Morecambe Offshore Windfarm: Generation Assets

Environmental Statement

Volume 5

Chapter 23 Summary: Generation and Transmission Assets Assessment

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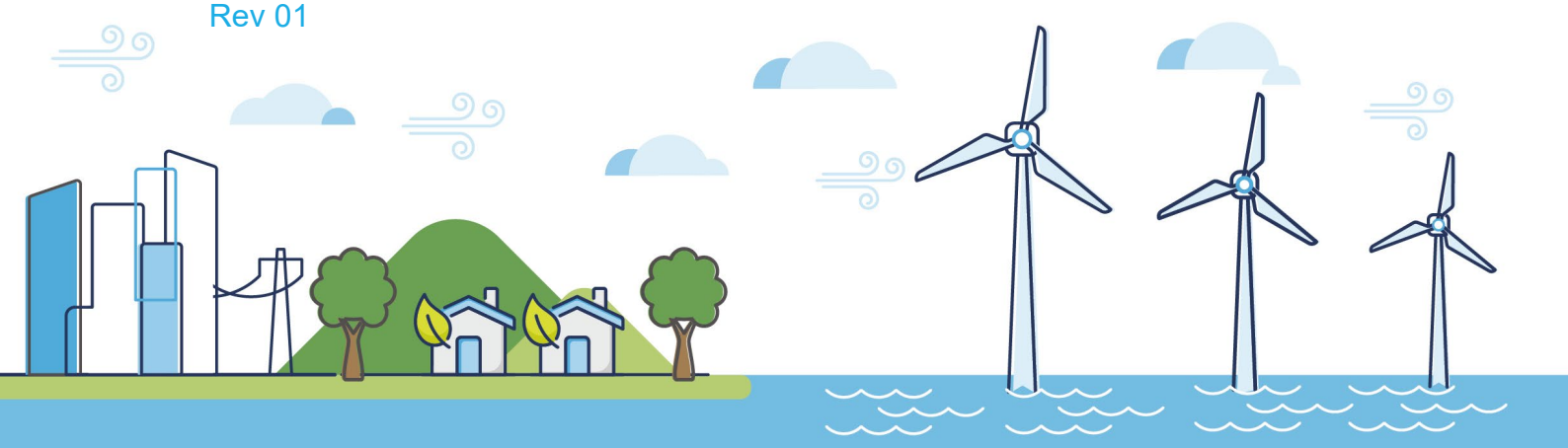

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Glossary of Acronyms

ALARP	As Low as Reasonably Possible
BMV	Best and Most Versatile
BNG	Biodiversity Net Gain
CCS	Carbon Capture and Storage
CEA	Cumulative Effects Assessment
cSAC	Candidate Special Area of Conservation
DCO	Development Consent Order
DCSA	Defence Communication Services Agency
EIA	Environmental Impact Assessment
EMF	Electromagnetic Field
EnBW	Energie Baden-Württemberg AG
ES	Environmental Statement
GHG	Greenhouse Gases
GVA	Gross Value Added
HDD	Horizontal Directional Drilling
HMRI	Helicopter Main Route (Indicator)
HNDR	Holistic Network Design Review
HSC	Historic Seascape Characterisation
IAQM	Institute of Air Quality Management
IEF	Important Ecological Feature
INNS	Invasive Non-Native Species
ISAA	Information to Support an Appropriate Assessment
LRN	Local Road Network
MCA	Marine Character Area
MCZ	Marine Conservation Zone
MCZA	Marine Conservation Zone Assessment
MLWS	Mean Low Water Springs
NCN	National Cycle Network
NGESO	National Grid Electricity System Operator
NTS	Non-Technical Summary
OBS	Offshore Booster Station
OSP	Offshore substation platform
OTNR	Offshore Transmission Network Review
OWF	Offshore Windfarm

OWL	Offshore Wind Limited
PATP	Port Access and Transport Plan
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
PRoW	Public Right of Way
RIAA	Report to Inform Appropriate Assessment
SAC	Special Area of Conservation
SAR	Search and Rescue
SRN	Strategic Road Network
SSC	Suspended Sediment Concentration
SSSI	Site of Special Scientific Interest
SSZ	Seascape Sensitivity Zone
UXO	Unexploded Ordnance
WTG	Wind turbine generator

