilised sediment in the bottom 5 m of the water column. It is not anticipated that a potential increase in SSC and deposition will hinder the conservation objectives of any of the Annex II migratory fish features. This is due to the temporary and localised nature of any effects, as well as the transitory nature of any migrating individuals. Therefore, with adherence to the embedded measures embedded into the cable construction methods (see Section 8.1.2 of the Llyr ES - HRA RIAA), there is no potential for an AEoSI on the above European sites due to increased SSC and deposition. <i>It is concluded that the achievement of these sites' conservation objectives will not be compromised and there will be no adverse effect on the integrity of the sites through this impact pathway.</i>	
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		phase, with the majority of sediment expected to have deposited in tens of centimetres thickness on the seabed between 50 – 500 m away of the source of disturbance.		
All Annex II migratory fish: • River lamprey • Sea lamprey • Allis shad • Twaite shad • Atlantic salmon	Impact of changes to marine water quality from the mobilisation of contaminants (construction)	Sediment-bound contaminants including heavy metals and Polycyclic Aromatic Hydrocarbons (PAH) could have detrimental impacts on fish and shellfish when present in concentrations above relevant thresholds and resuspended during disturbance to the seabed. Impacts can include cell apoptosis in fish immune systems. Contaminants are expected to be associated with finer materials, such as silts and clays, which make up a very low percentage of the total sediment composition in the OfECC. Sediment-bound contaminants have a maximum theoretical dispersal range of approximately 14 km, which is the tidal excursion on a mean tide in the Study Area. However, the majority of the sediment disturbed by installation and pre-installation activities is sand and gravel and will be deposited within 50 m, with limited measurable deposition of fine sediments beyond this distance and only a slight increase in SSC. The dilution processes over this distance are expected to result in very little or no detectable changes beyond 50 m.	The Cleddau Rivers, Carmarthen Bay and Estuaries, Cardigan Bay, Afon Teifi, River Tywi, River Usk, Severn Estuary Ramsar, Severn Estuary, and River Wye SACs are located more than 50 m away from the Offshore Development Area, at which point it is not expected that there will be detectable changes in sediment-bound contaminants. Moreover, the migratory fish features associated with these sites are only expected to transit through the Offshore Development Area during their migrations, and thus are considered likely to move away from any areas that are affected. Additionally, migratory fish tend to be pelagic, predominantly occurring in the surface layers of the water column, thus are unlikely to encounter mobilised sediment in the bottom 5 m of the water column. It is not anticipated that changes in water quality due to the mobilisation of contaminants will have an effect on the conservation objectives of any of the Annex II migratory fish features, and thus there is no potential for an AEoSI on the above European sites due to changes to marine water quality from the mobilisation of contaminants. <i>It is concluded that the achievement of these sites' conservation objectives will not be compromised and there will be no adverse effect on the integrity of the sites through this impact pathway.</i>	YES
All Annex II migratory fish:	Impact of changes to marine water quality from the use of drilling	The use of HDD and therefore the discharge of drilling fluids at the breakout location at the landfall has	The Cleddau Rivers, Carmarthen Bay and Estuaries, Cardigan Bay, Afon Teifi, River Tywi, River Usk, Severn Estuary Ramsar, Severn	YES

• River lamprey • Sea lamprey • Allis shad • Twaite shad • Atlantic salmon	fluids at HDD break-out points (construction)	the potential to alter marine water quality and negatively affect benthic receptors within in the surrounding habitats. It has been estimated that up to 1,700 m³ of drilling mud will be generated. Constituents of the drilling fluids have a maximum theoretical range of approximately 14 km, which is the tidal excursion on a mean tide in the nearshore area around the landfall and outside Milford Haven. However, discharged drilling fluid is expected to be subject to immediate dilution processes and rapid dispersal over this distance which will result in no detectable change from the baseline beyond 500 m. The HDD will punch out in the intertidal zone of Freshwater West, exiting at a water depth of around 3 to 8 m, up to 960 m seaward of MHWS and therefore in a dynamic area with considerable wave action and tidal water movement. Moreover, all drilling fluids used, such as bentonite, will be selected from the OSPAR List of Substances / Preparations Used and Discharged Offshore (2021) which are considered to PLONOR. The drilling fluid discharges from HDD operations will be a small number of single events over a short period of time and rapidly dispersed in an open sea coastal environment. Only receptors in the immediate vicinity of the HDD breakouts are likely to be in contact with drilling fluids, which pose little or no risk to the environment.	Estuary, and River Wye SACs are located more than 500 m away from the HDD breakout point, at which point there will be no detectable change from the baseline. Due to the limited ZoI, the migratory fish features associated with these sites are only expected to potentially transit through the Offshore Development Area during their migrations and thus are considered likely to move away from any areas that are affected. Therefore, it is not anticipated that changes in water quality from the use of HDD will have an effect on the conservation objectives of any of the Annex II migratory fish features, and thus there is no potential for an AEoSI on the above European sites due to changes in water quality due to HDD. <i>It is concluded that the achievement of these sites' conservation objectives will not be compromised and there will be no adverse effect on the integrity of the sites through this impact pathway.</i>	
All Annex II migratory fish:	Impact of changes to marine water quality from accidental leaks and spills from	A deterioration in water quality from the accidental release of pollutants (e.g., oil, fuels, lubricants, chemicals) and planned release of wastewater from any	A detailed assessment of effects on Annex II migratory fish is included in Section 8.5.2 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf).	NO

• River lamprey • Sea lamprey • Allis shad • Twaite shad • Atlantic salmon	vessels, including loss of fuel oils (construction, operation and maintenance, and decommissioning)	of the vessels associated has the potential to negatively affect water quality, with subsequent impacts to fish and shellfish species and habitats. Changes in marine water quality have a maximum theoretical range of approximately 14 km, which is the tidal excursion on a mean tide in the nearshore area around the landfall and outside Milford Haven. However, any effects are expected to be much more localised than this due to the small volumes that could be released.	Minor spills could occur through several activities including leaking hydraulic hoses or during refuelling. However, such spills are expected to be small, consisting of only a few litres. If released into the marine environment these minor spills are expected to undergo rapid dispersion and evaporation when subjected to wave action, wind, currents and light, as well as degradation via bacterial action. Consequently, any small releases are likely to break up and disperse in a short space of time, resulting in little impact to the marine environment. Larger spills, such as during collisions between vessels, have the potential to impact fish and shellfish, particularly if the spill is in shallow water. The applicant's assessment of effects takes account of best practice mitigation measures that will be adopted as part of the project. In the absence of any mitigation measures, however, there is a potential to compromise the site's conservation objectives.	
All Annex II migratory fish: • River lamprey • Sea lamprey • Allis shad • Twaite shad • Atlantic salmon	Underwater noise and vibration (construction)	Underwater noise and vibration impacts on migratory fish from construction activities are described in detail in the Pembrokeshire Marine SAC assessment table above. The activity main activity assessed is impact piling within the Array Area.	A detailed assessment of effects on Annex II migratory fish is included in Section 8.5.2 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llŷr ES - HRA RIAA.pdf). The Cleddau Rivers, Carmarthen Bay and Estuaries, Cardigan Bay, Afon Teifi, River Tywi, River Usk, Severn Estuary, River Wye SACs and the Severn Estuary Ramsar are located all more than 16.5 km away from the Llŷr Offshore Export Cable Corridor and even further from the Array Area. Additionally, all the migratory fish features designated under these SACs will interact with the proposed Project in a similar manner. Therefore, the conclusions of the assessment	YES

			undertaken for the Pembrokeshire Marine SAC (which overlaps the proposed project) also apply to the migratory fish features of the above European sites. The applicant's assessment of effects takes account of best practice mitigation measures that will be adopted as part of the project. <i>It is concluded that the achievement of these sites' conservation objectives will not be compromised and there will be no adverse effect on the integrity of the sites through this impact pathway.</i>	
All Annex II migratory fish: • River lamprey • Sea lamprey • Allis shad • Twaite shad • Atlantic salmon	Effects of EMF emissions (operation and maintenance)	Subsea cables associated with the proposed Project, including both inter-array cables and export cables are known to produce EMF emissions (Hutchison, et al., 2020). EMF has the potential to affect the foraging and migratory success and behaviour of migratory fish. EMF will be emitted for the operational life of the proposed Project, from both the export and the inter array cables. The target depth of subsea cables with the OfECC is 1.2 m (a minimum depth of 0.8 m). Results from the project-specific EMF assessment (Appendix 19C: EMF Assessment) found that the maximum EMF strength predicted to result from the operation of the export cables at a target burial depth of 1.2 m, when a receptor is 0 m from the seabed, is 2.6 μT. The effects of EMF reduce with distance from the cable, and the modelling shows negligible emissions beyond 2 m distance from the cable for 1.2 m burial depth.	A detailed assessment of effects on Annex II migratory fish is included in Section 8.5.2 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llŷr ES - HRA RIAA.pdf). The Cleddau Rivers, Carmarthen Bay and Estuaries, Cardigan Bay, Afon Teifi, River Tywi, River Usk, Severn Estuary, River Wye SACs and the Severn Estuary Ramsar are located all more than 16.5 km away from the Llŷr Offshore Export Cable Corridor and even further from the Array Area. Additionally, all the migratory fish features designated under these SACs will interact with the proposed Project in a similar manner. Therefore, the conclusions of the assessment undertaken for the Pembrokeshire Marine SAC (which overlaps the proposed project) also apply to the migratory fish features of the above European sites. Based on the conclusions for the Pembrokeshire Marine SAC, and considering the limited spatial area in which migratory fish are likely to experience effects of EMF, it is not anticipated that the effects of EMF associated with the proposed Project will hinder the conservation	YES

		For dynamic exposed cables in the water column, such as those within the Array Area, the maximum EMF strength at the surface of the cables has been calculated as ~5.2 mT. This is significantly higher than the background level of geomagnetic field in the UK, which is around 50 µT but this also decreases rapidly with distance from the cable. At a distance of 0.44 m from the cable surface EMF is approximately equal to background levels (Appendix 19C: EMF Assessment).	objectives of the Annex II migratory fish features, thus there is no potential for an AEoSI on the above European sites due to EMF emissions. <i>It is concluded that the achievement of these sites' conservation objectives will not be compromised and there will be no adverse effect on the integrity of the sites through this impact pathway.</i>	
All Annex II migratory fish: • River lamprey • Sea lamprey • Allis shad • Twaite shad • Atlantic salmon	Disturbance effects to fish (such as barrier effects, collision and entanglement) from the presence of floating offshore structures and associated tethering systems (operation and maintenance)	Floating platforms may act as fish aggregating devices, changing species composition and abundance at localised scales and foraging pressure for example, from seals (e.g.Farr et al., (2021)). The physical presence of floating offshore wind infrastructure also has the potential, depending on design, to cause barrier effects, entanglement, or collisions either directly or indirectly. Therefore, as floating offshore structures will only be present within the Array Area, entanglement will only occur within the footprint of the Array Area.	A detailed assessment of effects on Annex II migratory fish is included in Section 8.5.2 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llŷr ES - HRA RIAA.pdf). The Cleddau Rivers, Carmarthen Bay and Estuaries, Cardigan Bay, Afon Teifi, River Tywi, River Usk, Severn Estuary, River Wye SACs and the Severn Estuary Ramsar are located all more than 16.5 km away from the Llŷr Offshore Export Cable Corridor and even further from the Array Area. Additionally, all the migratory fish features designated under these SACs will interact with the proposed Project in a similar manner. Therefore, the conclusions of the assessment undertaken for the Pembrokeshire Marine SAC (which overlaps the proposed project) also apply to the migratory fish features of the above European sites. Based on the conclusions for the Pembrokeshire Marine SAC, it is not considered that Annex II migratory fish feature will aggregate, collide, or tangle with offshore structures, and thus the proposed Project will not hinder the conservation objectives of these features and there is no potential for an AEoSI on the above European	YES

			sites due to the aggregation of fish and associated effects. <i>It is concluded that the achievement of these sites' conservation objectives will not be compromised and there will be no adverse effect on the integrity of the sites through this impact pathway.</i>	
All Annex II migratory fish: • River lamprey • Sea lamprey • Allis shad • Twaite shad • Atlantic salmon	Underwater noise and vibration (operation and maintenance)	During operation of the proposed Project, underwater noise can be produced from both the rotating machinery in the turbines (non-impulsive), and from cables that may 'snap' as cable tension is released in the mooring system (impulsive). Modelling of the impact of underwater noise as a result of turbine operation, including vibration from rotating machinery in the turbines, concluded that any sound produced is expected to be very low (see Appendix 21B: Marine Mammals Noise Modelling). Moreover, cable snapping can occur when tension which has built up in the mooring lines of the floating turbines is released. This can also generate particle motion, which is known to be a key acoustic stimulus in fish (Popper, et al., 2014) could act as a barrier to the movement of diadromous fish during key migratory periods. Therefore, by its very nature, underwater noise and vibration associated with operation will only occur within the footprint of the Array Area and will be limited to a maximum estimated distance of 1 km (based on Popper et al., 2014 thresholds).	A detailed assessment of effects on Annex II migratory fish is included in Section 8.5.2 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llŷr ES - HRA RIAA.pdf). The Cleddau Rivers, Carmarthen Bay and Estuaries, Cardigan Bay, Afon Teifi, River Tywi, River Usk, Severn Estuary, River Wye SACs and the Severn Estuary Ramsar are located all more than 16.5 km away from the Llŷr Offshore Export Cable Corridor and even further from the Array Area. Additionally, all the migratory fish features designated under these SACs will interact with the proposed Project in a similar manner. Therefore, the conclusions of the assessment undertaken for the Pembrokeshire Marine SAC (which overlaps the proposed project) also apply to the migratory fish features of the above European sites. Based on the conclusions for the Pembrokeshire Marine SAC, it is not anticipated that the underwater noise and vibration associated with the operation and maintenance phase of the proposed Project will hinder the conservation objectives of the Annex II migratory fish features, thus there is no potential for an AEoSI on the above European sites due to underwater noise and vibration. <i>It is concluded that the achievement of these sites' conservation objectives will not be compromised and there will be no adverse effect</i>	YES

			<i>on the integrity of the sites through this impact pathway.</i>	
All Annex II migratory fish: • River lamprey • Sea lamprey • Allis shad • Twaite shad • Atlantic salmon	Potential effects to fish from maintenance activities (operation and maintenance)	Cable maintenance activities of the OfECC and Array Area carried out during operation will be the same, or similar, to methods employed in cable installation and will use the same type and number of vessels. Up to five cable repairs assumed to be required over the lifetime of the proposed Project.	A detailed assessment of effects on Annex II migratory fish is included in Section 8.5.2 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llŷr ES - HRA RIAA.pdf). The Cleddau Rivers, Carmarthen Bay and Estuaries, Cardigan Bay, Afon Teifi, River Tywi, River Usk, Severn Estuary, River Wye SACs and the Severn Estuary Ramsar are located all more than 16.5 km away from the Llŷr Offshore Export Cable Corridor and even further from the Array Area. Additionally, all the migratory fish features designated under these SACs will interact with the proposed Project in a similar manner. Therefore, the conclusions of the assessment undertaken for the Pembrokeshire Marine SAC (which overlaps the proposed project) also apply to the migratory fish features of the above European sites. Based on the conclusions for the Pembrokeshire Marine SAC, it is not anticipated that any impacts arising from maintenance activities will hinder the conservation objectives of the Annex II migratory fish features, thus there is no potential for an AEoSI on the above European sites due to impacts arising from maintenance activities. <i>It is concluded that the achievement of these sites' conservation objectives will not be compromised and there will be no adverse effect on the integrity of the sites through this impact pathway.</i>	YES
All Annex II migratory fish: • River lamprey	Underwater noise and vibration (decommissioning)	There is not considered to be a requirement for further impact piling associated with the Decommissioning phase (as the any piles used as the anchor solution will be cut off below the seabed level and the remaining	A detailed assessment of effects on Annex II migratory fish is included in Section 8.5.2 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llŷr ES - HRA RIAA.pdf).	YES

• Sea lamprey • Allis shad • Twaite shad • Atlantic salmon		structure recovered to the surface for onshore disposal). However, there is the potential that further geophysical surveys may be required to assess the condition and location of the cable and any cable and scour protection as well as other physical environment information. As with construction, geophysical surveys are not a marine licensable activity and are not considered further in this assessment.	The Cleddau Rivers, Carmarthen Bay and Estuaries, Cardigan Bay, Afon Teifi, River Tywi, River Usk, Severn Estuary, River Wye SACs and the Severn Estuary Ramsar are located all more than 16.5 km away from the Llŷr Offshore Export Cable Corridor and even further from the Array Area. Additionally, all the migratory fish features designated under these SACs will interact with the proposed Project in a similar manner. Therefore, the conclusions of the assessment undertaken for the Pembrokeshire Marine SAC (which overlaps the proposed project) also apply to the migratory fish features of the above European sites. Based on the conclusions for the Pembrokeshire Marine SAC, it is not anticipated that underwater noise and vibration during decommissioning activities will hinder the conservation objectives of the Annex II migratory fish features, thus there is no potential for an AEoSI on the above European sites due to impacts arising from underwater noise and vibration. <i>It is concluded that the achievement of these sites' conservation objectives will not be compromised and there will be no adverse effect on the integrity of the sites through this impact pathway.</i>	
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4. Harbour porpoise SACs

In compliance with NRW (2022) guidance (*"An Appropriate Assessment should be carried out on the closest site to the proposed plan or project location first. If an AEOSI cannot be ruled out, a sequential/iterative assessment should be carried out considering the next closest site."*), two harbour porpoise SACs have initially been taken through for the assessment of site integrity following the iterative assessment process.