Glossary of Unit Terms

km	Kilometres
km^2	Kilometres Squared
kV	Kilovolt
m	Metre

Glossary of Terminology

Applicant	Morecambe Offshore Windfarm Ltd
Applicant for the Transmission Assets	Morecambe Offshore Windfarm Ltd and Morgan Offshore Wind Limited
Application	This refers to the Applicant's application for a Development Consent Order (DCO). An application consists of a series of documents and plans which are published on the Planning Inspectorate's (PINS) website.
European sites	Designated nature conservation sites which include the National Site Network (designated within the UK) and Natura 2000 sites (designated in any European Union country). This includes candidate Special Areas of Conservation (cSAC), Sites of Community Importance, Special Areas of Conservation and Special Protection Areas.
Generation Assets (the Project)	Generation assets associated with the Morecambe Offshore Windfarm. This is infrastructure in connection with electricity production, namely the fixed foundation wind turbine generators (WTGs), inter-array cables, offshore substation platform(s) (OSP(s)) and possible platform link cables to connect OSP(s).
Inter-array cables	Cables which link the WTGs to each other and the OSP(s).
Landfall	Where the offshore export cables would come ashore.
Morgan and Morecambe Offshore Wind Farms: Transmission Assets	The transmission assets for the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm. This includes the OSP(s)[1], interconnector cables, Morgan Offshore Booster Station (OBS), offshore export cables, landfall site, onshore export cables, onshore substations, 400kV cables and associated grid connection infrastructure such as circuit breaker infrastructure. Also referred to in this chapter as the Transmission Assets, for ease of reading.
Offshore export cables	The cables which would bring electricity from the OSP(s) to the landfall.
Offshore substation platform(s)	A fixed structure located within the windfarm site, containing electrical equipment to aggregate the power from the WTGs and convert it into a more suitable form for export to shore.
Onshore export cables	The cables which would bring electricity from the offshore substation platform to the landfall.
Onshore project	Part of an electrical transmission and distribution system.

[1] At the time of writing the Environmental Statement (ES), a decision had been taken that the offshore substation platforms (OSPs) would remain solely within the Generation Assets application and would not be included within the Development Consent Order (DCO) application for the Transmission Assets. This decision post-dated the Preliminary Environmental Information Report (PEIR) that was prepared for the Transmission Assets. The OSPs are still included in the description of the Transmission Assets for the purposes of this ES as the Cumulative Effects Assessment (CEA) carried out in respect of the Generation/Transmission Assets is based on the information available from the Transmission Assets PEIR.

substation	Substations transform voltage from high to low, or the reverse by means of electrical transformers.
Platform link cable	An electrical cable which links one or more OSP(s).
Windfarm site	The area within which the WTGs, inter-array cables, OSP(s) and platform link cables will be present.
Wind turbine generator (WTG)	A fixed structure located within the windfarm site that converts the kinetic energy of wind into electrical energy.

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23 Summary: Generation and Transmission Assets Assessment

23.1 Introduction

1. This summary document is submitted as part of the Environmental Statement (ES) undertaken for the Morecambe Offshore Windfarm Generation Assets (the Project).

2. The Project infrastructure (Generation Assets) includes the wind turbine generators (WTGs), inter-array cables, offshore substation platform(s) (OSP(s)), and possible platform link cables to connect the OSP(s). All infrastructure will be located within the Project windfarm site.

3. This document provides an overview summary of the likely effects of the construction, operation and maintenance, and decommissioning of the transmission infrastructure for the Morecambe Offshore Windfarm which is subject to a separate consent application from the Project. A summary of the effects of the Project (Generation Assets) is also provided for context allowing stakeholders to have an overall view of the effects of all infrastructure as part of the Morecambe Offshore Windfarm. The boundaries of Generation Assets and Transmission Assets infrastructure are shown in **Figure 23.1**.

4. A separate consent for the Transmission Assets associated with the Morecambe Offshore Windfarm and the Morgan Offshore Wind Project (another proposed windfarm to be located in the Irish Sea) is being sought. This project is known as the Morgan and Morecambe Offshore Wind Farms: Transmission Assets and covers the transmission assets necessary to export electricity generated by both the Morecambe Offshore Windfarm and the Morgan Offshore Wind Project to the National Grid electricity transmission network (further details provided below).

5. The Applicant for the Transmission Assets is Morecambe Offshore Windfarm Ltd (which is also the sole Applicant for the Project) and Morgan Offshore Wind Limited (Morgan OWL). Morgan OWL is a joint venture formed between bp Alternative Energy Investments Ltd (bp) and Energie Baden-Württemberg AG (EnBW).