Natura 2000 site feature (from Table 3.2.2 – RED rows only)	Impact pathway(s) (from Table 3.2.2)	Description of impacts	Assessment in view of conservation objectives	Can adverse effect on site integrity be ruled out?
West Wales Marine SAC (13.65 km from Llŷr Array Area and overlap with Llŷr Offshore Export Cable Corridor) Bristol Channel Approaches SAC (12.11 km from Llŷr Array Area and 1.94 km from Llŷr Offshore Export Cable Corridor) All other SACs designated for harbour porpoise listed in section 3.2 (LSE)				
Harbour porpoise	Effects of underwater noise (construction, operation and decommissioning)	The potential effects from underwater noise span all phases of the proposed Project. During construction the main activities resulting in increased underwater noise are: • Impact piling within the Array Area - (PTS-onset and disturbance); • Other activities, including route clearance, cable laying and seabed preparation – (disturbance); and • Vessel noise – (disturbance). For harbour porpoise and grey seals, noise impacts during the operational and decommissioning phases are of lower magnitude than the potential impacts during construction. During the operational period, noise sources include: • WTG operational noise from the rotating turbines – (disturbance); and • Maintenance vessel noise – (disturbance). Based on expert judgment, noise effects from the decommissioning phase will be	A detailed assessment of effects on Annex II marine mammals is included in Section 8.5.3 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf). The detailed noise modelling and assessment are provided in ES Appendix 21B: Marine Mammals Noise Modelling and ES Appendix 21C: Marine Mammal Underwater Noise Assessment, respectively. Conservation Objective 1 – The species is a viable component of the site There is no site abundance estimate to enable a quantitative assessment of site population viability. Therefore, the applicant's consideration of effects under this conservation objective focuses on the risk of any activity associated with the proposed Project that may kill, injure, or significantly disturb harbour porpoise. Mortality There was no risk of mortality identified from any activity associated with the proposed Project. The only impact pathways identified that have the potential to result in mortality are collision with project vessels, and entanglement. These are considered separately in the below rows. Auditory injury (PTS-onset) <u>Impact piling</u>: The risk of PTS-onset from impact piling is low. Modelling has predicted that an	NO

		much less than for construction, particularly as this is a floating offshore wind project. The realistic worst-case parameters considered in the assessment are provided in Table 8-19 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf).	instantaneous injury is only possible within 40 m, and that an individual would need to be within 100m at the start of piling to accrue PTS-onset under the fleeing model scenario. <u>Other construction activities (e.g. cable laying):</u> The maximum PTS-onset range predicted for all other construction activities was 421 m for harbour porpoise using the static animal approach (i.e., cable laying vessel). This would only be a risk if the individual was within this limited range for the full 24 hours, which is a highly unlikely scenario given both the vessel and the individual will be moving. <u>Operational activities:</u> The predicted noise PTS-onset ranges for operational noise impacts suggest there is no risk to harbour porpoise (PTS-onset, within 10 m for 24 hrs). Appendix 21B (Underwater Noise Impact Study) indicates that, when assessed using cumulative Sound Exposure Level (SELcum) metrics under worst-case impact piling scenarios, auditory injury (PTS-onset) in harbour porpoise may occur at distances of up to 5.8 km from the noise source (Table 21B-16). Disturbance The project design envelope identifies the potential for up to 20 days of impact piling to occur, within an overall construction window of up to 45 days, reflecting contingency for weather downtime, mobilisation, and repositioning between turbine locations. The iPCoD model is unable to represent piling durations of less than 24 hours and therefore the assessment applied a precautionary scenario of 10 days of continuous piling (24 hours per day), representing the maximum piling activity for a ten-turbine layout.	
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			This approach is considered precautionary in terms of disturbance intensity and temporal concentration. Consideration of a 20-day piling duration would broadly represent a doubling of the disturbance input to the model and would therefore be expected to result in a proportional increase in the number of animals affected. On this basis, and informed by expert judgement, even a doubling of the predicted effect would remain below 1% of the relevant harbour porpoise management unit population and would not alter the overall conclusion of negligible population-level consequences. Accordingly, the disturbance assessment is considered to reflect a realistic worst-case scenario, and no adverse effect on site integrity is predicted in relation to disturbance once mitigation is taken into account. The applicant's assessment of effects takes account of best practice mitigation measures that will be adopted as part of the project. In the absence of any mitigation measures, however, there is a potential to compromise Conservation Objective 1 of this site. Conservation Objective 2 – No significant disturbance of the species within the site Noise disturbance has been assessed using fixed Effective Deterrent Ranges (EDRs), which represent empirically derived distances within which harbour porpoise are likely to exhibit disturbance responses to underwater noise. This approach aligns with JNCC's preferred methodology for Habitats Regulations Assessment purposes, recognising the uncertainty associated with detailed noise propagation modelling.	
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			JNCC (2020) states that: "Noise disturbance within an SAC from a plan/project, individually or in combination, is considered to be significant if it excludes harbour porpoises from more than: <i>1. 20% of the relevant area of the site in any given day, or</i> <i>2. an average of 10% of the relevant area of the site over a season"</i> <u>1. Percentage daily footprint overlap with harbour porpoise SACs:</u> Assessment of the daily footprint overlap indicates that none of the noise generating activities breach the spatial threshold of 20% of any relevant area, in any given day. In the summer season, the maximum spatial overlap for the West Wales Marine SAC is 16.83% as a result of an UXO clearance event occurring in the worst-case location within the OfECC. (Note: UXO clearance is not considered within this HRA). There is no possibility of an overlap from any activity relating to the winter season protected area. Bristol Channel Approaches SAC is a winter site and so the overlap has been assessed using the winter worst-case noise modelling parameters (18.1% as a result of an UXO clearance event occurring in the worst-case location within the OfECC). (Note: UXO clearance is not considered within this HRA). However, construction activities usually occur during the clement weather conditions in the summer months, thus, if there were no activities during the winter season, the area of overlap would in effect be zero. <u>2. Seasonal percentage overlap with harbour porpoise SACs:</u>	
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			The seasonal percentage overlap for both the West Wales Marine, and the Bristol Channel Approaches are lower than the 10% seasonal threshold. <i>No AEOI can be concluded when considered against Conservation Objective 2</i> Conservation Objective 3 – The supporting habitats and processes relevant to harbour porpoise and their prey are maintained The activities considered in relation to any potential impact to the supporting habitats and prey availability for harbour porpoise within this conservation objective are: accidental pollution or contamination; indirect impacts to prey species; EMF emissions; and barrier effects from the offshore structures. These are considered separately in the below rows.	
Harbour porpoise	Accidental pollution or contamination (construction, operation and maintenance, and decommissioning)	There is the potential for pollutants, such as hydrocarbons from fuel to be accidentally released from vessels, equipment, and machinery; however, the amount of fuel that may be accidentally released from the proposed Project vessels is small (see Chapter 28: Shipping and Navigation)	The applicant's assessment of effects takes account of best practice mitigation measures that will be adopted as part of the project. In the absence of any mitigation measures, however, there is a potential to compromise the site's conservation objectives.	NO
Harbour porpoise	Collision with Project vessels (construction, operation and decommissioning)	During construction (including pre-construction), operation and decommissioning, there is a potential risk of injury or mortality from vessel strike. Injury or mortality can result from blunt force trauma or propeller strike, with the severity influenced by factors such as the type and size of vessel, and the speed at which the vessel is travelling.	Harbour porpoise is highly mobile and has been observed to avoid vessel activity (Erbe, et al., 2019; Palka & Hammond, 2001). It is likely that harbour porpoise, if close to any vessel, will be able to take evasive action to avoid collision. Most of the vessels to be used during the construction (including pre-construction) stage are relatively small (e.g. tugs, vessels carrying ROVs, Crew Transfer Vessels (CTVs), barges and Rigid Hulled Inflatable Boats (RIBs)). These have higher speeds than larger vessels but are also manoeuvrable so can more easily stop or	NO

			move to avoid any animals, when detected. Larger vessels (e.g. cable lay vessel), whilst less manoeuvrable, will be travelling at lower speeds meaning they have more time to detect and avoid animals, and for any animals themselves to take evasive action (Schoeman, et al., 2020). ES Chapter 21: Marine Mammals concluded that the likelihood of a vessel strike was negligible for harbour porpoise. The applicant's assessment of effects takes account of best practice mitigation measures that will be adopted as part of the project. In the absence of any mitigation measures, however, there is a potential to compromise the site's conservation objectives.	
Harbour porpoise	Potential for indirect effects through impacts upon prey species (construction, operation and maintenance, and decommissioning)	Activities carried out during construction, operation, and maintenance, and decommissioning of the proposed Project, may cause changes to prey availability that could impact on harbour porpoise. Potential activities of relevance include those that physically disturb the seabed, as well as those activities generating underwater noise.	Harbour porpoise eat a varied diet in the UK relating to the local availability of food. Prey typically include clupeids (e.g. herring and sprat), gadoids (e.g. cod and whiting), sandeels and flatfish (Pierce, et al., 2004; Canning, et al., 2008; Tetley, et al., 2008; Jansen, et al., 2010; Evans & Hinter, 2013; Leopold, et al., 2018). The ES (Chapter 20: Fish and Shellfish Ecology) did not identify any significant effects to any fish species. However, should prey availability or distribution be affected, individuals may have to forage for different prey, or increase the time spent foraging. Which would result in adverse energetic consequences and a reduction in available time for resting or reproduction (Ransijn, 2022). However, harbour porpoise is highly mobile and wide-ranging, and it is anticipated individuals would be able to forage in alternative areas if required. Given the expected adaptability of harbour porpoise to find alternative prey species or locations, and the lack of impacts identified to any fish species, this impact is not	YES

			anticipated to negatively affect prey availability for harbour porpoise. During the operational phase, the presence of floating WTG structures could function as an artificial reef potentially resulting in increased foraging opportunities. At the Dutch windfarm, Egmond aan Zee, echolocation activity of harbour porpoise was noted to be higher during the operational phase than pre-construction (Scheidat, et al., 2011). Therefore, there is the potential for a positive effect on the availability of prey species. Any potential impact to prey species from the construction phase of the proposed Project is therefore likely to be short term and reversible. <i>It is concluded that the achievement of these sites' conservation objectives will not be compromised and there will be no adverse effect on the integrity of the sites through this impact pathway.</i>	
Harbour porpoise	Effects of EMF emissions	EMFs have the potential to alter the behaviour of marine organisms able to detect these fields. The design of the proposed Project includes up to two electricity export cables transmitting electricity from the wind turbines to the shore over a distance of 49 km. The export cables will be within separate trenches that are 10 m apart and with a target depth of 1.2 m. In addition, there will be inter-array cables with a total length of 17.31 km linking the turbines.	Some cetacean species may be able to detect variations in magnetic fields (Normandeau, et al., 2011; OSC, 2022), however, marine mammals in general, are considered to be less sensitive to EMFs than electro-receptive species, such as elasmobranchs, which may utilise natural EMFs during migration, orientation and prey location (Copping & Hemery, 2020). Whilst there is limited evidence of marine mammals' detection (Taormina, et al., 2018), there is no evidence to suggest EMFs from marine renewable energy devices or subsea cables have any adverse impact on marine mammals. Any detection of EMF is likely to only occur in close proximity to the cables (approx. 50 m) (OSC, 2022), and given the highly mobile nature of both harbour porpoise and grey seal, individuals are unlikely to remain in close proximity to the cables or array for any significant length of time (Copping &	YES

			Hemery, 2020; OSC, 2022). Therefore, impact from EMF emissions for all marine mammals is expected to be minimal. <i>It is concluded that the achievement of these sites' conservation objectives will not be compromised and there will be no adverse effect on the integrity of the sites through this impact pathway.</i>	
Harbour porpoise	Barrier effects from mooring lines and cables between platform and anchor	The physical presence of floating offshore wind infrastructure also has the potential, depending on design, to cause barrier effects to movement of marine mammals.	The Array Area is located 13.65 km from the West Wales Marine SAC and 12.11 km from the Bristol Channel Approaches SAC. Therefore, there is no risk of barrier effects within the SACs. However, it is worth considering whether the presence of the structures may affect the movement of harbour porpoise to and / or from any SAC. There is a lack of information specific to barrier effects resulting from floating WTG structures; however, there are several studies which have examined the impact on marine mammals in fixed-turbine wind farms. Long-term monitoring at the Horns Rev and Nysted offshore windfarms in Denmark, frequently recorded harbour porpoise within the array area of the operational wind farms, with populations comparable to pre-construction levels within two years of operation (Diederichs, et al., 2008). Studies from parallel industries enable the conclusion that the physical presence of floating WTG is unlikely to cause a barrier effect (OSC, 2022). The proposed Project's infrastructure may therefore enable additional foraging opportunities instead of representing a barrier to movement. Furthermore, at 0.05 km² the proposed Project Array Area is small. Should individuals transit around the Array Area, it is highly unlikely that the increased distance travelled will have any impact on their energy budgets are affected to the extent that an individual might experience a loss of	YES

			fitness. The risk of the proposed Project being a barrier to movement is therefore negligible. <i>It is concluded that the achievement of these sites' conservation objectives will not be compromised and there will be no adverse effect on the integrity of the sites through this impact pathway.</i>	
Harbour porpoise	Entanglement with mooring lines and cables	There is the concern that inter-array cables and mooring lines connected to the floating WTG may present a primary entanglement risk to harbour porpoise and grey seal, and therefore a risk of death or injury.	The risk to small marine mammals from the moorings and lines is thought to be minimal because the cables and mooring lines are often taut and of a diameter large enough to preclude entanglement. A secondary entanglement risk is considered to exist should lost or discarded fishing gear ('ghost gear') become caught on the moorings or cables. The conclusion in ES Chapter 21: Marine Mammals was that the anticipated likelihood of this occurring is low. The applicant's assessment of effects takes account of best practice mitigation measures that will be adopted as part of the project. In the absence of any mitigation measures, however, there is a potential to compromise the site's conservation objectives.	NO

5. Grey seal SACs

In compliance with NRW (2022) guidance (*"An Appropriate Assessment should be carried out on the closest site to the proposed plan or project location first. If an AEOSI cannot be ruled out, a sequential/iterative assessment should be carried out considering the next closest site."*), one grey seal SAC has initially been taken through for the assessment of site integrity following the iterative assessment process.

Natura 2000 site feature (from Table	Impact pathway(s) (from Table 3.2.2)	Description of impacts	Assessment in view of conservation objectives	Can adverse effect on site integrity be ruled out?
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3.2.2 – RED rows only)				
Pembrokeshire Marine SAC (23.04 km from Llŷr Array Area and overlap with Llŷr Offshore Export Cable Corridor (OfECC)) All other SACs designated for grey seal listed in section 3.2 (LSE)				
Grey seal	Effects of underwater noise (construction, operation and decommissioning)	The potential effects from underwater noise span all phases of the proposed Project. During construction the main activities resulting in increased underwater noise are: • Impact piling within the Array Area - (PTS-onset and disturbance); • Other activities, including route clearance, cable laying and seabed preparation – (disturbance); and • Vessel noise – (disturbance). For harbour porpoise and grey seals, noise impacts during the operational and decommissioning phases are of lower magnitude than the potential impacts during construction. During the operational period, noise sources include: • WTG operational noise from the rotating turbines – (disturbance); and • Maintenance vessel noise – (disturbance). Based on expert judgement, noise effects from the decommissioning phase will be much less than for construction, particularly as this is a floating offshore wind project.	A detailed assessment of effects on Annex II marine mammals is included in Section 8.5.3 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llŷr ES - HRA RIAA.pdf). The detailed noise modelling and assessment are provided in ES Appendix 21B: Marine Mammals Noise Modelling and ES Appendix 21C: Marine Mammal Underwater Noise Assessment, respectively. Conservation Objective 1 – The population is maintaining itself on a long-term basis as a viable component of its natural habitat Mortality There was no risk of mortality identified from any activity associated with the proposed Project. The only impact pathways identified that have the potential to result in mortality are collision with project vessels, and entanglement. These are considered separately in the below rows. Auditory injury (PTS-onset) Noise modelling (see Chapter 21: Marine Mammals; Appendix 21C: Marine Mammal Underwater Noise Assessment) has indicated that the risk of auditory injury (PTS-onset) for grey seals is low. For all activities modelled, the predicted number of individuals at risk of PTS-onset is less than one. The implementation of the activity specific Marine Mammal Management Plan (MMMP) (Appendix 04A: Outline CEMP) will further reduce any residual risk. Disturbance	NO

		The realistic worst-case parameters considered in the assessment are provided in Table 8-19 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf).	Interim Population Consequences of Disturbance (iPCoD) modelling indicated that there was no difference in the population trajectory when an unimpacted (no construction) scenario was compared to an impacted (with construction) scenario. The applicant's assessment of effects takes account of best practice mitigation measures that will be adopted as part of the project. In the absence of any mitigation measures, however, there is a potential to compromise Conservation Objective 1 of this site. Conservation Objective 2 – The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future. To consider whether the range within the SAC and adjacent inter-connected areas is not constrained, hindered or reduced, the results from noise disturbance, visual disturbance, population modelling (iPCoD) and barrier effects are drawn upon for this assessment. <i>Disturbance</i> For all activities, apart from impact piling (using dose response curve metric) assessment indicates that there are low numbers of individuals at potential risk of disturbance. The highest being 91 individuals predicted for the cable laying activity; however, this relates to well under 1% of the management population and therefore does not present a risk to the population. The number of individuals predicted to be impacted by piling disturbance is 848 (1.36% of the management population). Furthermore, any disturbance that occurs as a	
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			result of construction (or decommissioning) activity will be short term and reversible. Population modelling Population impact modelling (iPCoD) has shown that there is no negative impact at the population level, using the worst-case estimate of 848 individuals at risk of disturbance. The applicant's assessment of effects takes account of best practice mitigation measures that will be adopted as part of the project. In the absence of any mitigation measures, however, there is a potential to compromise Conservation Objective 2 of this site.	
Grey seal	Potential effects to supporting habitats and species	Activities carried out during construction, operation, and maintenance, and decommissioning of the proposed Project, may cause changes to habitats and species required to support grey seal resulting in changes to the distribution, abundance or population dynamics of the species.	Conservation Objective 3 – The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance, and populations dynamics of the species within the site and population beyond the site is stable or increasing. Important considerations include; distribution, extent, structure, function and quality of habitat, and prey availability and quality. The export cable route crosses the Pembrokeshire Marine SAC. The total habitat loss in the entire OfECC is 0.055 km². This is a small percentage area in comparison to the Pembrokeshire Marine SAC total area of 1,380 km². ES Chapter 19: Benthic Ecology has concluded that the significance of effect for all potential impacts assessed (including temporary loss and physical disturbance to benthic habitats and species) to be not significant. Therefore, there is no possibility for the proposed Project's construction within the Pembrokeshire Marine SAC to impact the presence, condition and	YES

			diversity of habitats and species relevant for the grey seal. There were no significant effects to fish and shellfish ecology identified as a result of the proposed Project (Chapter 20: Fish and Shellfish Ecology). NRW's indicative site condition assessment of Pembrokeshire Marine SAC (NRW, 2018d), suggest that the growth of pup production within the site indicates that the supporting habitat is functioning well. The loss and/or physical disturbance to the seabed habitats and benthic species from the proposed Project's activities, has been concluded as temporary, with a rapid recovery of seabed habitats and species (Chapter 19: Benthic Ecology). Therefore, it can be concluded that there is no lasting impact to the presence, abundance, condition and diversity of habitats required to support the population of grey seals in the SAC.	
Grey seal	Airborne sound and visual disturbance at haul-outs	During the construction phase, there is the possibility that vessels and construction activities close to the coast along the offshore export cable corridor route may disturb grey seals hauled out on the shore. When disturbed, animals may flush into the water, potentially resulting in energy losses or impacts on breeding success.	A detailed assessment of effects on Annex II marine mammals is included in Section 8.5.3 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf). Pupping in Welsh waters occurs from August to December, with September and October being the busiest months. Adult seals congregate in large numbers on beaches between December and February to moult. August through to February are therefore key sensitive months. According to SCOS (2021; 2022), the three main haul-out sites utilised by breeding grey seals located close to the proposed Project are Ramsey Island, Skomer MCZ and north Pembrokeshire, with the closest being Skomer MCZ (approximately 38.39 km from the Array Area, 11.57 km from the OfECC and 13 km from	NO

			the landfall at Freshwater West respectively). Given the distances from these key grey seal haul-outs / breeding sites to the Array Area, OfECC and landfall site, it is unlikely that airborne sound from the pre-construction and construction works (e.g. pin-piling, cable laying), will disturb hauled-out seals at these key haul-out sites. There is also the potential for vessels transiting from the port to the array area to cause disturbance to grey seal haul-outs. However, it is not expected that any vessels would pass close enough (within 200 – 300m) or be travelling at sufficient speed to result in any disturbance to hauled-out animals at these key sites. Additionally, there is no evidence that disturbance at haul-out sites is currently a concern at the population level (SCOS, 2021). Therefore, general vessel construction activity is unlikely to contravene Conservation Objective 2. The proposed HDD landfall site is Freshwater West, and construction is anticipated to take between 24 and 64 weeks. Although the landfall location does not appear to be a key location within the SAC for grey seals to haul out, as mentioned above, seals could be present anywhere along the Pembrokeshire coastline. The applicant's assessment of effects takes account of best practice mitigation measures that will be adopted as part of the project. In the absence of any mitigation measures, however, there is a potential to compromise the site's conservation objectives.	
Grey seal	Accidental pollution or contamination (construction, operation and maintenance, and decommissioning)	There is the potential for pollutants, such as hydrocarbons from fuel to be accidentally released from vessels, equipment, and machinery; however, the amount of fuel that may be accidentally released from the proposed	The applicant's assessment of effects takes account of best practice mitigation measures that will be adopted as part of the project. In the absence of any mitigation measures, however, there is a potential to compromise the site's conservation objectives.	NO