6. Both the Morecambe Offshore Windfarm and the Morgan Offshore Wind Project were scoped into the ‘Pathways to 2030’ workstream under the Offshore Transmission Network Review (OTNR). The OTNR aims to consider, simplify, and wherever possible facilitate a collaborative approach to offshore wind projects connecting to the National Grid.

7. Under the OTNR, the National Grid Electricity System Operator (NGESO) is responsible for assessing options to improve the coordination of offshore wind generation connections and transmission networks and has undertaken a

Holistic Network Design Review (HNDR). In July 2022, the NGESO published the 'Pathway to 2030 Holistic Network Design' documents, which set out the approach to connecting 50GW of offshore wind to the National Grid (NGESO, 2022). A key output of the HNDR process was the conclusion that the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm would both connect their windfarms to the National Grid electricity transmission network at Penwortham in Lancashire.

8. The developers of the Transmission Assets project, being in agreement with the output from the HNDR, are working collaboratively and are jointly seeking a single Development Consent Order (DCO) for the Transmission Assets of both projects. The separate DCO application for the Transmission Assets is expected to be submitted to the Planning Inspectorate (PINS) in 2024. An application accompanied by an ES will therefore be provided separately for the Transmission Assets, with separate marine licences to be deemed under the DCOs for the Project (Generation Assets) and the Transmission Assets, respectively.

9. This document has been prepared in response to Section 42 responses, primarily from Natural England and the Marine Management Organisation, as part of the formal consultation process for the Project, and in recognition of the connection between the Project and the Transmission Assets. The approach to co-ordination and to this document (outlining the effects of all infrastructure associated with both Transmission and Generation Assets) is also in line with the overarching national policy statement for energy (EN-1) (DESNZ, 2023) which states that:

The Planning Act 2008 aims to create a holistic planning regime so that the cumulative effect of different elements of the same project can be considered together. Co-ordinated applications typically bring economic efficiencies and reduced environmental impact. The government therefore envisages that wherever reasonably possible, applications for new generating stations and related infrastructure should be contained in a single application to the Secretary of State or in separate applications submitted in tandem which have been prepared in an integrated way, as outlined in EN-5. This is particularly encouraged to ensure development of more co-ordinated transmission overall (EN-1 4.11.7).

On some occasions it may not be possible to coordinate applications. For example, different elements of a project may have different lead-in times and be undertaken by different legal entities subject to different commercial and regulatory frameworks (for example grid companies operate within OFGEM controls) making it inefficient from a delivery perspective to submit one application. Applicants may therefore decide to submit separate applications for each element. Where this is the case, the applicant should include information on the other elements and explain the reasons for the separate

application confirming that there are no obvious reasons for why other elements are likely to be refused (EN-1 4.11.8).

10. The integration between the Generation Assets and the Transmission Assets takes place at the OSP(s). The inter-array cables will connect the WTGs to the OSP(s) as part of the Generation Assets, and the offshore export cables will connect the OSP(s) to the landfall (as part of the Transmission Assets).

11. At the time of writing this ES, a decision had been taken that the OSP(s) would remain solely within the respective Generation Assets DCO Applications for Morecambe and Morgan and would not be included within the DCO Application for the Transmission Assets. This decision post-dated the Preliminary Environmental Information Report (PEIR) that was prepared for the Transmission Assets (within which the OSPs are also assessed). The OSP(s) are still included in the description of the Transmission Assets for the purposes of this summary document as this ES is based on the information available from the Transmission Assets PEIR (noting the ES for the Transmission Assets will not be available until after the DCO application for the Transmission Assets has been made).

12. The Transmission Assets PEIR has been used in this document to outline the description of the Transmission Assets project as well as the summary of assessment of environmental effects, noting that the ES for the Transmission Assets is planned to be submitted after this Project DCO Application.

23.2 Description of Generation and Transmission Assets

13. This section presents a brief description of the following windfarm components which will be subject to separate consent applications:

- Generation Assets (the Project)
- Transmission Assets

14. The information regarding the Transmission Asset project has been obtained from the publicly available Morgan and Morecambe Offshore Wind Farms: Transmission Assets PEIR published in October 2023 (Morgan Offshore Wind Limited and Morecambe Offshore Windfarm Ltd, 2023a). The Non-Technical Summary (NTS) for the Transmission Assets PEIR is included within the DCO Application for reference (Document Reference 4.16).

15. The Transmission Assets ES is expected to be submitted in 2024 (following the submission of this Project ES) and shall contain final details of both the Transmission Assets and the Generation Assets at Application stage (i.e. the Transmission Assets ES will refer to the assessments contained within this Project (Generation Assets) ES when considering cumulative effects).

16. A description of the elements that comprise the Generation Assets (**Section 23.2.1**) and Transmission Assets (**Section 23.2.2**) is presented below, and a schematic overview of these components is shown in **Plate 23.1** for context.

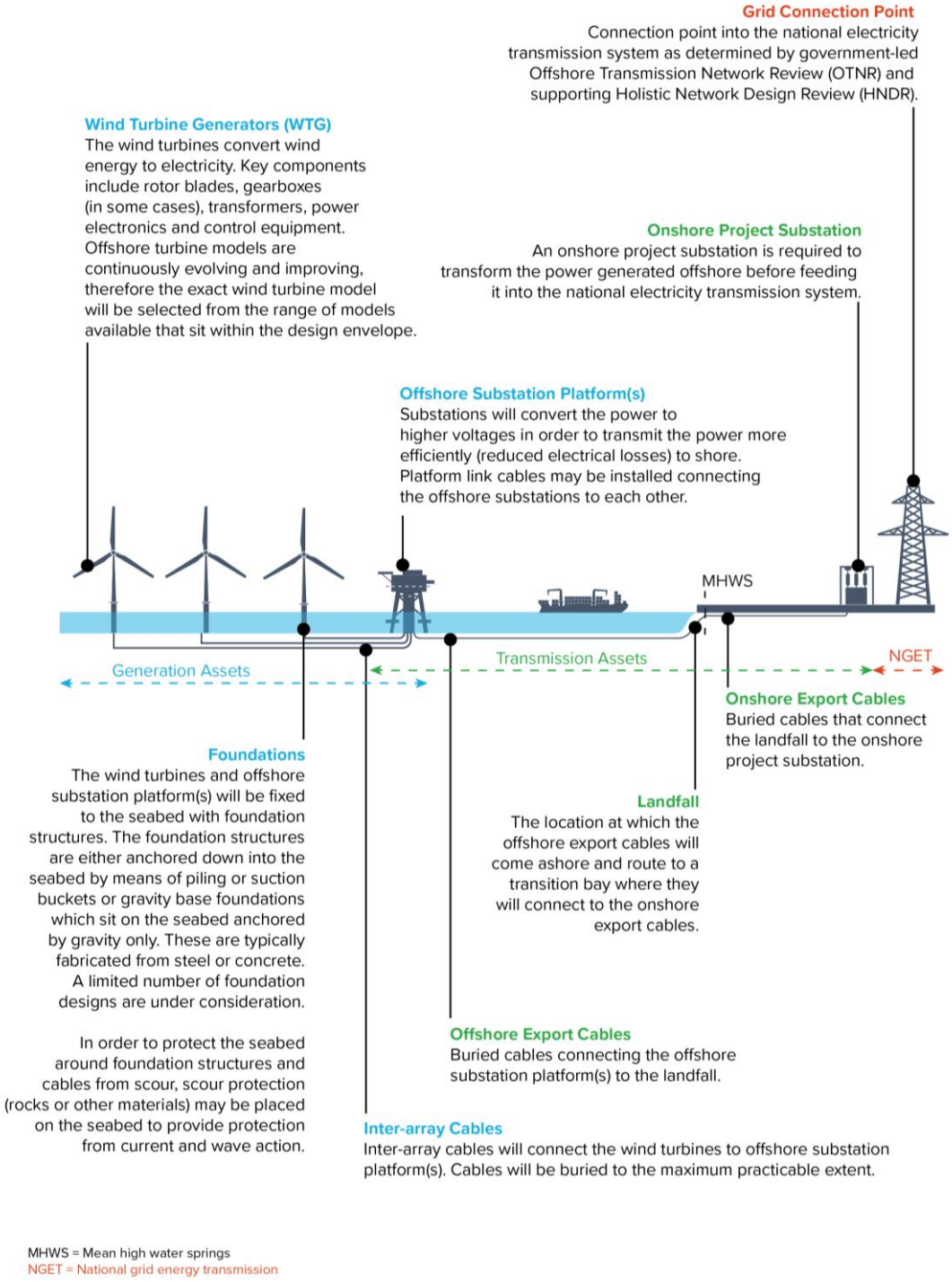

Plate 23.1 Components of Morecambe Offshore Windfarm (generation and transmission). Generation Assets are in blue (the Project), and Transmission Assets are in green)

23.2.1 Generation Assets

17. The Project windfarm site (encompassing all Generation Asset infrastructure) is located in the Eastern Irish Sea and encompasses a seabed area of 87km^2. It is located approximately 30km from the nearest point on the coast of Lancashire (see **Figure 23.1**).