		Project vessels is small (see Chapter 28: Shipping and Navigation)		
Grey seal	Collision with Project vessels (construction, operation and decommissioning)	During construction (including pre-construction), operation and decommissioning, there is a potential risk of injury or mortality from vessel strike. Injury or mortality can result from blunt force trauma or propeller strike, with the severity influenced by factors such as the type and size of vessel, and the speed at which the vessel is travelling.	The likelihood of seals being struck by vessels is low. Seals are also highly mobile and agile and are likely to respond to any vessel's presence. In the Moray Firth, harbour seals were shown to utilise waters occupied by vessels when moving between foraging and haul-out sites; however, animals tended to remain beyond 20 m from vessels with only three instances of seals coming within 20m of vessels over 2,241 days (Onoufriou, et al., 2016). Most of the vessels to be used during the construction (including pre-construction) stage are relatively small (e.g. tugs, vessels carrying ROVs, Crew Transfer Vessels (CTVs), barges and Rigid Hulled Inflatable Boats (RIBs)). These have higher speeds than larger vessels but are also manoeuvrable so can more easily stop or move to avoid any animals, when detected. Larger vessels (e.g. cable lay vessel), whilst less manoeuvrable, will be travelling at lower speeds meaning they have more time to detect and avoid animals, and for any animals themselves to take evasive action (Schoeman, et al., 2020). ES Chapter 21: Marine Mammals concluded that the likelihood of a vessel strike was negligible for grey seal. The applicant's assessment of effects takes account of best practice mitigation measures that will be adopted as part of the project. In the absence of any mitigation measures, however, there is a potential to compromise the site's conservation objectives.	NO
Grey seal	Potential for indirect effects through impacts upon prey	Activities carried out during construction, operation, and maintenance, and decommissioning of the proposed	Grey seals are generalist feeders, foraging mainly on the seabed taking a wide variety of	YES

	species (construction, operation and maintenance, and decommissioning)	Project, may cause changes to prey availability that could impact on grey seal. Potential activities of relevance include those that physically disturb the seabed, as well as those activities generating underwater noise.	prey including sandeels, gadoids (mainly whiting) and flatfish (mainly sole) (NRW, 2018e). The ES (Chapter 20: Fish and Shellfish Ecology) did not identify any significant effects to any fish species. However, should prey availability or distribution be affected, individuals may have to forage for different prey, or increase the time spent foraging. Which would result in adverse energetic consequences and a reduction in available time for resting or reproduction (Ransijn, 2022). Grey seal is highly mobile and wide-ranging, it is anticipated individuals would be able to forage in alternative areas, if required. Grey seals forage in the open sea, and frequently forage over 100 km between haul-out sites. Foraging trips can last anywhere between 1 and 30 days (SCOS, 2022). Therefore, it is likely that grey seals can supplement their diet with other available species if required, making them resilient to changes in prey availability. During the operational phase, the presence of floating WTG structures could function as an artificial reef potentially resulting in increased foraging opportunities. A tracking study undertaken by Russell et al. (2014) demonstrated that harbour and grey seals move between WTGs in a grid-like pattern, and often repeatedly returning to the array area potentially for foraging. Therefore, there is the potential for a positive effect on the availability of prey species. Any potential impact to prey species from the construction phase of the proposed Project is therefore likely to be short term and reversible. <i>It is concluded that the achievement of these sites' conservation objectives will not be compromised and there will be no adverse effect on the integrity of the sites through this impact pathway.</i>	
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Grey seal	Effects of EMF emissions	EMFs have the potential to alter the behaviour of marine organisms able to detect these fields. The design of the proposed Project includes up to two electricity export cables transmitting electricity from the wind turbines to the shore over a distance of 49 km. The export cables will be within separate trenches that are 10 m apart and with a target depth of 1.2 m. In addition, there will be inter-array cables with a total length of 17.31 km linking the turbines.	Some cetacean species may be able to detect variations in magnetic fields (Normandeau, et al., 2011; OSC, 2022), however, marine mammals in general, are considered to be less sensitive to EMFs than electro-receptive species, such as elasmobranchs, which may utilise natural EMFs during migration, orientation and prey location (Copping & Hemery, 2020). Whilst there is limited evidence of marine mammals' detection (Taormina, et al., 2018), there is no evidence to suggest EMFs from marine renewable energy devices or subsea cables have any adverse impact on marine mammals. Any detection of EMF is likely to only occur in close proximity to the cables (approx. 50 m) (OSC, 2022), and given the highly mobile nature of both harbour porpoise and grey seal, individuals are unlikely to remain in close proximity to the cables or array for any significant length of time (Copping & Hemery, 2020; OSC, 2022). Therefore, impact from EMF emissions for all marine mammals is expected to be minimal. <i>It is concluded that the achievement of these sites' conservation objectives will not be compromised and there will be no adverse effect on the integrity of the sites through this impact pathway.</i>	YES
Grey seal	Barrier effects from mooring lines and cables between platform and anchor	The physical presence of floating offshore wind infrastructure also has the potential, depending on design, to cause barrier effects to movement of marine mammals.	The Array Area is located 23.04 km from Pembrokeshire Marine SAC. Therefore, there is no risk of barrier effects within the SACs. However, it is worth considering whether the presence of the structures may affect the movement of grey seal to and / or from any SAC. There is a lack of information specific to barrier effects resulting from floating WTG structures; however, there are several studies which have examined the impact on marine mammals in fixed-turbine wind farms. A tracking study undertaken by Russell et al. (2014) demonstrated that harbour and grey seals move between	YES

			WTGs in a grid-like pattern, and often repeatedly returning to the array area. Studies from parallel industries enable the conclusion that the physical presence of floating WTG is unlikely to cause a barrier effect (OSC, 2022). The proposed Project's infrastructure may therefore enable additional foraging opportunities instead of representing a barrier to movement. Furthermore, at 0.05 km² the proposed Project Array Area is small. Should individuals transit around the Array Area, it is highly unlikely that the increased distance travelled will have any impact on their energy budgets are affected to the extent that an individual might experience a loss of fitness. The risk of the proposed Project being a barrier to movement is therefore negligible. <i>It is concluded that the achievement of these sites' conservation objectives will not be compromised and there will be no adverse effect on the integrity of the sites through this impact pathway.</i>	
Grey seal	Entanglement with mooring lines and cables	There is the concern that inter-array cables and mooring lines connected to the floating WTG may present a primary entanglement risk to harbour porpoise and grey seal, and therefore a risk of death or injury.	The risk to small marine mammals from the moorings and lines is thought to be minimal because the cables and mooring lines are often taut and of a diameter large enough to preclude entanglement. A secondary entanglement risk is considered to exist should lost or discarded fishing gear ('ghost gear') become caught on the moorings or cables. The conclusion in ES Chapter 21: Marine Mammals was that the anticipated likelihood of this occurring is low. The applicant's assessment of effects takes account of best practice mitigation measures that will be adopted as part of the project. In the absence of any mitigation measures, however,	NO

			there is a potential to compromise the site's conservation objectives.	
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6. Skomer, Skokholm and the Seas off Pembrokeshire SPA

The proposed Project Array Area lies out with Skomer, Skokholm and the Seas off Pembrokeshire SPA, at 37.16 km distance. Due to this distance, it is only Conservation Objective 1 (population viability) which is relevant to consider (under Appropriate Assessment) for seabirds which may forage in, or otherwise fly through, the proposed Array Area.

Appropriate Assessment against Conservation Objective 1 addresses those potential impacts where the estimated mortalities arising from WTGs located in the proposed Array Area could potentially lead to a population consequence for the SPA qualifying interests under consideration.

The OfECC directly impacts the marine section of Skomer, Skokholm and the Seas off Pembrokeshire SPA, where the cable will run through the SPA en route to landfall. In this regard, it is Conservation Objective 2 (distribution of birds within the SPA) and Conservation Objective 3 (maintenance of supporting habitat) which are relevant to consider under Appropriate Assessment.

Natura 2000 site feature (from Table 3.2.2 – RED rows only)	Impact pathway(s) (from Table 3.2.2)	Description of impacts	Assessment in view of conservation objectives	Can adverse effect on site integrity be ruled out?
Skomer, Skokholm and the Seas off Pembrokeshire SPA (37.16 km from Llŷr Array Area)				
Guillemot Puffin Razorbill	Disturbance and / or displacement associated with vessels and other offshore activities (construction and decommissioning)	Birds may be disturbed and / or displaced from foraging or resting areas, which could lead to a reduction in foraging opportunities or an increase in energy expenditure, resulting in a decrease in survival or productivity. Disturbance and / or displacement may be caused by the presence of vessels, as well as above water noise and visual disturbance associated with other construction and decommissioning activities including pre-installation surveys, route preparation, cable installation and piling or drilling.	A detailed assessment of effects on Annex I marine ornithology features is included in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llŷr ES - HRA RIAA.pdf) with additional information provided in the Addendum to the Environmental Statement. Conservation Objective 2: The distribution of the population should be being maintained, or where appropriate increasing. Construction impacts relating to cable installation at sea (including HDD in nearshore waters) will	YES

Guillemot Manx shearwater Puffin Razorbill	Effects of underwater noise on diving seabirds (construction and decommissioning)	Underwater sound may be generated by a range of proposed Project activities, including, piling or drilling, cable installation and vessel traffic. Diving seabirds may be temporarily displaced or disturbed by underwater noise generating activities, which could result in behavioural changes, such as changes in swimming direction, diving duration, possible avoidance of the area and reduce foraging success. There is potential for impact on seabirds which typically dive for prey as part of their foraging behaviour, which includes gannet, Manx shearwater, common guillemot, razorbill, and puffin.	not disturb or affect the distribution of the birds while they are on their island nest sites, and there will be no alteration to the distribution of the nest sites themselves. Therefore only the birds 'at sea' activities and distribution need further consideration. In this regard, the cable-laying vessels will be moving slowly and will be static for long periods, with limited associated noise emissions (either through the air or underwater). Any disturbance or displacement of seabirds (including when they're diving underwater) around the cable-laying activities (including placement of cable protection) will be temporary and localised. Therefore, it can be concluded there will be no significant or long-term change in the 'at sea' distribution of birds within the SPA arising from installation of the export cables for the proposed Project. Therefore, Conservation Objective 2 will not be compromised.	
All seabird species features: Kittiwake Guillemot Lesser Black-backed Gull Razorbill Puffin European storm petrel	Indirect effects due to changes in habitat and / or prey availability and distribution (construction, operation and maintenance, and decommissioning)	There is potential for changes to the abundance and distribution of prey from activities which disturb the seabed, resulting in an increase in suspended sediment, or generation of underwater noise. This may reduce the foraging success of seabirds, which could result in reduced survival and productivity. There is potential for impact from this impact on all seabird species which have been screened in. Loss of supporting habitat or other potential impacts on prey species (particularly arising from cable protection for the OfECC and/or turbine anchorage) may indirectly affect marine ornithological receptors.	A detailed assessment of effects on Annex I marine ornithology features is included in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf) with additional information provided in the Addendum to the Environmental Statement. Conservation Objective 3: There should be sufficient habitat, of sufficient quality, to support the population in the long term. Benthic mapping undertaken for the project (see ES Chapter 19: Benthic Ecology) shows the sediment is primarily deep circalittoral sand offshore with circalittoral coarse sediment closer to shore, both of which are highly dynamic environments. While there may be temporary habitat disturbance during cable-laying, it will be highly localised and not long-term.	YES

Manx shearwater		Prey species may also be disturbed by the vessel movements associated with operational and maintenance activities. Installation of scour protection or cable protection may also lead to some habitat loss for key prey species. This may potentially reduce seabird foraging success.	It is anticipated that 79% of the cable will be buried, with 21% requiring cable protection (primarily closer to shore). As assessed in ES Chapter 19: Benthic Ecology, the long-term habitat loss associated with cable protection is negligible in relation to the wider resource and it will not materially change the available prey resource for the SPA seabirds. Therefore, there will be no long-term effects on the survival rate of any of the protected SPA seabird populations under consideration and Conservation Objective 3 will not be compromised.	
Guillemot Razorbill Puffin European storm petrel Manx shearwater	Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities	Birds may be disturbed or displaced from foraging or resting areas, which could lead to a reduction in foraging opportunities or an increase in energy expenditure, resulting in a decrease in survival or productivity. Disturbance and / or displacement may be caused by the presence of wind turbines, or by associated maintenance activities such as the presence of vessels.	A detailed assessment of effects on Annex I marine ornithology features is included in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf) with additional information provided in the Addendum to the Environmental Statement. Supporting information is provided in ES Appendix 22E: Marine Ornithology Project Alone and Cumulative Impact Scenarios and ES Appendix 22F: Marine Ornithology Population Modelling. Conservation Objective 1: The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term. Breeding season and annual assessments using the displacement matrix have been presented for lesser black-backed gull, Manx shearwater, kittiwake, and razorbill do not exceed the respective thresholds determined. There will therefore be no significant or quantifiable population-level effects arising from the proposed	YES
All seabird species features: Kittiwake Guillemot Lesser Black-backed Gull	Barrier effect due to presence of WTGs	The presence of the WTGs may result in a barrier effect to bird movements, which could lead to a reduction in foraging opportunities or an increase in energy expenditure, resulting in a decrease in survival or productivity.		

Razorbill Puffin European storm petrel Manx shearwater			Project on these qualifying interests either alone or in combination. For guillemot and puffin, mortalities have been further explored using the Natural England population viability analysis (PVA) tool. The population modelling results presented in ES Appendix 22F: Marine Ornithology Population Modelling report for guillemot and puffin, show that neither project alone nor cumulative impacts will significantly affect population growth rate or compromise conservation objective 1 for either species (or for guillemot as part of the seabird assemblage). Storm petrel have been considered qualitatively, as requested by NRW and JNCC, because digital aerial surveys may potentially under record them (see Section 22.6.2 of ES Chapter 22: Marine Ornithology). In this regard, there is no reason to think this species is at any more risk from the proposed Project than the others for which quantitative assessment has been possible. On this basis, it seems safe to conclude that there will be no adverse population-level effects to storm petrel arising from either displacement / barrier effects or from collision risk (including in relation to nocturnal lighting).	
Kittiwake Lesser Black-backed Gull	Collision risk with WTGs	Birds in flight are at direct risk of injury or mortality due to collision with the offshore wind turbines. The risk is greatest for species which fly at higher altitude (e.g., kittiwake, gulls, and gannet) as they are more likely to fly at a height that overlaps with the rotor blade swept area, while species that remain at low altitude in flight (e.g., shearwaters) have a very low risk of collision.		
Kittiwake Lesser Black-backed Gull	Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure (increased collision risk)	The introduction of floating platforms and associated infrastructure presents the opportunity for new roosting habitat and may provide easier access to foraging grounds. The floating platform may also provide a perching and resting location during foraging or in storm conditions. While NRW, JNCC and RSPB have raised the possibility of increased collision risk (with WTGs) if birds are attracted into the wind farm in this manner; such risk only relates to kittiwake and lesser black-backed gull and is encompassed by the level of precaution already inherent in collision risk modelling.		

European storm petrel Manx shearwater	Attraction of nocturnal seabirds to proposed Project infrastructure lighting (increased collision risk)	Nocturnal seabirds, such as shearwaters and petrels, may be attracted to the offshore proposed Project infrastructure lighting causing them to become disorientated and / or increase their risk of collision with the offshore arrays. Therefore, there is potential for impact on Manx shearwater and storm petrel from this impact.		
Guillemot Razorbill Puffin Manx shearwater	Entanglement with mooring lines and cables	Floating offshore wind farms require mooring lines to connect turbines with their anchors, potentially posing an entanglement risk for diving seabirds, primarily from derelict fishing gear which may have become caught on the moorings. In this regard, there is potential for impact on seabirds which typically dive for prey as part of their foraging behaviour, including gannet, Manx shearwater, common guillemot, razorbill, and puffin. Kittiwake, lesser black-backed gull, and storm-petrel typically feed at the water surface and so are unlikely to be subject to this risk.	A detailed assessment of effects on Annex I marine ornithology features is included in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf) with additional information provided in the Addendum to the Environmental Statement. Conservation Objective 1: The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term. While entanglement is fatal for the individual affected, the risk of such an event occurring is very low and reduced further by regular inspection of the mooring lines. The applicant's assessment of effects takes account of best practice mitigation measures that will be adopted as part of the project. In the absence of any mitigation measures, however, there is a potential to compromise the site's conservation objectives.	NO

7. Grassholm SPA

The conservation objective for gannet at Grassholm SPA requires consideration only of those impact pathways associated with the proposed Project which could give rise to mortality of the birds, potentially resulting in a population consequence. Therefore, a

number of impacts originally screened in have not been considered further. These include indirect effects due to changes in habitat and/or species availability and distribution and effects of underwater noise.

Natura 2000 site feature (from Table 3.2.2 – RED rows only)	Impact pathway(s) (from Table 3.2.2)	Description of impacts	Assessment in view of conservation objectives	Can adverse effect on site integrity be ruled out?
Grassholm SPA (37.29 km from Llŷr Array Area)				
Gannet	Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities	Birds may be disturbed or displaced from foraging or resting areas, which could lead to a reduction in foraging opportunities or an increase in energy expenditure, resulting in a decrease in survival or productivity. Disturbance and / or displacement may be caused by the presence of wind turbines, or by associated maintenance activities such as the presence of vessels.	A detailed assessment of effects on Annex I marine ornithology features is included in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llŷr ES - HRA RIAA.pdf) with additional information provided in the Addendum to the Environmental Statement. Supporting information is provided in ES Appendix 22E: Marine Ornithology Project Alone and Cumulative Impact Scenarios and ES Appendix 22F: Marine Ornithology Population Modelling. Conservation Objective 1: The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term. While project alone impacts on gannet do not exceed the 1% baseline mortalities, cumulative impacts have been modelled on a precautionary basis as these do exceed the stated threshold when the upper limit of the displacement matrix impact range advised by NRW and JNCC is modelled (80% / 10%). Even at such high rates for the species (particularly the 10% mortality rate) there will be no population-level consequence of concern (as	YES
Gannet	Barrier effect due to presence of WTGs	The presence of the WTGs may result in a barrier effect to bird movements, which could lead to a reduction in foraging opportunities or an increase in energy expenditure, resulting in a decrease in survival or productivity.		
Gannet	Collision risk with WTGs (including increased risk due to floating platforms providing additional roosting habitat)	Birds in flight are at direct risk of injury or mortality due to collision with the offshore wind turbines. The risk is greatest for species which fly at higher altitude (e.g., kittiwake, gulls, and gannet) as they are more likely to fly at a height that overlaps with the rotor blade swept area, while species that remain at low altitude in flight (e.g., shearwaters) have a very low risk of collision.		

			evidenced by Table 22-10 and Figure 22-6 of Appendix 22F: Marine Ornithology Population Modelling) and Conservation Objective 1 will not be compromised.	
Gannet	Entanglement with mooring lines and cables	Floating offshore wind farms require mooring lines to connect turbines with their anchors, potentially posing an entanglement risk for diving seabirds, primarily from derelict fishing gear which may have become caught on the moorings. In this regard, there is potential for impact on seabirds which typically dive for prey as part of their foraging behaviour, including gannet, Manx shearwater, common guillemot, razorbill, and puffin. Kittiwake, lesser black-backed gull, and storm-petrel typically feed at the water surface and so are unlikely to be subject to this risk.	A detailed assessment of effects on Annex I marine ornithology features is included in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf) with additional information provided in the Addendum to the Environmental Statement. Conservation Objective 1: The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term. While entanglement is fatal for the individual affected, the risk of such an event occurring is very low and reduced further by regular inspection of the mooring lines. The applicant's assessment of effects takes account of best practice mitigation measures that will be adopted as part of the project. In the absence of any mitigation measures, however, there is a potential to compromise the site's conservation objectives.	NO

8. Irish Sea Front SPA

Due to the distance between the proposed Project Array Area and the Irish Sea Front SPA (a distance of about 248.49 km), only Conservation Objective 3 is relevant to consider in respect of the proposed Project.

Conservation Objective 1 relates to any disturbance of Manx shearwater while they are within the SPA, and Conservation Objective 2 relates to impacts on prey within the frontal mixing area, located within and protected by the SPA designation.

Therefore only Conservation Objective 3 is relevant, relating to access of the SPA from the identified breeding colonies, where there may be a pathway to impact arising from the proposed Project.

Therefore, a number of impacts originally screened in have not been considered further. These include indirect effects due to changes in habitat and/or species availability and distribution; effects of underwater noise; disturbance and / or displacement due to the presence of WTGs and associated maintenance activities; entanglement with mooring lines and cables; and increased collision risk due to additional roosting habitat on floating platforms.

Natura 2000 site feature (from Table 3.2.2 – RED rows only)	Impact pathway(s) (from Table 3.2.2)	Description of impacts	Assessment in view of conservation objectives	Can adverse effect on site integrity be ruled out?
Irish Sea Front SPA (248.49 km from Lŷr Array Area)				
Manx shearwater	Barrier effect due to presence of WTGs	The presence of the WTGs may result in a barrier effect to bird movements, which could lead to a reduction in foraging opportunities or an increase in energy expenditure, resulting in a decrease in survival or productivity.	A detailed assessment of effects on Annex I marine ornithology features is included in Section 8.5.4 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Lŷr ES - HRA RIAA.pdf) with additional information provided in the Addendum to the Environmental Statement.	YES
Manx shearwater	Attraction of nocturnal seabirds to proposed Project infrastructure lighting	Nocturnal seabirds, such as shearwaters and petrels, may be attracted to the offshore proposed Project infrastructure lighting causing them to become disorientated and / or increase their risk of collision with the offshore arrays. Therefore, there is potential for impact on Manx shearwater and storm petrel from this impact.	Conservation Objective 3: Ensure connectivity between the site and its supporting habitats and Manx shearwater breeding colonies is maintained. It is extremely unlikely that the proposed Project will act as a barrier disrupting bird flight paths between Lundy and the Irish Sea Front SPA, considering the small size of the Array Area and limited number of turbines (max 10). In this regard, there is negligible risk that project infrastructure lighting will increase collision risk to Manx shearwater flying between Lundy and the Irish Sea Front.	

4.2 Assessment of the project taking into account additional mitigating measures, conditions or restrictions

Natura 2000 Feature (from Table 4.1 – ‘NO’ rows only)	Description of adverse effect(s)	Can adverse effect(s) be mitigated?	Description of mitigation measures, and how they would be applied (e.g. contractual obligations, consent conditions)	Can adverse effect on site integrity be ruled out?
Pembrokeshire Marine SAC • <i>Estuaries</i> • <i>Large shallow inlets and bays</i> • <i>Reefs</i> • <i>Sandbanks which are slightly covered by sea water all the time</i> • <i>Mudflats and sandflats not covered by seawater at low tide</i> • <i>Coastal lagoons</i> • <i>Atlantic salt meadows</i> <i>Glaucopuccinellietalia maritima</i>	Impact of changes to marine water quality from accidental leaks and spills from vessels, including loss of fuel oils (construction)	YES	To ensure the risk of accidental spills is as low as reasonably practicable, the proposed Project will adhere to relevant guidance (e.g., Pollution Prevention Guidance). A CEMP (Appendix 04A: Outline CEMP) including an Emergency Spill Response Plan and Waste Management Plan and Vessel Management Plan (VMP) will be implemented during the Construction phase of the proposed Project to minimise the risk of accidental releases. A Water Quality and Pollution Management Plan will also be implemented. The Plans referred to above will require submission and subsequent approval prior to commencement of the proposed activities. This will be secured through licence conditions. Control measures and a Shipboard Oil Pollution Emergency Plan (SOPEP) will be in place and adhered to under MARPOL Annex I requirements for all vessels. Vessels will be required to comply with the International Regulations for Preventing Collisions at Sea (1972) and regulations relating to International Convention for the Prevention of Pollution from Ships (MARPOL Convention 73/78) specifically including compliance with Annex IV on pollution by sewage and prevention of air pollution by ships; and Annex V on pollution by garbage from ships with the aim of preventing and minimising pollution from ships.	YES

• <i>Submerged or partially submerged sea caves</i>				
Pembrokeshire Marine SAC • <i>Estuaries</i> • <i>Large shallow inlets and bays</i> • <i>Reefs</i> • <i>Sandbanks which are slightly covered by sea water all the time</i> • <i>Mudflats and sandflats not covered by seawater at low tide</i> • <i>Coastal lagoons</i> • <i>Atlantic salt meadows</i> <i>Glaucopuccinellietalia maritima</i> • <i>Submerged or partially submerged sea caves</i>	Permanent direct loss and physical disturbance to benthic habitats and species (operation and maintenance)	YES	To ensure all Annex 1 benthic habitats are avoided in the OfECC additional post-consent surveys will be undertaken as part of the CSIP and CBRA, and the subsequent careful placement of the articulated cable in sensitive areas (such as Annex 1 reef), alongside sufficient evidence to demonstrate that the cable will not move or mitigation that is appropriate to ensure the cable remains in place. The development of clear criteria to identify and differentiate between mixed gravel and low resemblance stony reef habitat is required to ensure that the latter feature is not impacted by any boulder clearance activities. This will also be captured and addressed as part of the post-consent CSIP and CBRA. The above can be secured through a licence condition.	YES
Pembrokeshire Marine SAC	Introduction and spread of INNS via	YES	Best practice measures will be adopted to minimise INNS. In particular, all proposed Project vessels will adhere to the Ballast Water	YES

• Estuaries • Large shallow inlets and bays • Reefs • Sandbanks which are slightly covered by sea water all the time • Mudflats and sandflats not covered by seawater at low tide • Coastal lagoons • Atlantic salt meadows • <i>Glaucopuccinellietalia maritima</i> • Submerged or partially submerged sea caves	vessel hull or ballast water (construction), from installation of hard substrate onto the seabed (operation and maintenance), and during removal of infrastructure (decommissioning)		Management Convention with the aim of preventing the spread of INNS from any release of ballast water (IMO, 2017). In addition, vessels will be required to adhere to the IMO guidelines for the control and management of ships' biofouling to minimise the transfer of invasive aquatic species (Biofouling Guidelines). All construction work will be undertaken in accordance with an INNS Management Plan. An Outline INNS plan has been prepared (Appendix 04B: INNS Plan). These measures, implemented via the CEMP and INNS Plan (Appendix 04A: Outline CEMP; Appendix 04B: INNS Plan) will lower the probability of INNS transmission from vessels to the benthic habitat and their spread and establishment. The above can be secured through a licence condition.	
Pembrokeshire Marine SAC • River lamprey • Sea lamprey • Allis shad • Twaite shad	Impact of changes to marine water quality from accidental leaks and spills from vessels, including loss of fuel oils (construction, operation and maintenance, and decommissioning)	YES	To ensure the risk of accidental spills is as low as reasonably practicable, the proposed Project will adhere to relevant guidance (e.g., Pollution Prevention Guidance). A CEMP (Appendix 04A: Outline CEMP) including an Emergency Spill Response Plan and Waste Management Plan and Vessel Management Plan (VMP) will be implemented during the Construction phase of the proposed Project to minimise the risk of accidental releases. Control measures and a Shipboard Oil Pollution Emergency Plan (SOPEP) will be in place and adhered to under MARPOL Annex I requirements for all vessels. Vessels will be required to comply with the International Regulations for	YES

			Preventing Collisions at Sea (1972) and regulations relating to International Convention for the Prevention of Pollution from Ships (MARPOL Convention 73/78) specifically including compliance with Annex IV on pollution by sewage and prevention of air pollution by ships; and Annex V on pollution by garbage from ships with the aim of preventing and minimising pollution from ships.	
Pembrokeshire Marine SAC • <i>River lamprey</i> • <i>Sea lamprey</i> • <i>Allis shad</i> • <i>Twaite shad</i>	Underwater noise and vibration (construction)	YES	JNCC guidelines (2010) will be adopted during UXO clearance activities to further minimise the potential risk of injury to marine mammals. These measures will also potentially reduce the risk to migratory fish species. Low order detonation techniques will also be adopted where possible and where multiple explosive charges are present, wherever possible, the smaller charges shall be detonated first to maximise the 'soft-start' effect. A soft-start procedure will also be employed during impact piling activities. The above measures will be secured through a marine licence condition.	YES
Pembrokeshire Marine SAC Otter	The construction phase, specifically the cable burial activities, is likely to cause disturbance through noise and visually the feature.	YES	The Otter survey report has identified numerous otter protection & mitigation measures which can be used to avoid adverse effect on site integrity. These include the following: • Two months before site clearance & construction works are due to start, trail cameras should be set up at key areas of scrub and checked by the ecologist 2 weeks before start of works, and on the day before start of works. If a female with cubs is recorded during this period it may be necessary to delay the start of works until the family group has left that area of scrub. • Key areas of scrub must be retained intact (i.e untrimmed) and should be protected from accidental damage and disturbance. • The cable route should be adjusted to be as far from potential breeding sites as possible. With regard to site 5, positioning the cable route to the south of the linear band of scrub would avoid severing a corridor of habitat and allow any otter present to move northwards away from the works. • Night-time working is to be avoided • Key scrub habitats close to the main development area should be protected from damage & disturbance by erecting barrier fencing (e.g. Heras fencing).	YES

			To ensure appropriate mitigation measures are adhered to, the licence holder will be required to submit an Otter mitigation Plan to the Licensing Authority Prior to the commencement of any cable burial activity or cable burial associated activities. This will be secured through licence conditions.	
Limestone Coast of South West Wales SAC <i>Submerged or partially submerged sea caves</i>	Impact of changes to marine water quality from accidental leaks and spills from vessels, including loss of fuel oils (construction)	YES	To ensure the risk of accidental spills is as low as reasonably practicable, the proposed Project will adhere to relevant guidance (e.g., Pollution Prevention Guidance). A CEMP (Appendix 04A: Outline CEMP) including an Emergency Spill Response Plan and Waste Management Plan and Vessel Management Plan (VMP) will be implemented during the Construction phase of the proposed Project to minimise the risk of accidental releases. Control measures and a Shipboard Oil Pollution Emergency Plan (SOPEP) will be in place and adhered to under MARPOL Annex I requirements for all vessels. Vessels will be required to comply with the International Regulations for Preventing Collisions at Sea (1972) and regulations relating to International Convention for the Prevention of Pollution from Ships (MARPOL Convention 73/78) specifically including compliance with Annex IV on pollution by sewage and prevention of air pollution by ships; and Annex V on pollution by garbage from ships with the aim of preventing and minimising pollution from ships.	YES
Limestone Coast of South West Wales SAC <i>Submerged or partially submerged sea caves</i>	Introduction and spread of INNS via vessel hull or ballast water (construction), from installation of hard substrate onto the seabed (operation and maintenance), and during removal of infrastructure (decommissioning)	YES	Best practice measures will be adopted to minimise INNS. In particular, all proposed Project vessels will adhere to the Ballast Water Management Convention with the aim of preventing the spread of INNS from any release of ballast water (IMO, 2017). In addition, vessels will be required to adhere to the IMO guidelines for the control and management of ships' biofouling to minimise the transfer of invasive aquatic species (Biofouling Guidelines). All construction work will be undertaken in accordance with an INNS Management Plan. An Outline INNS plan has been prepared (Appendix 04B: INNS Plan). These measures, implemented via the CEMP and INNS Plan (Appendix 04A: Outline CEMP; Appendix 04B: INNS Plan) will lower the probability of INNS transmission from vessels to the benthic habitat and their spread and establishment. The above can be secured through a licence condition.	YES

All Other European site with Annex II migratory features • <i>River lamprey</i> • <i>Sea lamprey</i> • <i>Allis shad</i> • <i>Twaite shad</i> • <i>Atlantic salmon</i>	Impact of changes to marine water quality from accidental leaks and spills from vessels, including loss of fuel oils (construction, operation and maintenance, and decommissioning)	YES	To ensure the risk of accidental spills is as low as reasonably practicable, the proposed Project will adhere to relevant guidance (e.g., Pollution Prevention Guidance). A CEMP (Appendix 04A: Outline CEMP) including an Emergency Spill Response Plan and Waste Management Plan and Vessel Management Plan (VMP) will be implemented during the Construction phase of the proposed Project to minimise the risk of accidental releases. Control measures and a Shipboard Oil Pollution Emergency Plan (SOPEP) will be in place and adhered to under MARPOL Annex I requirements for all vessels. Vessels will be required to comply with the International Regulations for Preventing Collisions at Sea (1972) and regulations relating to International Convention for the Prevention of Pollution from Ships (MARPOL Convention 73/78) specifically including compliance with Annex IV on pollution by sewage and prevention of air pollution by ships; and Annex V on pollution by garbage from ships with the aim of preventing and minimising pollution from ships.	YES
Harbour porpoise SACs	Effects of underwater noise (specifically from piling)	YES	The Applicant has committed to employing marine mammal mitigation (see Appendix 04A: Outline CEMP and P11-LYR-4.2.3-PLA-0003-Outline Marine Mammal Mitigation Plan. The level of risk will be revisited in the risk assessment that will accompany the EPS and Marine Licences once the proposed Project's build out parameters are refined (Piling Strategy) pre-construction. The above can be secured through a licence condition.	YES
Harbour porpoise SACs	Accidental pollution or contamination (construction, operation and maintenance, and decommissioning)	YES	To ensure the risk of accidental spills is as low as reasonably practicable, the proposed Project will adhere to relevant guidance (e.g., Pollution Prevention Guidance). A CEMP (Appendix 04A: Outline CEMP) including an Emergency Spill Response Plan and Waste Management Plan and Vessel Management Plan (VMP) will be implemented during the Construction phase of the proposed Project to minimise the risk of accidental releases. Control measures and a Shipboard Oil Pollution Emergency Plan (SOPEP) will be in place and adhered to under MARPOL Annex I requirements for all vessels. Vessels will be required to comply with the International Regulations for Preventing Collisions at Sea (1972) and regulations relating to International Convention for the Prevention of Pollution from Ships (MARPOL Convention 73/78) specifically including compliance with Annex IV on pollution by sewage and prevention of air pollution by ships; and Annex V on pollution by garbage from ships with the aim of preventing and minimising pollution from ships.	YES

Harbour porpoise SACs	Collision with Project vessels (construction, operation and decommissioning)	YES	The applicant has committed to employing a Vessel Management Plan (VMP) (see Appendix 04A: Outline CEMP and P11-LYR-4.2.3-PLA-0003-Outline Marine Mammal Mitigation Plan) which will ensure that all vessels move along predictable routes when transiting and will also define how vessels should be handled in the presence of marine mammals in order to minimise the risk of collision. This will allow animals to safely take evasive action if required. The above can be secured through a licence condition.	YES
Harbour porpoise SACs	Entanglement with mooring lines and cables	YES	The Applicant has committed to regular inspections of the moorings and cables, and the removal of any ghost gear found (see Appendix 04A: Outline CEMP and P11-LYR-4.2.3-PLA-0003-Outline Marine Mammal Mitigation Plan). This could be secured through a licence condition. Therefore, when considering the regular inspection commitment, entanglement is not likely to affect the species viability in the SAC or the wider region. There will also be a requirement to submit a Marine Mammal Management Plan post consent for approval prior to commencement of licensed activities. This can be secured through licence conditions.	YES
Grey seal SACs	Effects of underwater noise (specifically from piling)	YES	The Applicant has committed to employing marine mammal mitigation (see Appendix 04A: Outline CEMP and P11-LYR-4.2.3-PLA-0003-Outline Marine Mammal Mitigation Plan). The level of risk will be revisited in the risk assessment that will accompany the EPS and Marine Licences once the proposed Project's build out parameters are refined (Piling Strategy) pre-construction. The above can be secured through a licence condition.	YES
Grey seal SACs	Airborne sound and visual disturbance at haul-outs	YES	All vessel crew will be made aware of seal disturbance indicators via toolbox talks and will adhere to good practice movement when close to shore. Furthermore, the cable laying vessel will be moving slowly when cable laying and therefore unlikely to cause flushing to any hauled-out seals. As additional mitigation, the Applicant will investigate whether a seasonal restriction is able to be put in place if required, such that activity on the shoreline would not take place between August and	YES

			February. Alternatively, should construction be necessary during this period, the Applicant will commit to winter surveys of the landfall site post submission to obtain greater detail on the number of mother-pup pairs likely to be in that specific location.	
Grey seal SACs	Accidental pollution or contamination (construction, operation and maintenance, and decommissioning)	YES	To ensure the risk of accidental spills is as low as reasonably practicable, the proposed Project will adhere to relevant guidance (e.g., Pollution Prevention Guidance). A CEMP (see Appendix 04A: Outline CEMP and P11-LYR-4.2.3-PLA-0003-Outline Marine Mammal Mitigation Plan) including an Emergency Spill Response Plan and Waste Management Plan and Vessel Management Plan (VMP) will be implemented during the Construction phase of the proposed Project to minimise the risk of accidental releases. Control measures and a Shipboard Oil Pollution Emergency Plan (SOPEP) will be in place and adhered to under MARPOL Annex I requirements for all vessels. Vessels will be required to comply with the International Regulations for Preventing Collisions at Sea (1972) and regulations relating to International Convention for the Prevention of Pollution from Ships (MARPOL Convention 73/78) specifically including compliance with Annex IV on pollution by sewage and prevention of air pollution by ships; and Annex V on pollution by garbage from ships with the aim of preventing and minimising pollution from ships.	YES
Grey seal SACs	Collision with Project vessels (construction, operation and decommissioning)	YES	The applicant has committed to employing a Vessel Management Plan (VMP) (see Appendix 04A: Outline CEMP and P11-LYR-4.2.3-PLA-0003-Outline Marine Mammal Mitigation Plan). which will ensure that all vessels move along predictable routes when transiting and will also define how vessels should be handled in the presence of marine mammals in order to minimise the risk of collision. This will allow animals to safely take evasive action if required. The above can be secured through a licence condition.	YES
Grey seal SACs	Entanglement with mooring lines and cables	YES	The Applicant has committed to regular inspections of the moorings and cables, and the removal of any ghost gear found. This could be secured through a licence condition. Therefore, when considering the regular inspection commitment, entanglement is not likely to affect the species viability in the SAC or the wider region.	YES

			There will also be a requirement to submit a Marine Mammal Management Plan post consent for approval prior to commencement of licensed activities. This can be secured through licence conditions.	
Skomer, Skokholm and the Seas off Pembrokeshire SPA: <i>Guillemot</i> <i>Razorbill</i> <i>Puffin</i> <i>Manx shearwater</i>	Entanglement with mooring lines and cables	YES	Regular inspection of the mooring lines and removal of entangled debris to be implemented during operations and maintenance via the Project Environmental Management Plan (PEMP). The above can be secured through a licence condition.	YES
Grassholm SPA: <i>Gannet</i>	Entanglement with mooring lines and cables	YES	Regular inspection of the mooring lines and removal of entangled debris to be implemented during operations and maintenance via the PEMP. The above can be secured through a licence condition.	YES

4.3 Concluding the appropriate assessment of the project alone

(a) If the right hand column of Table 4.1 and Table 4.2 (if applicable) is 'YES' for all features	It has been ascertained that the proposal, when considered alone, will not adversely affect the integrity of any Natura 2000 sites.
(b) If there are any 'NO's in the right hand column of Table 4.1 that have not been resolved to 'YES' through mitigation measures identified in Table 4.2	It has not been ascertained that the proposal, when considered alone, will not adversely affect the integrity of one or more Natura 2000 sites.
	YES

(c) Are there any residual effects of the project (net of any mitigation measures identified) which, though insignificant on their own, could be significant if considered in combination with the effects of other plans or projects?	
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5 In combination assessment

5.1 Identifying possible in combination effects

1. Annex II Migratory Fish Species

BLUE impact pathway from Table 3.2 and/or Residual effect (from appropriate assessment in section 4)	Natura 2000 site feature(s) concerned	Other plans/projects with effects that might interact with the effects of the project to render its effects significant (if any)	Nature of the in-combination effect (if any)	Is there likely to be any significant in-combination effect, in view of the site's conservation objectives?