18. The Project (Generation Assets) will include WTGs (windfarm array), OSP(s) to convert generated power to a suitable voltage for transmission to shore, inter-array cables to connect WTGs to the OSP(s), and possible platform link cables to connect the OSP(s). A full description of the Project is provided in **Chapter 5 Project Description** (Document Reference 5.1.5).

23.2.2 Transmission Assets

23.2.2.1 General description

19. The Transmission Assets, as described in the Transmission Asset PEIR, will comprise of the permanent and temporary infrastructure required for the transmission of electricity from both the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm to a common connection point into the existing National Grid substation at Penwortham, Lancashire, including:

- Offshore infrastructure including offshore export cables, OSPs, interconnector cables and a potential Morgan Offshore Booster Station (OBS)[2]
- Landfall (where the offshore cables reach the shore in the vicinity of Blackpool Airport) between Mean Low Water Springs (MLWS) and the transition joint bays (where the offshore and onshore cables will be jointed), intertidal working area, landfall construction compound(s), and temporary and permanent access
- Onshore infrastructure from the transition joint bays to the electricity transmission network connection. This includes onshore export cables to two new substations, temporary construction compounds, temporary and permanent accesses, and onward connections to the existing National Grid substation at Penwortham, Lancashire
- Areas for Biodiversity Net Gain (BNG), enhancement and/or mitigation, including permanent access for operation and maintenance of those areas

[2] As described in **Section 23.1**, at the time of writing this ES a decision had been taken that the OSPs would not be included within the DCO Application for the Transmission Assets. This decision post-dated the Transmission Asset PEIR (within which the OSPs are also assessed). The final ES for the Transmission Assets will therefore not include the OSPs or associated interconnector cables. Additionally, a decision had been taken since the PEIR that the Morgan OBS would no longer be required. Whilst the OSPs, OBS and interconnector cables will not form part of the DCO Application for the Transmission Assets, they are included here as they were contained within the Transmission Asset PEIR which has been used to inform this ES and summary document.

20. It should be noted that the Transmission Assets will comprise of two coordinated, but electrically separate, sets of transmission works for Morgan and Morecambe (for example, where each offshore windfarm would have its own transmission cables and substation infrastructure). A full description of the Transmission Assets is provided in the Transmission Assets PEIR (Morgan Offshore Wind Limited and Morecambe Offshore Windfarm Ltd, 2023a), with a summary provided below.

23.2.2.2 Offshore components of the Transmission Assets

21. The offshore Transmission Assets comprise of:

- OSP(s) to transform electricity generated by the windfarms to a higher voltage, allowing the power to be efficiently transmitted to shore. Up to six OSPs (comprising of up to four OSPs for the Morgan Offshore Wind Project and up to two OSPs for the Morecambe Offshore Windfarm) are required
- Interconnector cables may be required between OSPs to provide redundancy in the case of cable failure and to connect individual OSPs to each other
- An OBS may be required for the Morgan Offshore Wind Project for the HVAC transmission system where the total length of the export cable exceeds 80km
- Offshore export cables laid within a shared export cable corridor are anticipated to transfer power from the OSPs to the landfall. Up to six offshore export cables may be required (i.e. up to four export cables for the Morgan Offshore Wind Project and up to two export cables for the Morecambe Offshore Windfarm)

23.2.2.3 Landfall

22. The landfall site serves as the connection point where the offshore export cables link with the onshore export cables, being a transitional area between offshore and onshore cabling.

23. The anticipated landfall location is situated along the northwest coast of England between Blackpool and Lytham St. Annes in Lancashire.

24. The offshore export cable will be installed beneath the Lytham St. Annes Site of Special Scientific Interest (SSSI), traversing under the golf course and sand dunes, using Horizontal Directional Drilling (HDD) or other trenchless techniques. Cable installation across the intertidal (beach) area may utilize either trenchless methods or open trenching as required.

25. The offshore export cables will be connected to the onshore export cables at transition joint bays. These bays consist of underground concrete structures and will be located in the vicinity of Blackpool Airport.