Temporary physical disturbance to migratory fish species from increased SSC and sediment deposition (construction)	Pembrokeshire Marine SAC and All Other European sites with Annex II migratory fish features: • River lamprey • Sea lamprey • Allis shad • Twaite shad • Atlantic salmon	• Llŷr 2 Floating Offshore Wind Project (Offshore Wind Pre-Application)	There is potential for simultaneous construction of the proposed Project and Llŷr 2, which is anticipated to commence in 2027 / 2028. Llŷr 2 will adopt the same OfECC as the proposed Project. In terms of any in-combination effects of increased SSC and deposition, in-combination effect would only apply to the finer fragments of the particulate matter, as the largest sediment plumes and highest levels of increased SSC are associated with the disturbance of sediments which have a high proportion of fine particulate matter, such as muds and clays. Considering most of the sediment in the OfECC and the Array Area is dominated by sand and gravel particles, the likelihood of plumes overlapping is therefore reduced significantly. Thus, should the works be temporally separated between projects, it is considered there will be sufficient time to allow any localised increases in SSC to disperse and dilute. The majority of the sediment disturbed by the proposed Project will be deposited within 50 m and therefore effects are considered to be highly localised to the individual project.	NO
Underwater noise and vibration	Pembrokeshire Marine SAC and All Other European sites with Annex II migratory fish features: • River lamprey • Sea lamprey • Allis shad • Twaite shad • Atlantic salmon	• Llŷr 2 Floating Offshore Wind Project (Offshore Wind Pre-Application)	For impacts associated with underwater noise and vibration, the Llŷr 2 Floating Offshore Wind Project is assumed to have similar effects as that of the proposed Project, assuming that similar methods will be used. If these activities occurred concurrently, they will be short-term and temporary. If disturbance effects were to occur between the proposed Project and the Llŷr 2 Floating Offshore Wind Project, then a maximum disturbance distance of 2km is predicted from each Array Area. However, as these sites are further	NO

			offshore, this distance would not be large enough to result in a barrier to fish migration and individuals would be able to return once the temporary activities were completed. Given the limited area of underwater noise effects from rotating machinery and cable 'snapping' of the mooring system, and the transitory presence of any migratory fish in the Array Area, the proposed Project identified no AEoSI alone on any of the SACs considered within the assessment. It is not anticipated that the cumulative impact of Llŷr 2 will hinder the conservation objectives of any Annex II migratory fish features of any of the SACs considered, and there is no potential for in-combination with the Llŷr 2 Floating Offshore Wind Project.	
		• Erebus (Erebus Offshore wind Consented)	Although the Pembrokeshire Marine and Cleddau Rivers SACs were screened into the Erebus HRA, it was concluded that there was no potential for LSE on the Annex II migratory fish features of either SAC (MarineSpace Ltd, 2021). For in-combination effects to occur for underwater sound, activities would need to be conducted simultaneously. Construction is not anticipated to run concurrently. Therefore, as the proposed Project identified no AEoSI alone on either of the Pembrokeshire Marine and Cleddau Estuaries SACs and considers there to be no in-combination effects of either site with the Erebus project.	NO
		• Dragon Energy Project (Inshore Energy Pre-Application)	The Dragon Energy project is in concept / planning stages. Therefore, as the proposed Project can draw the conclusion of no AEoSI with mitigation alone, it is for the Dragon Energy Project to demonstrate	NO

			no in-combination effects. Moreover, the Dragon Energy Project is located terrestrially, thus any impacts to Annex II migratory fish are considered to be very limited.	
		• South Pembrokeshire Demonstration Zone (Wave Energy – Pre-application)	Given the limited area and temporary nature of the impacts associated with the proposed Project and the transitory presence of any migratory fish in the vicinity of the projects, the proposed Project has identified no AEoSI alone on any of the sites considered within the assessment. Therefore, it is not anticipated that the cumulative impact of South Pembrokeshire Demonstration Zone will hinder the conservation objectives of any Annex II migratory fish features of any of the SACs considered, and there is no potential for in-combination with the South Pembrokeshire Demonstration Zone.	NO
		• Trivane Demonstrator (Offshore wind Pre-application)	The Trivane Demonstrator is in the pre-application stages. Accordingly, it is not known if any Annex II migratory fish of the SACs will be affected. Therefore, as the proposed Project can draw the conclusion of no AEoSI with mitigation alone, it is for the Trivane Demonstrator to demonstrate no in-combination effects.	NO
		• White Cross (Offshore wind Application submitted)	Given the limited area and temporary nature of the impacts associated with the proposed Project and the transitory presence of any migratory fish in the vicinity of the projects, the proposed Project has identified no AEoSI alone on any of the sites considered within the assessment. Therefore, it is not anticipated that the cumulative impact of White Cross will hinder the conservation objectives of any Annex II migratory fish features of any of the SACs considered, and there is no potential for in-combination with the White Cross.	NO

		• Crown Estate Leasing Round 5 (15-27 km from OfECC) (Offshore wind Pre-application)	The Carmarthen Bay and Estuaries SAC and Severn Estuary Ramsar site have not been scoped in for the Crown Estate Leasing Round 5 HRA (The Crown Estate, 2024), therefore no pathway has been identified for in-combination effects on these SACs. The Crown Estate Leasing Round 5 HRA Screening concluded that the interaction with Annex II migratory fish will be limited to collision (The Crown Estate, 2024). Therefore, therefore no pathway has been identified for in-combination effects on the Pembrokeshire Marine, Cleddau Rivers, Cardigan Bay, Afon Teifi, River Tywi, River Usk, Severn Estuary, or River Wye SACs.	NO
		• Telecommunication Cable – FR 0000084477 00001 (Telecommunications cable Consented)	There is little information of the telecommunications cable currently available. It is considered that beyond 5 km the impact of underwater noise and vibration associated with the proposed Project will be limited to disturbance effects. These activities will be temporary in nature, and given the transitory presence of any migratory fish in the vicinity of the proposed Project, no AEoSI alone on any of the sites and it is considered that there is no in-combination effects of any of the sites with the telecommunication cables.	NO
		• Nobel Banks (Mineral Aggregate Site Operational)	There is little information of the Nobel Banks aggregate site currently available. It is considered that beyond 5 km the impact of underwater noise and vibration associated with the proposed Project will be limited to disturbance effects. These activities will be temporary in nature, and given the transitory presence of any migratory fish in the vicinity of the proposed Project, no AEoSI alone on any of the sites and it is considered that there is no in-combination effects of any of the sites with the existing operations at Nobel Banks.	NO

		• Crown Estate Leasing Round 5 (39-61 km from OfECC) (Offshore wind Pre-application)	The Carmarthen Bay and Estuaries SAC and Severn Estuary Ramsar site have not been scoped in for the Crown Estate Leasing Round 5 HRA (The Crown Estate, 2024), therefore no pathway has been identified for in-combination effects on these SACs. The Crown Estate Leasing Round 5 HRA Screening concluded that the interaction with Annex II migratory fish will be limited to collision (The Crown Estate, 2024). Therefore, therefore no pathway has been identified for in-combination effects on the Pembrokeshire Marine, Cleddau Rivers, Cardigan Bay, Afon Teifi, River Tywi, River Usk, Severn Estuary, or River Wye SACs.	NO
Effects of EMF emissions (operation and maintenance)	Pembrokeshire Marine SAC and All Other European sites with Annex II migratory fish features: • River lamprey • Sea lamprey • Allis shad • Twaite shad • Atlantic salmon	• Llŷr 2 Floating Offshore Wind Project (Offshore Wind Pre-Application)	Given the limited area of EMF emissions from IACs and the transitory presence of any migratory fish in the Array Area, the proposed Project identified no AEoSI alone on any of the SACs considered within the assessment. It is not anticipated that the cumulative impact of Llŷr 2 will hinder the conservation objectives of any Annex II migratory fish features of any of the SACs considered, and there is no potential for in-combination with the Llŷr 2 Floating Offshore Wind Project.	NO
		• Erebus (Erebus Offshore wind Consented)	Although the Pembrokeshire Marine and Cleddau Rivers SACs were screened into the Erebus HRA, it was concluded that there was no potential for LSE on the Annex II migratory fish features of either SAC (MarineSpace Ltd, 2021). Any impact of EMF is anticipated to be highly localised to each project. Therefore, as the proposed Project identified no AEoSI alone on either of the Pembrokeshire Marine and Cleddau Estuaries SACs and considers there to be no in-combination effects of either site with the Erebus project.	NO

Disturbance effects to fish (such as barrier effects, collision and entanglement) from the presence of floating offshore structures and associated tethering systems (operation and maintenance)	Pembrokeshire Marine SAC and All Other European sites with Annex II migratory fish features: • River lamprey • Sea lamprey • Allis shad • Twaite shad • Atlantic salmon	• Llŷr 2 Floating Offshore Wind Project (Offshore Wind Pre-Application)	Given the limited area of disturbance from floating offshore infrastructure, and the transitory presence of any migratory fish in the Array Area, the proposed Project identified no AEoSI alone on any of the SACs considered within the assessment. It is not anticipated that the cumulative impact of Llŷr 2 will hinder the conservation objectives of any Annex II migratory fish features of any of the SACs considered, and there is no potential for in-combination with the Llŷr 2 Floating Offshore Wind Project.	NO
Impacts of changes to marine water quality	Pembrokeshire Marine SAC and All Other European sites with Annex II migratory fish features: • River lamprey • Sea lamprey • Allis shad • Twaite shad • Atlantic salmon	• Dragon Energy Project (Inshore Energy Pre-Application)	The Dragon Energy project is in concept / planning stages. Therefore, as the proposed Project can draw the conclusion of no AEoSI with mitigation alone, it is for the Dragon Energy Project to demonstrate no in-combination effects. Moreover, the Dragon Energy Project is located terrestrially, thus any impacts to Annex II migratory fish are considered to be very limited.	NO
		• South Pembrokeshire Demonstration Zone (Wave Energy – Pre-application)	Given the limited area and temporary nature of the impacts associated with the proposed Project and the transitory presence of any migratory fish in the vicinity of the projects, the proposed Project has identified no AEoSI alone on any of the sites considered within the assessment. Therefore, it is not anticipated that the cumulative impact of South Pembrokeshire Demonstration Zone will hinder the conservation objectives of any Annex II migratory fish features of any of the SACs considered, and there is no potential for in-combination with the South Pembrokeshire Demonstration Zone.	NO
		• Trivane Demonstrator (Offshore wind Pre-application)	The Trivane Demonstrator is in the pre-application stages. Accordingly, it is not known if any Annex II migratory fish of the SACs will be affected. Therefore, as the	NO

			proposed Project can draw the conclusion of no AEoSI with mitigation alone, it is for the Trivane Demonstrator to demonstrate no in-combination effects.	
		• White Cross (Offshore wind Application submitted)	Given the limited area and temporary nature of the impacts associated with the proposed Project and the transitory presence of any migratory fish in the vicinity of the projects, the proposed Project has identified no AEoSI alone on any of the sites considered within the assessment. Therefore, it is not anticipated that the cumulative impact of White Cross will hinder the conservation objectives of any Annex II migratory fish features of any of the SACs considered, and there is no potential for in-combination with the White Cross.	NO
		• Crown Estate Leasing Round 5 (15-27 km from OfECC) (Offshore wind Pre-application)	The Carmarthen Bay and Estuaries SAC and Severn Estuary Ramsar site have not been scoped in for the Crown Estate Leasing Round 5 HRA (The Crown Estate, 2024), therefore no pathway has been identified for in-combination effects on these SACs. The Crown Estate Leasing Round 5 HRA Screening concluded that the interaction with Annex II migratory fish will be limited to collision (The Crown Estate, 2024). Therefore, therefore no pathway has been identified for in-combination effects on the Pembrokeshire Marine, Cleddau Rivers, Cardigan Bay, Afon Teifi, River Tywi, River Usk, Severn Estuary, or River Wye SACs.	NO

2. Annex II Marine Mammals

BLUE impact pathway from Table 3.2 and/or	Natura 2000 site feature(s) concerned	Other plans/projects with effects that might interact with the effects of the project to render its effects significant (if any)	Nature of the in-combination effect (if any)	Is there likely to be any significant in-combination effect, in view of the site's
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Residual effect (from appropriate assessment in section 4)				conservation objectives?
Effects of underwater noise (construction, operation and decommissioning)	Harbour porpoise SACs: West Wales Marine SAC Bristol Channel Approaches SAC All Other SACs	• Erebus (Erebus Offshore wind Consented) • White Cross (Offshore wind Application submitted) • TwinHub (Floating Offshore wind Consented) • South Irish Sea Array (Offshore Wind Application submitted) • Awel y Môr (Offshore wind Consented) • Mona (Offshore wind) • Morcecambe (Offshore wind) • Morgan (Offshore wind)	Conservation Objective 1 <i>PTS-onset</i> The risk of PTS-onset for all projects will be required via consent conditions to be minimised to negligible using JNCC marine mammal mitigation guidelines (JNCC, 2010; JNCC, 2010; JNCC, 2010). Each marine mammal mitigation plan will be tailored to the project specific predicted impacts and agreed during the post consent dialogue with NRW. The use of mitigation measures (including MMOs; PAMs; and ADDs) will result in no risk of an in-combination auditory injury pathway for harbour porpoise within the Celtic and Irish Seas MMMU. <i>Disturbance</i> There is the potential for an accumulated risk of disturbance to harbour porpoise within the Celtic and Irish Seas MMMU from the identified projects. This was assessed in ES Chapter 21: Marine Mammals using a population model (iPCoD). The results from this model indicated that there was no accumulated risk to the harbour porpoise population, with no difference in population trajectory between the impacted (with construction) and the un-impacted populations. Conservation Objective 2 The only project from the plans and projects identified above that could have a noise impact overlap in-combination is Erebus; at	NO

			approximately 5 km from this proposed Project. It is also possible that Erebus will be constructing within the same period as this proposed Project (2025 - 2026). As with the project alone assessment, operational noise from either project does not have a spatial overlap with any harbour porpoise SAC. The results presented in Table 8-29 of the HRA – Report to Inform Appropriate Assessment (ORML2465 - App 08E Llyr ES - HRA RIAA.pdf) suggest that the activities assessed (impact piling, cable laying) for the proposed Project in-combination with Erebus will not compromise the 10% seasonal threshold and therefore no AEOSI can be concluded for in combination effects when considered against Conservation Objective 2.	
Collision with Project vessels (construction, operation and decommissioning)	Harbour porpoise SACs: West Wales Marine SAC Bristol Channel Approaches SAC All Other SACs	• Erebus (Erebus Offshore wind Consented) • White Cross (Offshore wind Application submitted) • TwinHub (Floating Offshore wind Consented) • South Irish Sea Array (Offshore Wind Application submitted) • Awel y Môr (Offshore wind Consented) • Mona (Offshore wind) • Morcecambe (Offshore wind) • Morgan (Offshore wind)	Conservation Objective 1 The collision risk from any project vessel movement is considered to be negligible. All projects will be required to implement a Vessel Management Plan and adhere to good practice wildlife guidelines (e.g. the WiSE scheme (2018)). The population model run for the assessment, included consideration of vessel disturbance, from all projects included in ES Chapter 30: Inter-related and Cumulative Effects. There was no accumulated risk to the harbour porpoise population predicted from the model. Therefore, although an increase in vessel movements from a number of developments in the MMMU is possible, there is no potential of an in-combination effect.	NO
Entanglement with mooring lines and cables	Harbour porpoise SACs: West Wales Marine SAC	• Erebus (Erebus Offshore wind Consented)	Conservation Objective 1	NO

	Bristol Channel Approaches SAC All Other SACs	• White Cross (Offshore wind Application submitted) • TwinHub (Floating Offshore wind Consented) • South Irish Sea Array (Offshore Wind Application submitted) • Awel y Môr (Offshore wind Consented) • Mona (Offshore wind) • Morcecambe (Offshore wind) • Morgan (Offshore wind)	The risk of entanglement is only an impact pathway for floating offshore wind projects. This is a potential risk throughout each of the project's operational phase. This applies therefore to three of the five identified projects in addition to the proposed Project (i.e., Erebus, White Cross and TwinHub). The total number of floating offshore wind platforms from these projects in combination is a maximum of 30 WTGs. This scale of development will not cover a significant area in comparison to the Celtic and Irish Seas MMMU. The proposed project is predicted to cover 0.05 km². If multiplied by 3 (as a proxy for the area covered by 30 WTGs) an area of 0.15 km² can be estimated, which in comparison to the area covered by the Celtic and Irish Seas MMMU which is 516,893 km² is negligible. Regardless, the risk of entanglement for harbour porpoise is considered to be negligible from the cables and moorings themselves (see Chapter 21: Marine Mammals). There is a lack of evidence in relation to the potential risk from secondary entanglement (ghost gear). However, it is likely that all floating offshore wind developments will deploy monitoring of the cables and moorings and will commit to removal of any ghost gear present, which will reduce the potential for grey seals to become entangled. An in-combination effect therefore is not anticipated.	
Accidental pollution or contamination (construction, operation and maintenance, and decommissioning)	Harbour porpoise SACs: West Wales Marine SAC Bristol Channel Approaches SAC All Other SACs	• Erebus (Erebus Offshore wind Consented) • White Cross (Offshore wind Application submitted) • TwinHub (Floating Offshore wind Consented) • South Irish Sea Array (Offshore Wind Application submitted)	Conservation Objective 3 All projects will be required to implement a VMP, which will include adherence to international requirements for the prevention of pollution at sea. Therefore, there is no realistic pathway or in-	NO

		• Awel y Môr (Offshore wind Consented) • Mona (Offshore wind) • Morcecambe (Offshore wind) • Morgan (Offshore wind)	combination effects from accidental pollution and contamination.	
Potential for indirect effects through impacts upon prey species (construction, operation and maintenance, and decommissioning)	Harbour porpoise SACs: West Wales Marine SAC Bristol Channel Approaches SAC All Other SACs	• Erebus (Erebus Offshore wind Consented) • White Cross (Offshore wind Application submitted) • TwinHub (Floating Offshore wind Consented) • South Irish Sea Array (Offshore Wind Application submitted) • Awel y Môr (Offshore wind Consented) • Mona (Offshore wind) • Morcecambe (Offshore wind) • Morgan (Offshore wind)	Conservation Objective 3 There were no potential impacts to prey species identified in ES Chapter 20: Fish and shellfish Ecology for the proposed Project alone, and the conclusion from Erebus (Marine Space Ltd, 2019b), was also that there were no significant cumulative effects identified. In the event of any potential impact during construction or decommissioning, this is likely to be short term, and fully reversible. During the operational period, it is likely that the offshore wind structures may increase prey availability for harbour porpoise due to the artificial reef and fish aggregation device effect. This effect could increase foraging opportunities and therefore be a positive effect on harbour porpoise (Galparsoro, et al., 2022).	NO
Effects of EMF emissions	Harbour porpoise SACs: West Wales Marine SAC Bristol Channel Approaches SAC All Other SACs	• Erebus (Erebus Offshore wind Consented) • White Cross (Offshore wind Application submitted) • TwinHub (Floating Offshore wind Consented) • South Irish Sea Array (Offshore Wind Application submitted) • Awel y Môr (Offshore wind Consented) • Mona (Offshore wind) • Morcecambe (Offshore wind) • Morgan (Offshore wind)	Conservation Objective 3 The project alone assessment found that any detection of EMF is likely to only occur in close proximity to the cables once in operation (approx. 50 m) (OSC, 2022), and given the highly mobile nature of marine mammals, animals are unlikely to remain in close proximity to the cables or array for any significant length of time (Copping & Hemery, 2020; OSC, 2022). Therefore, impact from EMF emissions for all marine mammals is expected to be minimal. With any potential detection being limited to 50m, it can therefore be concluded that there is no pathway to an in-combination impact.	NO

Barrier effects from mooring lines and cables between platform and anchor	Harbour porpoise SACs: West Wales Marine SAC Bristol Channel Approaches SAC All Other SACs	• Erebus (Erebus Offshore wind Consented) • White Cross (Offshore wind Application submitted) • TwinHub (Floating Offshore wind Consented) • South Irish Sea Array (Offshore Wind Application submitted) • Awel y Môr (Offshore wind Consented)	Conservation Objective 3 The project alone concluded that there was no risk of a barrier effect due to the presence of the offshore wind structures. Harbour porpoise have been shown in frequent offshore wind farm locations during construction (Graham, et al., 2019) and post construction (Diederichs, et al., 2008). It is therefore unlikely that there is an in-combination barrier effect from all projects considered in this assessment, however due to the lack of evidence surrounding barrier effect, a commitment to from the applicant has been included within the outline MMMP to carry out an evidence-based monitoring programme which will be agreed post consent.	NO
Effects of underwater noise (construction, operation and decommissioning)	Grey seal SACs: Pembrokeshire Marine SAC All Other SACs	• Erebus (Erebus Offshore wind Consented) • White Cross (Offshore wind Application submitted) • TwinHub (Floating Offshore wind Consented) • South Irish Sea Array (Offshore Wind Application submitted) • Awel y Môr (Offshore wind Consented) • Mona (Offshore wind) • Morcecambe (Offshore wind) • Morgan (Offshore wind)	Conservation Objective 1 <i>PTS-onset</i> The risk of PTS-onset for all projects will be required via consent conditions to be reduced to negligible using standard JNCC marine mammal mitigation guidelines. The mitigation ultimately employed will be tailored to the project specific predicted impacts and agreed during post consent dialogue with NRW. The use of mitigation measures (i.e., MMOs; PAM; ADDs) to reduce the risk of injury to negligible at the project level, will mean that there is no risk of an in-combination auditory injury pathway for grey seal within the OSPAR Region III. <i>Disturbance</i> The potential for a cumulative risk of disturbance to grey seal within OSPAR Region III MMMU from the identified projects was assessed in ES Chapter 21: Marine Mammals and concluded that the	NO

			impacts to grey seal from accumulated disturbance was negligible. This conclusion was based on the maximum overall percentage of the MU population predicted to be at risk of disturbance of less than 1% (0.29%). This conclusion also applies to the in-combination assessment. Conservation Objective 2 <i>Disturbance</i> As detailed above, the population modelling conducted for cumulative impact assessment shows that there is no in-combination effect from underwater noise. Both the proposed Project and Erebus' export cables will be located within the Pembrokeshire Marine SAC and therefore the proposed Project and Erebus are the only two projects that could potentially have an in-combination effect on the site. However, for both projects, the installation of the export cables will be carried out in a relatively localised area and for a relatively short duration, and therefore there is no potential for this activity to reduce the natural range of grey seal for the foreseeable future. Any disturbance to hauled out seals, would therefore not be permanent and would be recoverable (SCOS, 2021).	
Airborne sound and visual disturbance at haul-outs	Grey seal SACs: Pembrokeshire Marine SAC All Other SACs	• Erebus (Erebus Offshore wind Consented) • White Cross (Offshore wind Application submitted) • TwinHub (Floating Offshore wind Consented) • South Irish Sea Array (Offshore Wind Application submitted)	Conservation Objective 2 Although the landfall locations do not appear to be a key location within the SAC for grey seals to haul out, as mentioned above, seals could be present anywhere along the Pembrokeshire coastline. The proposed Project has committed to investigate whether a seasonal restriction is	NO

		• Awel y Môr (Offshore wind Consented) • Mona (Offshore wind) • Morcecambe (Offshore wind) • Morgan (Offshore wind)	able to be put in place if required, such that activity on the shoreline would not take place between August and February. Alternatively, should construction be necessary during this period, the Applicant will commit to winter surveys of the landfall site post submission to obtain greater detail on the number of mother-pup pairs likely to be in that specific location. Provided a seasonal restriction is implemented during breeding season for the cable landfall activity, or pre-construction surveys indicate the landfall site is not used for grey seal pupping, then it can be concluded that there is no risk of the proposed Project contravening Conservation Objective 2 for Pembrokeshire Marine SAC. No other in-combination effects are considered likely for visual or airborne disturbance at seal haul-outs within the SAC, based on the locations and distances to other projects.	
Collision with Project vessels (construction, operation and decommissioning)	Grey seal SACs: Pembrokeshire Marine SAC All Other SACs	• Erebus (Erebus Offshore wind Consented) • White Cross (Offshore wind Application submitted) • TwinHub (Floating Offshore wind Consented) • South Irish Sea Array (Offshore Wind Application submitted) • Awel y Môr (Offshore wind Consented) • Mona (Offshore wind) • Morcecambe (Offshore wind) • Morgan (Offshore wind)	Conservation Objective 1 The collision risk from project vessel movement is considered to be negligible (as detailed above and scoped out from the project alone assessment). All projects will be required to implement a VMP and adhere to good practice wildlife guidelines (e.g. the WiSE scheme (2018)). Therefore, all potential projects' vessel movements to and from each project area, will be along existing vessel routes. Due to the existing baseline level of vessel activity (see ES Chapter 28: Shipping and Navigation), it is likely that grey seals are accustomed to vessel movement and can easily detect and	NO

			avoid. There is no likelihood of the in-combination increase in vessel activity, will increase the collision risk for grey seal. Therefore, there is no potential of an in-combination effect.	
Entanglement with mooring lines and cables	Grey seal SACs: Pembrokeshire Marine SAC All Other SACs	• Erebus (Erebus Offshore wind Consented) • White Cross (Offshore wind Application submitted) • TwinHub (Floating Offshore wind Consented) • South Irish Sea Array (Offshore Wind Application submitted) • Awel y Môr (Offshore wind Consented)	Conservation Objective 1 The risk of primary or secondary entanglement, is only an impact pathway for floating offshore wind projects and is a potential risk throughout each project's operational phase. This risk therefore applies to three of the five identified projects; Erebus, White Cross; TwinHub in addition to the proposed Project. The risk of primary entanglement for grey seal is considered to be negligible (see ES Chapter 21: Marine Mammals). There is a lack of evidence in relation to the potential risk from secondary entanglement (ghost gear). However, it is likely that all floating offshore wind developments will deploy monitoring of the cables and moorings and will commit to removal of any ghost gear present, which will reduce the potential for grey seals to become entangled. An in-combination effect therefore is not anticipated.	NO
Barrier effects from mooring lines and cables between platform and anchor	Grey seal SACs: Pembrokeshire Marine SAC All Other SACs	• Erebus (Erebus Offshore wind Consented) • White Cross (Offshore wind Application submitted) • TwinHub (Floating Offshore wind Consented) • South Irish Sea Array (Offshore Wind Application submitted) • Awel y Môr (Offshore wind Consented) • Mona (Offshore wind) • Morcecambe (Offshore wind) • Morgan (Offshore wind)	Conservation Objective 2 The assessment for the proposed Project alone concluded no potential for adverse effect from any potential barrier effect, due to the evidence that seals have been observed transiting within offshore wind turbines (Russell, et al., 2014). It is therefore not anticipated that multiple projects within the OSPAR Region III MMMU will combine to any greater barrier risk, than the project alone. However, due to the lack of evidence surrounding barrier effect, a commitment to from the applicant	NO

			has been included within the outline MMMP to carry out an evidence-based monitoring programme which will be agreed post consent.	
Potential effects to supporting habitats and species	Grey seal SACs: Pembrokeshire Marine SAC All Other SACs	• Erebus (Erebus Offshore wind Consented) • White Cross (Offshore wind Application submitted) • TwinHub (Floating Offshore wind Consented) • South Irish Sea Array (Offshore Wind Application submitted) • Awel y Môr (Offshore wind Consented) • Mona (Offshore wind) • Morcecambe (Offshore wind) • Morgan (Offshore wind)	Conservation Objective 3 The consideration under Conservation Objective 3 would be whether the combined construction and operation of the plans or projects identified in this section would have a negative impact on the condition and diversity of habitats required to support grey seals. The evidence provided in the project alone assessment applies for multiple projects. It is likely that once constructed the developments identified would provide increased foraging opportunities. This assessment has shown that the grey seal population is stable or increasing and that the loss and/or physical disturbance to the seabed habitats and benthic species from the plans and projects identified will be temporary, with a rapid recovery of seabed habitats and species (see ES Chapter 19: Benthic Ecology). Therefore, it can be concluded that there is no lasting impact to the presence, abundance, condition and diversity of habitats required to support the population of grey seals at the SAC.	NO

3. Annex I Marine Ornithology Features

Several pathways were identified as insignificant (blue) for several SPAs in Section 3.2 of this HRA. These are not presented in the table below as it can be assumed that if there is not likely to be a significant in-combination effect for the three assessed SPA closest to the proposed Project, then there is not likely to be a significant in-combination effect for other SPAs which are further away.

BLUE impact pathway from Table 3.2 and/or Residual effect (from appropriate assessment in section 4)	Natura 2000 site feature(s) concerned	Other plans/projects with effects that might interact with the effects of the project to render its effects significant (if any)	Nature of the in-combination effect (if any)	Is there likely to be any significant in-combination effect, in view of the site's conservation objectives?
Disturbance and / or displacement associated with vessels and other offshore activities (construction and decommissioning)	Skomer, Skokholm and the Seas off Pembrokeshire SPA: Guillemot Puffin Razorbill	The following projects were considered <u>quantitatively</u> within ES Appendix 22E: Marine Ornithology Project Alone and Cumulative Impact Scenarios: • Erebus offshore wind project; • Awel y Mor offshore wind project; • Twin Hub offshore wind project; • Morlais Orbital O2 tidal project; and • White Cross offshore wind project.	The potential Impact of the proposed Project in-combination with other projects and plans on any SPAs has already been considered alongside the alone assessments for each SPA (Section 4 of this form). It has been concluded that there is no potential for in-combination effects on the Annex I marine ornithological features of Skomer, Skokholm and the Seas of Pembrokeshire SPA, Grassholm SPA, or Irish Sea Front SPA. Specifically for the Manx shearwater feature of the Irish Sea Front SPA it was concluded that even considering Erebus (floating offshore wind project, as consented, max 10 turbines) and White Cross (floating offshore wind project, at application, max 8 turbines) together with the proposed Project Even, there is negligible risk of Manx shearwater flight paths from Lundy SSSI being disrupted or of access to the Irish Sea Front SPA being prevented, due to the small-scale of this development.	NO
Effects of underwater noise on diving seabirds (construction and decommissioning)	Skomer, Skokholm and the Seas off Pembrokeshire SPA: Guillemot Manx shearwater Puffin Razorbill			
Indirect effects due to changes in habitat and / or prey availability and distribution (construction, operation and maintenance, and decommissioning)	Skomer, Skokholm and the Seas off Pembrokeshire SPA: Kittiwake Guillemot Lesser Black-backed Gull Razorbill Puffin European storm petrel Manx shearwater	The remainder of the short-listed projects listed below were identified as not anticipated to have population consequences so have been considered qualitatively within ES Chapter 22: Marine Ornithology and Appendix 22E: Marine Ornithology Project Alone and Cumulative Impact Scenarios:		
Disturbance and / or displacement due to the presence of WTGs and associated	Skomer, Skokholm and the Seas off Pembrokeshire SPA: Guillemot	• Greenlink Interconnector Construction • Llewelyn Offshore wind Pre-application	ES Chapter 22: Marine Ornithology, notes that if each project is required to produce an agreed Lighting and Marking Management Plan (such as that proposed for the proposed Project, and the Aviation	

maintenance activities	Razorbill Puffin European storm petrel Manx shearwater	• White Cross Offshore wind Application submitted • Gwynt Glas Offshore wind Pre-application • Ramsey Sound Tidal Energy Operational • Petroc Offshore wind Pre-application • South Irish Sea Array Offshore wind Application submitted • Inis Ealga Marine Energy Park Offshore wind Pre-application • Arklow Bank Offshore wind Operational • Celtic Interconnector Consented • Codling Wind Park Offshore wind Pre-application • Dublin Array Offshore wind Pre-application • Rhyl Flats Offshore wind farm Operational • North Celtic Sea Offshore wind Pre-application	and lighting Scheme Plan required for Erebus; Section 3.26.1 of their marine licence), then there is no outstanding risk of significant cumulative impacts to Manx shearwater from project infrastructure lighting during the operational phase of these projects.	
Barrier effect due to presence of WTGs	Skomer, Skokholm and the Seas off Pembrokeshire SPA: Kittiwake Guillemot Lesser Black-backed Gull Razorbill Puffin European storm petrel Manx shearwater		Additional information has been submitted to support the conclusion of the in combination assessment and is fully detailed within the following documents submitted in response to the further information request: • ORML2465 2025 03 28 - LIÿr - marine ornithology - clarification note 1 - cumulative & in-combination • ORML2465 2025 03 28 - LIÿr - marine ornithology - clarification note 2 - auk non-ID apportioning 2 • ORML2465 2025 05 21 - LIÿr - marine ornithology - clarification note 3 - further info on cumulative & in-combination – final • ORML2465 2025 05 22 - LIÿr - marine ornithology - clarification note 4 - auk non-ID apportioning - further info - vs3	
Collision risk with WTGs	Skomer, Skokholm and the Seas off Pembrokeshire SPA: Kittiwake Lesser Black-backed Gull			
Creation of roosting habitat for birds due to presence of floating platforms and associated infrastructure (increased collision risk)	Skomer, Skokholm and the Seas off Pembrokeshire SPA: Kittiwake Lesser Black-backed Gull			
Attraction of nocturnal seabirds to proposed Project infrastructure lighting (increased collision risk)	Skomer, Skokholm and the Seas off Pembrokeshire SPA: European storm petrel Manx shearwater			
Entanglement with mooring lines and cables	Skomer, Skokholm and the Seas off Pembrokeshire SPA: Guillemot Razorbill		The applicant has also collated cumulative / in-combination figures for EIA and HRA from the Mona deadline 7, REP7-033 report(for EIA) and the Mona deadline 7, REP7-020 (for HRA). This is detailed in full within '251107 - LIÿr - marine ornithology - clarification note 3 – FINAL'	

	Puffin Manx shearwater			
Disturbance and / or displacement due to the presence of WTGs and associated maintenance activities	Grassholm SPA: Gannet			
Barrier effect due to presence of WTGs	Grassholm SPA: Gannet			
Collision risk with WTGs (including increased risk due to floating platforms providing additional roosting habitat)	Grassholm SPA: Gannet			
Entanglement with mooring lines and cables	Grassholm SPA: Gannet			
Barrier effect due to presence of WTGs	Irish Sea Front SPA: Manx shearwater			
Attraction of nocturnal seabirds to proposed Project infrastructure lighting	Irish Sea Front SPA: Manx shearwater			

5.2 Addressing in-combination effects

In combination effect	Describe any conditions, restrictions or other measures, if any, applicable to the subject project, and/or to the other plans/projects giving rise to the in combination effect, which could remove the risk of adverse effects on the Natura 2000 site features. Include details of how such measures would be applied, and who would be responsible for applying them.	Taking into account any additional measures identified and how they would be applied, can adverse effects on site features from in-
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		combination effects be ruled out?
(a) If the right hand column is 'YES' in all cases	It can be concluded that the project will not adversely affect the integrity of any Natura 2000 sites, either alone or in combination with other plans or projects.	
(b) If any row is 'NO' in the right hand column	It cannot be concluded that the project will not adversely affect the integrity of any Natura 2000 sites, when considered in combination with other plans or projects.	

6. Conclusion

HRA is not required because the whole of the project is directly connected with or necessary to the management of one or more Natura 2000/Ramsar sites, for the purposes of conserving the habitats or species for which the site(s) is/are designated, <u>and</u> the project is not likely to have a significant effect on any other Natura 2000/Ramsar sites. (As documented in section 2.1 and 2.2 of this form)	
HRA is not required because there is no conceivable impact pathway to any Natura 2000/Ramsar site (As documented in section 2.3 of this form)	
This project is a renewal of a current permission which complies with NRW agreed criteria for ruling out significant effects of a renewal without conducting a project-specific LSE test. Therefore it is considered not likely to have a significant effect on any Natura 2000/Ramsar sites, either alone or in-combination with other plans and projects. (As documented in section 3.1 of this form)	
The project has been screened for likelihood of significant effects and, taking account of the advice received from protected sites advisors, is considered not likely to have a significant effect on any Natura 2000/Ramsar site (As documented in section 3.2 of this form, or section 5 if applicable)	

In light of the conclusions of an appropriate assessment, and taking account of the advice received from protected sites advisors, it has been established that the project will not adversely affect the integrity of any Natura 2000/Ramsar site, taking into account any conditions or restrictions as applicable, either alone or in-combination with other plans and projects. (As documented in section 4 of this form, and section 5 if applicable)	X
In light of the conclusions of the appropriate assessment, it has <u>not</u> been ascertained that the project will not adversely affect the integrity of any Natura 2000/Ramsar site, as documented in section 4 of this form, and section 5 is applicable. Approval for the project <u>cannot</u> be given unless either: - the project specification, and/or the terms under which it might be approved, are modified so as to remove the risk of adverse effects, and a revised HRA report is prepared, or - the project satisfies the requirements of Article 6(4) of the Habitats Directive, an Article 6(4) Statement of Case is prepared (OGN 200 Form 3) and submitted for consideration by the appropriate authority, normally Welsh Ministers	
Signed:  Name: Joe Thomas Position: Lead Specialist Licensing Officer Date: 18 March 2026	

7. Consultation with protected sites advisor(s) and how sections 2, 3, 4 and 5 of this HRA report (as applicable) take into account that advice.

Relevant section of the HRA report	Date(s) of correspondence* and any meeting(s) with protected sites advisor(s)	Description of how the comments from protected sites advisors have been taken into account
1	NRW A – 29 July 2025	NRW A requested clarification on whether the maximum rotor radius would change from 285m now the applicant is committing to a maximum turbine tip height to 300 m above Highest Astronomical Tide (HAT). The maximum tip height of 300m has been included within the HRA and clarification has been south on the rotor radius which will not exceed 285 m.
3	NRW A – 29 July 2025	NRW A advised that potential 'blockage' impacts to bedload sediment transport processes via cable crossings requiring cable protection measures should be screened in as an impact pathway for the Pembrokeshire Marine SAC. This has been included in section 3.2.2 for the Pembrokeshire marine SAC, However, due to the proximity of proposed cable crossings to the shore and designated features of the SAC, likely significant effect can be ruled out.
3	NRW A – 29 July 2025	Following advice from NRW A, specific reference to named components of the seabird assemblage Qualifying Features of the SSSP SPA has been made for Guillemot, Razorbill and Kittiwake in section 3.
3	NRW A – 29 July 2025	NRW A advised that for grey seal and harbour porpoise, the collision with project vessels impact pathway should also include operations. This has been updated accordingly.
3	NRW A – 29 July 2025	Potential effects to supporting habitats and species has been included as an impact pathway for Grey Seals in all protected sites following request for clarification as to why it was only included for Grey Seals in the Pembrokeshire Marine SAC.
3/4	NRW A – 29 July 2025	NRW A advised that the migratory fish assemblage feature of the Ramsar includes sea trout and European eel, and these should be included in the table. In addition, for the Severn Estuary SAC, the notable species sub-feature of the estuary feature includes: salmon, eel, sea trout and Allis shad. These species have been screened in to section 3 and taken forward to AA stage, section 4.
4	NRW A – 29 July 2025	When referring to the statement 'noise effects from the decommissioning phase will be much less than for construction, particularly as this is a floating offshore wind project', reference has been made to this being as known through expert judgement following advice from NRW A.

4	NRW A – 29 July 2025	NRW A requested that specific reference is made to a Water Quality and Pollution Management Plan to be able to conclude no AEoSI. This has now been included in section 4.2 for the Pembrokeshire Marine SAC. The CEMP, VMP and Water Quality and Pollution Management Plan will require submission and subsequent approval prior to the commencement of any proposed activities. This is now detailed in section 4.2 for the Pembrokeshire Marine SAC.
4	NRW A – 29 July 2025	NRW A advised that SeabORD modelling is not relied upon in the HRA and that the assessment is updated based on the displacement matrix approach results instead. Section 4.1, the AA for SSSP SPA has therefore been updated to reflect this change.
4	NRW A – 29 July 2025	NRW A advised that to rule out AEoSI for Manx Shearwater and Puffin features, and the guillemot and razorbill named components of the assemblage feature, of the SSSP SPA or the gannet feature of Grassholm SPA, the reasoning needs to be updated to include 'and removal of entangled debris' as mitigation to be secured through the PEMP. This has now been included within the AA for Grassholm SPA and SSSP SPA.
3/4	NRW A – 29 July 2025	NRW A advised that Otters may be present within the area and are likely to be affected by the proposed activities. An otter survey report was carried out which identified that otters may be present. Therefore, this feature has been taken through the appropriate assessment stage, however adverse effect has been ruled out through the requirement for the licence holder to submit an Otter Mitigation Plan to the Licensing Authority prior to the commencement of any cable burial activity or cable burial associated activities. This will be secured through licence conditions.
4	NRW A – 29 July 2025	In addition to the marine mammal mitigation commitments from the applicant outlined in Appendix 04A: Outline CEMP, they have also produced an outline marine mammal mitigation Plan (P11-LYR-4.2.3-PLA-0003-Outline Marine Mammal Mitigation Plan) with additional and more detailed commitments which is now referred to in section 4.2 where appropriate. The licence holder will still be required to submit a Marine Mammal Mitigation Plan prior to commencement of licensed activities.
5	NRW A – 29 July 2025	At the request of NRW Advisory and JNCC, the applicant has collated cumulative / in-combination figures for EIA and HRA from the Mona deadline 7, REP7-033 report(for EIA) and the Mona deadline 7, REP7-020 (for HRA). Reference to '251107 - Llŷr - marine ornithology - clarification note 3 – FINAL' where this information is detailed has now been referred to within the in combination assessment for marine ornithology features.
3/4	NRW A – 17 March 2026	As requested by NRW A, reference to 'soft-start' procedures as mitigation for fish and shellfish ecology has been removed, however, conclusions of no likely significant effect remain as stated by NRW A.
5	NRW A – 17 March 2026	NRW A stated that a number of additional projects may have a cumulative effect on the Management Unit populations (including Mona, Morgan, and Morecambe Offshore Wind Farm Projects) and that these should be included in the assessment, and the HRA revised accordingly. These projects have now been listed in section 5 of the in-combination assessment above for marine mammals however the conclusions of the assessment remain unchanged. NRW agreed with this conclusion via email on 27 March 2026.

4	JNCC – 18 March 2026	JNCC requested that the HRA be amended to reflect the worse-case auditory injury ranges as presented in Appendix 21B – underwater noise impact study. This section has been updated to reference Appendix 21B.
4	JNCC – 18 March 2026	JNCC acknowledge the clarification and further information provided within ORML2465 P11-LYR-3.4.3-PAP-REV4-Clarifications 2 however requested that this information was presented in an updated assessment prior to any consent being issued. The HRA has been updated to reflect the information detailed with this document.
4	JNCC – 18 March 2026	Following advice from JNCC, the HRA has been updated to explicitly reflect the use of fixed Effective Deterrent Ranges in the disturbance assessment for harbour porpoise.
5	JNCC – 18 March 2026	JNCC also stated that LIÿr 2 and Valorous are missing from the other plans/projects in-combination assessment for marine mammals. Whilst it is noted that these have been assessed for benthic and ornithology receptors but not for marine mammals, the Applicant detailed their omission due to the data limitations of these projects, NRW MLT are satisfied that suitable in-combination assessment has been completed. When/If these projects reach application stage, they will be required to carry out and in-combination assessment with LIÿr.
4	JNCC – 18 March 2026	JNCC considered that decommissioning activities had not been fully assessed in the ES and advised that a worst-case, quantitative decommissioning footprint should be included, consistent with newly published OEUK Designing for Decommissioning guidance. JNCC noted that, without a quantitative assessment of likely decommissioning impacts, the full project lifecycle effects could not be clearly understood. The applicant confirmed that a Best Practicable Environmental Option (BPEO) assessment will be carried out prior to decommissioning and will accompany the necessary discharge of condition application at that stage. Whilst JNCC are still of the opinion that the Applicant has not taken a quantitative approach to the worst-case scenario for decommissioning, NRW MLT are satisfied that an appropriate assessment has been carried out given the information available at this time, and that any decommissioning methods will need to be approved prior to commencement, this will be done in consultation with JNCC. A Decommissioning Programme would also be required under section 105 of the Energy Act (2004)
5	JNCC – 18 March 2026	JNCC raised concerns surrounding the lack of evidence of cumulative barrier effects on marine mammals. A commitment from the Applicant has been included within the updated outline MMMP to carry out an evidence-based monitoring programme which will be agreed post consent.

Appendix 1 – NRA HRA Form 2

Appropriate nature conservation body (ANCB) response to an internal HRA consultation

This form should be completed by the team or individual providing the ANCB advice to the competent authority team

TO: Joseph Thomas, Senior Officer: Marine Licencing Team

FROM: Nia Phillips and Leonie Richardson, Lead Specialists Advisors, Marine: Marine Area Advice and Management Team

SUBJECT: Habitats Regulations Assessment (HRA) of ORML2465: Llyr 1 Floating Offshore Windfarm

Thank you for consulting the Marine Area Advice and Management Team on the above. Our advice should be read in conjunction with the advice provided to NRW's Marine Licensing Team on the *ORML2465 Llyr Floating Offshore Wind Project, Band 3 EIA* dated 29 July 2025. Our comments on the draft HRA are as follows:

OFFSHORE

1. Physical Processes

NRW (A) agrees with the overall conclusions of the HRA of no adverse effects on site integrity (AEoSI) for impact pathways related to physical processes.

We note that potential 'blockage' impacts to bedload sediment transport processes via cable crossings requiring cable protection measures outlined in *Volume 1, Chapter 4: Description of the Proposed Project* (Section 4.5.3, para 104) are not identified as a potential impact pathway. We advise this potential impact pathway should be included in the screening assessment (Section 3.2.2) due to the potential for interruptions to sediment transport processes which support designated benthic habitat features within the Pembrokeshire Marine Special Area of Conservation (SAC). Due to the proximity of proposed cable crossings to the shore and designated features of the SAC, NRW (A) recognises that in this case, at the Appropriate Assessment (AA) stage of the HRA process, AEoSI could be ruled out and therefore, including this impact pathway would not make a material difference to the conclusion of the HRA.

2. Benthic Subtidal and Intertidal Ecology

NRW (A) agrees with the overall conclusions of the HRA of no AEoSI for impacts on benthic ecology receptors. This includes those measures indicated in the HRA that can be secured through a licence condition.

3. Marine Water and Sediment Quality

Whilst NRW (A) agrees with a conclusion of no AEoSI when “... *taking into account any conditions or restrictions as applicable*...”, we disagree with aspects of the Competent Authority’s (CA) assessment process to reach these conclusions. Further detail is provided below, alongside recommendations to the CA to improve the assessment. We welcome discussion with the CA on these aspects.

Section 3.2, Likelihood of significant effects (LSE) test

NRW (A) agrees that the appropriate protected areas have been included for assessment by the CA and that the appropriate pressures and source-pathways have been included for the test of likely significant effects.

Section 4.2, Assessment of the project taking into account additional mitigating measures, conditions or restrictions

NRW (A) can agree with the conclusion of the assessment of no AEoSI, subject to the inclusion of a post-consent condition to provide the requested mitigation with respect to the Construction Environmental Management Plan and the Water Quality and Pollution Management Plan (as noted in our response to the recent consultation response dated 29 July 2025 at paragraph 37), the detail and suitability of which is to be agreed in writing with NRW (A) – this should include detail of the mechanisms for reducing the identified effects, or reducing the impacts of those effects.

Advice on the assessment

Although it is not necessary to provide all the details of the proposed mitigation at this stage of the HRA process, a high-level summary containing information about the effects to be mitigated, with information of how the mitigation will be put in to place, would increase the quality of the assessment presented by the CA.

To support a conclusion of no adverse effect, the links between the proposed mitigating activities and the mechanism for reducing adverse effects should be made explicit at AA, and it should be made clear that any conclusion of no AEoSI is dependent on the full development, implementation and adherence to any proposed mitigation. Further, any schemes (e.g. on-site monitoring) for determining the efficacy of the proposed mitigation must include details of how they will lead to controls on an activity that is found to be having an adverse or deleterious effect that may affect protected sites or designated features.

4. Fish and Shellfish Ecology

We agree overall with the conclusions of no AEoSI for migratory fish features of Welsh sites.

However, we note the following:

- Tables 9 and 10, page 30-34 Severn Estuary Ramsar and Severn Estuary SAC

The migratory fish assemblage feature of the Ramsar includes sea trout and European eel, and these should be included in the table. In addition, for the Severn Estuary SAC, the notable species sub-feature of the estuary feature includes: salmon, eel, sea trout and

Allis shad, and the Assemblage of fish species (>100 species). These features should also have been taken forward for Appropriate Assessment in Section 4.

- We note that soft-start procedures have been included as mitigation for impacts to migratory fish features from underwater noise from piling activities. We advise that there is no evidence to support the use of soft-start as mitigation for fish, however given the short duration of the activities and the limited spatial extent of the noise impact, we agree that adverse effects on site integrity can be ruled out.

5. Marine Ornithology

Please note that we have only provided comments/advice on SPAs that are located within Wales and are therefore within NRW's remit, namely: Skomer, Skokholm and Seas off Pembrokeshire (SSSP) SPA, Grassholm SPA and Aberdaron Coast and Bardsey Island SPA.

Whilst we agree with the conclusions of no AEoSI for SSSP SPA and Grassholm SPA from the project alone and in-combination, we note that this is only because NRW (A) has had to undertake its own work on in-combination assessments (including extracting Population Viability Analysis (PVA) metrics from the Mona project documents, apportioning of in-combination impacts to SSSP SPA Lesser Black-Backed Gull (LBBG) and puffin, and ultimately undertaking our own assessments based on these), as the assessments provided by the Applicant were insufficient. Please see Section 1.6.1.2 and Appendices 1 and 2 of our response to MLT dated 29 July 2025.

We note that the draft HRA has not considered NRW (A)'s advice previously provided to MLT on 29 January 2025. Therefore, we suggest that the HRA is updated according to our advice of 29 January 2025 and as provided on the re-consultation dated 29 July 25.

We note that in the draft HRA, the CA has not ruled out AEoSI pre-mitigation for entanglement with mooring lines and cables for the Manx shearwater and puffin features, and the guillemot and razorbill named components of the assemblage feature, of the SSSP SPA or the gannet feature of Grassholm SPA. However, with mitigation through 'regular inspection of the mooring lines', which would be implemented via the Project Environmental Management Plan (PEMP), a conclusion of no AEoSI has been reached. For this to be considered mitigation, we suggest that this be updated to regular inspection of the mooring lines and removal of entangled debris and be secured through a licence condition and agreed in writing with NRW (A) and JNCC. Additionally, as part of the licence condition, we advise a requirement be included that the Applicant provide annual reports of the debris found entangled in the mooring lines, with the reports including frequency of entanglement, type of debris entangled and details of its removal. Given that the Llŷr project is a FLOW demonstrator project, providing this information will add to the evidence base for the frequency of entanglement of debris and of marine fauna with mooring lines and cables, which will aid with future FLOW impact assessments.

Additional specific comments

Project details Table 1a of the draft HRA (page 2 of HRA): The information on the proposed activity states that:

'Up to 10 Wind Turbine Generators (WTGs), each with a maximum rotor diameter of 285m'

Whilst we note that the maximum rotor diameter figure stated is correct based on the collision risk modelling information provided with the application, we note that the Applicant has since reevaluated the *Project Design Envelope and will commit to limit the turbine tip height to 300 meters above Highest Astronomical Tide (HAT) within the Project Design Envelope* – as stated in the 'NRW(A) SLVIA' tab of the 'Marine Licence Application Clarifications A2' spreadsheet. As noted in NRW (A)'s 29 July 2025 response to the clarification information provided by the Applicant, it is unclear what this commitment means in terms of the turbine parameters (rotor radius, rotor speed etc). We assume that it would result in a reduction to the maximum rotor radius. We advise that the CA seek clarification on this point from the Applicant if the HRA is to list the maximum rotor radius.

Skomer, Skokholm and seas off Pembrokeshire (SSSP) SPA (throughout HRA): Please note that the Qualifying Features (QF) of the SSSP SPA are:

- Lesser black-backed gull
- Manx shearwater
- Atlantic puffin
- European storm petrel
- Seabird Assemblage

Guillemot, razorbill and kittiwake are not qualifying features of the site in their own right – they are named components of the seabird assemblage Qualifying Features. We advise that the draft HRA is updated to reflect this throughout.

SSSP SPA assessment (page 168 of HRA): The assessment in view of conservation objectives makes reference to the Applicant's SeabORD outputs. In our advice to MLT dated 29 January 2025, NRW (A) raised concerns regarding the confidence that we can place in the outputs of the SeabORD approach undertaken by the Applicant, and hence we have based our advice on consideration of the displacement matrix assessment and predicted impacts and not SeabORD. (see paras 160-165 of our original consultation response to MLT). Therefore, we advise that the SeabORD modelling is not relied upon in the HRA and that the assessment is updated based on the displacement matrix approach results instead.

We also note that the text in the draft HRA regarding SeabORD is not fully correct, as SeabORD modelling was not undertaken for lesser black-backed gull or Manx shearwater and the model can only be run for auks (guillemot, razorbill, puffin) and kittiwake - see Appendix 22D-Annex C SeabORD modelling report of submission.

6. Marine Mammals

NRW (A) does not currently agree with the conclusions of the HRA. Nonetheless, we would be able to agree with the conclusions of no AEOI, if 1) the Applicant commits to key mitigation measures (as advised in Section 1.7.2 of our response to the re-consultation exercise dated 29 July 2025, and as noted below) - the suitability of which is to be agreed in writing with NRW (A) and secured through a post-consent condition; 2) clarification is provided regarding the duration of piling and 3) the CA considers the remaining assessment discrepancies outlined below.

We welcome the approach taken to group the AA for harbour porpoise and grey seal SACs into a single section, which facilitated easier review. For larger HRA documents (e.g. Band 3) it could be beneficial to include a contents page.

We note that NRW's position statement (PS) on the use of Management Units in HRA (NRW, 2022) has since been updated and any references to this PS should be changed to (NRW, 2025) although no further changes are necessary to the HRA since the advice on the use of iterative assessment has not changed.

In view of the newly published Revised Reg 37 Conservation Advice Packages, we recommend that any reference to the superseded condition assessments made below are updated and information used to inform conclusions revised to ensure these are up to date.
Likelihood of significant effects (LSE) test, 3.2.1 – Which Natura 2000 sites might be affected by the proposal – page 10

We agree with the list of SACs that have been screened in, and also agree with the decision to screen out harbour seal (page 12).

Screening Assessment

For grey seal and harbour porpoise, the collision with project vessels impact pathway currently only covers the construction and decommissioning phases in the table. The operational phase should be included, following which the assessments may need revision.

For grey seal, the impact pathway "*Potential effects to supporting habitats and species*" was included for Pembrokeshire Marine but not other grey seal SACs. Clarification would be welcomed.

We confirm agreement over the decision to screen out the inshore population of bottlenose dolphin, as per our original advice to the Applicant.

Appropriate Assessment of the Project when Considered Alone, 4. Harbour porpoise SACs, page 148 – page 155.

- *Effects of underwater noise (construction, operation and decommissioning):*

“For harbour porpoise and grey seals, noise impacts during the operational and decommissioning phases are of lower magnitude than the potential impacts during construction.”

We agree that noise impacts during the operational phase would be expected to be of lower magnitude than the construction phase, and that it is likely that noise impacts during the decommissioning phase will be of lower magnitude than the construction phase. While no action is required, we note that when considering impacts for each phase alone, this statement is sufficient to help inform a conclusion. However, for an in-combination assessment, the total effects across all phases need to be considered over the lifetime of the project.

- *Effects of underwater noise (construction, operation and decommissioning):*

“Noise effects from the decommissioning phase will be much less than for construction, particularly as this is a floating offshore wind project.”

This statement could be made more robust if evidence, or a rationale supporting it, were provided. Alternatively it can be sufficient to say that it was based on “expert judgement / knowledge”.

- *Effects of underwater noise (construction, operation and decommissioning):*

For Conservation Objective 1, the assessment of disturbance appears to have only considered piling noise. We advise that the assessment should be updated to include all other activities that may cause disturbance.

- *Effects of underwater noise (construction, operation and decommissioning):*

For Conservation Objective 2, the maximum daily spatial overlap of 16.83% given is for a UXO clearance event (which is not considered in this HRA). We recommend that for completeness, it would be beneficial to also include a statement on the worst spatial overlap that could occur as a result of an impact pathway that is considered in this HRA (e.g. piling).

- *Effects of underwater noise (construction, operation and decommissioning):*

For Conservation Objective 2, we recommend that the seasonal percentage overlap section should specify the impact pathway and the percentage overlap.

- *Collision with Project vessels (construction, operation and decommissioning):*

While we agree with the conclusions of the assessment on collision with vessels, the assessment could be made more robust by referring to any published avoidance / collision rates with construction / maintenance vessels.

- *Entanglement with mooring lines and cables:*

In NRW (A)'s view, the statement "*the cables and mooring lines are **often** taut and of a diameter large enough to preclude entanglement*" (note: bold and underlining of text is our own) is not sufficiently robust to allow a conclusion of the risk being small, particularly considered within the context of NRW's mortality limits (NRW, 2022b).

We posit that in the absence of data on avoidance and entanglement rates with mooring lines and fishing gear, conclusions on the risk of entanglement remain a judgement call, which should be stated in the assessment. This leads to the focus needing to be on mitigation to lower the risk.

While we agree with the overall conclusions that "*In the absence of any mitigation measures, however, there is a potential to compromise the site's conservation objectives.*", we do not agree with the statement that "*The applicant's assessment of effects takes account of best practice mitigation measures that will be adopted as part of the project.*"

However, with a firm commitment from the Applicant to provide the requested mitigation with respect to entanglement monitoring (as noted at paragraph 100 in our consultation response dated 29 July 2025), the suitability of which is to be agreed in discussion and written agreement with NRW (A) prior to any works commencing, and secured via post-consent condition, then we would be able to agree no AEoSI.

Appropriate Assessment of the Project when Considered Alone, 5. Grey seal SACs, page 156 – page 165.

- *Effects of underwater noise (construction, operation and decommissioning):*

Similarly to above, we agree that noise impacts during the operational phase would be expected to be of lower magnitude than the construction phase, and that it is likely that noise impacts during the decommissioning phase will be of lower magnitude than the construction phase. While no action is required, we note that when considering impacts for each phase alone, this statement is sufficient to help inform a conclusion. However, for an in-combination assessment, the total effects across all phases need to be considered over the lifetime of the project.

- *Effects of underwater noise (construction, operation and decommissioning):*

"Noise effects from the decommissioning phase will be much less than for construction, particularly as this is a floating offshore wind project."

This statement could be made more robust if evidence or a rationale supporting it were provided. Alternatively it can be sufficient to say that it was based on "expert judgement / knowledge".

- *Effects of underwater noise (construction, operation and decommissioning):*

For conservation objective 1, the assessment of disturbance appears to have only considered piling noise. We advise that the Assessment should be updated to include all other activities that may cause disturbance.

- *Effects of underwater noise (construction, operation and decommissioning):*

For conservation objective 2, we note that the numbers disturbed as a proportion of the MU population are based on a single disturbance event at a single point in time (e.g. 91 individuals for the cable laying activity) and are not equivalent to the number of animals disturbed by that activity over the entire phase of the project / lifetime of the project through repeated disturbance events (and / or a moving noise source). If a conclusion is based on numbers disturbed by a single disturbance event, sufficient justification needs to be provided to back the conclusion that subsequent disturbance events would not lead to additional effects. It may be sufficient to use expert judgement to arrive at this conclusion.

“Furthermore, any disturbance that occurs as a result of construction (or decommissioning) activity will be short term and reversible.”

We do not consider referring to the ‘short term’ nature of the impact or ‘recoverability’ to be adequate justification to inform a conclusion as we posit that in the process of repeated recovery from repeated disturbance events, the animals sustain some cost (e.g. energetic). If a conclusion is based on numbers disturbed by a single disturbance event, sufficient justification needs to be provided to back the conclusion that subsequent disturbance events would not lead to additional effects. Furthermore, a definition of “short term” (and other temporal terminology) would need to be provided.

- *Entanglement with mooring lines and cables:*

The same comments made for harbour porpoise above also apply to grey seal.

Section 4.2 Assessment of the project taking into account additional mitigating measures, conditions or restrictions, page 173 – 181
of the HRA Form 1,

- *For grey seal SACs and harbour porpoise SACs - Entanglement with mooring lines and cables*
- *For grey seal SACs and harbour porpoise SACs - Effects of underwater noise (specifically from piling)*

Alongside reference to our comments in our initial response to NRW MLT (29 January 2025) and paragraph 102 of the consultation response to MLT dated 29 July 2025, we cannot currently agree that impacts from Permanent Threshold Shift (PTS) will be mitigated as the Applicant has indicated that mitigation measures have only been considered for auditory injury from instantaneous PTS from piling and not cumulative auditory injury.

That said, with additional commitment from the Applicant to mitigate cumulative SEL as outlined in paragraph 103 of the response dated 29 July 2025, NRW (A) would be able to agree no AEoSI.

In-combination assessment, 2. Annex II Marine Mammals, page 189 – 197

With reference to Annex II Marine Mammals, page 189: We advise that a number of additional projects may have a cumulative effect on the MU populations (including Mona, Morgan, and Morecambe) and that these should be included in the assessment, and the HRA revised.

- *Effects of underwater noise (construction, operation and decommissioning),
Harbour porpoise SACs:*

We note that the assessment for disturbance for Conservation Objective 1, appears to have only considered piling noise. The combined total impact of all underwater noise pathways across the lifetime of the project should be assessed.

We understand that Conservation Objective 2 was assessed by only considering plans and projects that could have a noise overlap with the project. However it is possible that other projects may overlap with SACs within the same MU, without overlapping with the Llŷr project. We recommend that the assessment should be updated to consider this.

- *Collision with Project vessels (construction, operation and decommissioning),
Harbour porpoise SACs:*

We understand that although the Applicant presented a table with total numbers of animals disturbed in combination with other projects, the population model run for the assessment (iPCoD) only modelled the combined population effects from pile driving – iPCoD can currently only assess impacts of piling on a population. Therefore, as the model predictions did not include the additional risk of collision, further information should be included to justify a conclusion of no in-combination effect, and ideally the current reasoning should be revised.

- *Entanglement with mooring lines and cables, Harbour porpoise and Grey Seal SACs:*

We agree that the scale of this development, in combination with other floating wind farm projects will not cover a significant area in comparison to the Celtic and Irish Seas MU. However, we advise that when considering the risk of entanglement for harbour porpoise, the possibility of an entanglement occurring needs to take into consideration our mortality limits (NRW, 2022b), as well as density distribution of the population.

Furthermore, the conclusion of no in-combination effect has been based on it being “...likely that all floating offshore wind developments will deploy monitoring of the cables and moorings and will commit to removal of any ghost gear present”. We do not

consider that this is sufficiently robust to justify a conclusion of no in-combination effect particularly in the context of a lack of evidence of the risk of secondary entanglement and rate of subsequent mortality as a result.

- [*Effects of underwater noise \(construction, operation and decommissioning\), Grey seal SACs*](#)

While we acknowledge that the ES *Chapter 21: Marine Mammals* presented the cumulative total number of animals at risk of disturbance for each activity, the total was calculated by summing the number of animals at risk of disturbance from one disturbance event for each activity – it does not consider repeated disturbance events (across the lifetime of the project).

If a conclusion is based on numbers disturbed by single disturbance events, sufficient justification needs to be provided to back the conclusion that subsequent disturbance events would not lead to additional effects. We do not consider the points currently presented referring to the ‘short term’ nature of the impact or ‘recoverability’ to be adequate justification to inform a conclusion as we posit that in the process of repeated recovery from repeated disturbance events, the animals sustain some cost (e.g. energetic). However, in the absence of supporting empirical evidence, we consider it sufficient to use expert judgement to reach this conclusion, should these points be taken into account and included in the consideration of the impacts in a revised HRA

- [*Collision with Project vessels \(construction, operation and decommissioning\), Grey seal SACs:*](#)

The HRA would benefit from evidence that “*grey seals are accustomed to vessel movement.*”

Similar to Paragraph 107 in our response to the MLT consultation dated 29 July 2025, the worst-case scenario for impact piling duration had originally been specified as 20 days in the project description (Volume 1: Chapter 4 – Description of the Proposed Project), however, this is not consistent with the impact assessment, where the worst-case scenario for piling duration is stated as 10 days. We note and acknowledge the response provided by the Applicant at *Number / reference 218* in the Clarifications Spreadsheet, however we advise the assessment is updated to include this information; application documents should be as updated as possible at the determination stage e.g. via an errata document, particularly to inform future projects using this ES to inform their own.

ONSHORE

7. Terrestrial European Protected Species and Protected Sites

Otters

We cannot agree with a conclusion of no Likely Significant Effect for otters as a feature of the Pembrokeshire Marine SAC and Pembrokeshire Bat Sites and Bosherton Lakes SAC. We are unable to assess the proposals in the context of the Favourable Conservation Status test.

Otters are a feature of Pembrokeshire Marine SAC and Pembrokeshire Bat Sites and Bosheston Lakes SAC, and the application site is well within the range of otters from both SACs. The HRA form indicates that noise and visual disturbance could arise from the works with disturbance anticipated up to approximately 600m from source. This could encompass some of the terrestrial coastal habitat suitable for the species.

No specific otter surveys have been carried out and, as such, it is not possible to ascertain whether an otter natal holt is present in close proximity to the shore where the cabling works will make landfall. In the absence of such survey information, significant effects cannot be ruled out. If further surveys can rule out the likely presence of a natal holt within 200m of the works, we would be content to agree with a conclusion of no likely significant effect on this feature of both SACs.

Bats

Horseshoe bats are a feature of both the Pembrokeshire Bat Sites SAC and Limestone Cliffs of SW Wales SAC, and the greater horseshoe bats in particular are known to use the sea caves along the Castlemartin Coast. We refer to our previous advice in which we confirmed that the works are unlikely to affect any of the sea caves used by the bats and encompassed by SAC designation. We are content to agree a conclusion of no likely significant effect for the horseshoe bat features of these two SAC sites.

Signed: 

Andrea Winterton,

Rheolwr Gwasanaeth Morol, Gweithrediadau / Marine Service Manager, Operations

Date: **29 July 2025**

Appropriate nature conservation body (ANCB) response to an internal HRA consultation

This form should be completed by the team or individual providing the ANCB advice to the competent authority team

TO: Joseph Thomas, Senior Officer, Marine Licencing Team

FROM: Leonie Richardson, Lead Specialist Advisor, Marine
Marine Area Advice and Management Team

SUBJECT: Habitats Regulations Assessment (HRA) of ORML2465: Llŷr 1 Floating Offshore Windfarm (Further Information Consultation 2)

Thank you for consulting the Marine Area Advice and Management Team on the above. Please note this response should be read in conjunction with the advice provided to NRW's Marine Licensing Team on the *ORML2465 Llŷr Floating Offshore Wind Project, Band 3 EIA* Consultation dated 16th March 2026. Our comments are as follows:

OFFSHORE

1. Physical Processes

NRW (A) agrees with the overall conclusions of the HRA of no adverse effects on site integrity (AEoSI) for impact pathways related to physical processes. This includes those measures indicated in the HRA that can be secured through post-consent licence conditions (namely the commitment from the applicant to a post-consent licence condition related to the Cable Burial Risk Assessment (CBRA) and Cable Specification and Installation Plan (CSIP)).

2. Benthic Subtidal and Intertidal Ecology

NRW (A) agree with the overall conclusions of the HRA assessment of no AEoSI for Benthic Subtidal and Intertidal Ecology. We note the importance of the measures indicated in the HRA to secure agreement of the post-consent licence conditions related to agreement on the CBRA and CSIP to avoid impacts on benthic features. These include avoiding impacts on Annex 1 Reef features through micro-siting, cable preparation and laying methodology, and use of appropriate rock protection where necessary.

3. Marine Water and Sediment Quality

NRW (A) agree with the overall conclusions of the HRA assessment of no AEoSI for matters relating to marine water and sediment quality.

4. Fish and Shellfish Ecology

NRW (A) agree with the overall conclusions of the HRA assessment of no AEoSI for matters relating to Fish and Shellfish Ecology. However, we note that for migratory fish features, the Appropriate Assessment concludes that AEoSI cannot be ruled out in the absence of mitigation and proposes that 'soft-start' procedures are conditioned in the Marine Licence. In our response dated 29th July 2025, we provided the following advice in Section 1.5.2.2. Paragraph 62 and referenced at end of the HRA form: *'We note that soft-start procedures have been included as mitigation for impacts to migratory fish features from underwater noise from piling activities. We advise that there is no evidence to support the use of soft-start as mitigation for fish, however, given the short duration of the activities and the limited spatial extent of the noise impact, we agree that adverse effects on site integrity can be ruled out.'* We therefore advise that the use of soft-start procedures as a mitigation measure is not necessary in this instance and the HRA can be amended accordingly.

5. Marine Ornithology

NRW (A) agree with the conclusions of no AEoSI for the Skomer, Skokholm and the Seas off Pembrokeshire (SSSP) SPA and Grassholm SPA from the project alone and in-combination. However, we reiterate that this is due to NRW (A) undertaking its own work on in-combination assessments (including apportioning of in-combination impacts to SSSP SPA (LBBG) and puffin alongside interpretation of the Mona Population Viability Analysis metrics (see Appendix 2 of our advice to MLT dated 29th July 2025).

We welcome that in *Section 4.2* of the HRA for the 'assessment of the project alone taking into account additional mitigating measures', conditions or restrictions for the SSSP SPA and Grassholm SPA for entanglement of the relevant qualifying features has been updated with the following mitigation measure:

'Regular inspection of the mooring lines and removal of entangled debris to be implemented during operations and maintenance via the Project Environmental Management Plan. The above can be secured through a licence condition.'

We agree that this should be secured as a condition in the marine licence and ask that this is also agreed in writing with NRW (A). The CA may also wish to consider inclusion of agreement with JNCC given their remit beyond 12 nm. Additionally, as part of the licence condition, we again advise a requirement be included that the Applicant provide annual reports of the debris found entangled in the mooring lines, including frequency of entanglement, type of debris entangled and details of its removal.

We remain able to conclude that AEoSI can be ruled out from both the project alone and in-combination for all features of all relevant Welsh SPAs.

6. Marine Mammals

With reference to our previous response, dated 29th July 2025, whilst a number of issues have been resolved, NRW (A) consider that there remain some outstanding issues that have not been addressed.

Of those outstanding issues, we consider that the points raised in our response of 29th July 2025 in *Paragraphs 123, 124 and 131* pertaining to the section on *Appropriate Assessment of the Project when Considered Alone*, *4. Harbour porpoise SACs, page 148 – page 155*; *Paragraphs 141 – 144* pertaining to the section on *Appropriate Assessment of the Project when Considered Alone*, *5. Grey seal SACs, page 156 – page 165*; and *Paragraphs 149, 152, and 154-155* pertaining to the section on *In-combination assessment*, *2. Annex II Marine Mammals, page 189 – 197*, will not have a material effect on our ability to agree with the conclusions of the HRA.

However, we advise that a number of additional projects may have a cumulative effect on the Management Unit populations (including Mona, Morgan, and Morecambe Offshore Wind Farm Projects) and that these should be included in the assessment, and the HRA revised accordingly.

We note that these projects were listed as Tier 4 projects in the Applicant's cumulative assessment and Report to Inform Appropriate Assessment (RIAA) as at the time the Marine Mammals Chapter of the ES and RIAA were finalised, these projects were only expected to be submitted for application. However, full assessment information for these projects is now publicly available, and given the elapsed time between the final draft of the RIAA and the current stage of the consenting process, whilst we consider it likely that we would be able to agree with the conclusions of the HRA, we advise that the list for the in-combination assessment is revisited to ensure a full and robust assessment.

We further advise the following:

- Regarding *Section 4 Harbour porpoise SACs – Entanglement with mooring lines and cables*, the HRA (page 157) currently states that: '*The Applicant's assessment of effects takes account of best practice mitigation measures that will be adopted as part of the project.*' We advise this is updated to match the statement by the Applicant in *Section 1 Introduction* and *Section 2.7 Entanglement Risk* of the outline MMMP (Revision 02), with respect to developing the relevant mitigation measures post-consent, secured by a condition.
- Similarly, regarding *Section 4.2 Assessment of the project taking into account additional mitigating measures, conditions or restrictions – Entanglement with mooring lines and cables* the HRA (page 181) states that: '*The Applicant has committed to regular inspections of the moorings and cables, and the removal of any ghost gear found.*' We advise this is updated to match the information provided by the Applicant in *Section 2.7 Entanglement Risk* of the Outline MMMP (Revision 02).

Otherwise, we have no further comments to make regarding *ORML2465: Record of a Habitats Regulations Assessment of a project: Form 1* with respect to Marine Mammals.

7. Terrestrial European Protected Species and Protected Sites

Construction Environmental Management Plan (CEMP)

We note that an outline CEMP has been produced in support of the application (Appendix 4A). With reference to otters, we advise that an updated CEMP be conditioned as part of any permission granted, which includes the following, but is not limited to:

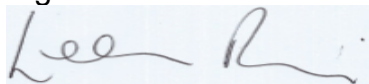
- Details of pre-construction checks for otters;
- Contingencies in the event that otters are found in advance of works commencing or during the works;
- Appropriate buffers between works and identified otter natal holts;
- Protected species mitigation measures including good practice working measures for otters and appropriate, specified otter-proof fencing around HDD pits;
- Details of where existing gateways / gaps in hedges shall be used.

To ensure implementation of the otter mitigation measures, set out in Section 6.4 of the Onshore Cable Route Otter Survey, we advise that the document below is included within the approved plans and documents section of the decision notice:

- Llyr Offshore Wind Farm. Onshore Cable Route Otter Survey. Freshwater West to Pembroke Power Station dated December 2025. Ref: P10-LLY-4.2.3-REP-0003

Provided the above conditions are included within any decision notice, NRW (A) consider that the HRA can be positively concluded with respect to otters.

Signed:



Leonie Richardson

Cynghorydd Arbenigol Arweiniol, Morol / Lead Specialist Advisor, Marine

Tîm Cyngor a Rheoli Ardaloedd Morol / Marine Area Advice and Management Team

Date: 16th March 2026

Appendix 2 – JNCC Advice

<https://publicregister.naturalresources.wales/Search/Download?RecordId=205891>