23.2.2.4 Onshore components of the Transmission Assets

26. The onshore export cables will link the landfall site and the proposed onshore substations. The onshore cable corridor is expected to be approximately 25km in length heading eastward inland as it moves away from the coastline.

27. Near Blackpool Airport, the site selection process is exploring various options, including cable installation on airport-operated land or within public highways.

28. Beyond Blackpool Airport and Queensway (B5261), the corridor narrows and heads southeast toward North Houses Lane. In the Lytham Moss and Higher Ballam area, two route options are under consideration.

29. These options converge east of Ballam Road, and the corridor then continues northeast toward Hall Cross, north of Freckleton. The routing of the cable corridor in this region will depend on the final location of the onshore substations, situated within the Freckleton/Hall Cross onshore export cable corridor search area.

30. In the same way, options are being considered regarding the location of the onshore substations, which would be separate for the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm.

31. Anticipating the need for up to 18 onshore export cables (up to 12 for the Morgan Offshore Wind Project and up to six for the Morecambe Offshore Windfarm), installation methods will primarily involve open-cut techniques. Trenchless methods, such as HDD, will be employed where necessary.

32. Once installed, the cables will typically occupy a corridor up to 70m wide but may vary in specific areas where obstacles are present.

33. The link between the proposed project onshore substations and the existing National Grid substation at Penwortham will be established using 400kV grid connection cables. These cables will be situated within the designated 400kV grid connection cable corridor search area, with an estimated route length of approximately 15km. A total of up to 12 x 400kV grid connection cables are expected to be necessary.

23.2.2.5 Onshore BNG, enhancement and/or mitigation areas

34. Impact on habitats resulting from the Transmission Assets are planned to be minimised and, where feasible and necessary, achieving BNG. Through an iterative Environmental Impact Assessment (EIA) process, areas suitable for BNG, enhancement, and/or mitigation have been identified.

35. Opportunities are being explored to collaborate with existing biodiversity schemes in proximity to the Transmission Assets. Efforts have been made to identify potentially suitable schemes and determine where the project can positively contribute to ongoing conservation initiatives.

36. Various measures are actively under consideration as both mitigation and enhancement opportunities.

23.3 Transmission Assets assessment (PEIR)

37. The Transmission Assets PEIR is divided into four volumes. The structure and the content of each volume is presented in **Table 23.1**.

Table 23.1 Transmission Assets PEIR structure

Volume	Chapters
Volume 1: General introduction, context, project description, site selection and methodology of the EIA	Chapter 1: Introduction Chapter 2: Policy and legislation context Chapter 3: Project description Chapter 4: Site selection and consideration of alternatives Chapter 5: Environmental assessment methodology
Volume 2: Focuses on the assessment of the offshore effects of the Transmission Assets project	Chapter 1: Physical processes Chapter 2: Benthic subtidal and intertidal ecology Chapter 3: Fish and shellfish ecology Chapter 4: Marine mammals Chapter 5: Offshore ornithology Chapter 6: Commercial fisheries Chapter 7: Shipping and navigation Chapter 8: Marine archaeology Chapter 9: Other sea users
Volume 3: Focuses on the assessment of the onshore effects of the Transmission Assets project.	Chapter 1: Geology, hydrogeology and ground conditions Chapter 2: Hydrology and flood risk Chapter 3: Onshore ecology and nature conservation Chapter 4: Onshore and intertidal ornithology Chapter 5: Historic environment Chapter 6: Land use and recreation Chapter 7: Traffic and transport Chapter 8: Noise and vibration Chapter 9: Air quality
Volume 4: Focuses the assessment of the offshore and onshore effects of the Transmission Assets project	Chapter 1: Seascape, landscape and visual resources Chapter 2: Aviation and radar Chapter 3: Climate change Chapter 4: Socio-economics Chapter 5: Inter-relationships

23.3.1 Assessment summary

38. This section presents a summary of the assessment of the Transmission Assets project-alone offshore effects (**Table 23.2**), onshore effects (**Table 23.3**) and offshore and onshore effects (**Table 23.4**), as derived from the assessment information of the Transmission Assets PEIR (Morgan Offshore Wind Limited and Morecambe Offshore Windfarm Ltd, 2023a). The assessment includes consideration of embedded mitigation measures identified for the Transmission Assets within the PEIR, with proposed additional mitigation measures identified where applicable to the assessment.

Table 23.2 Results of the assessment of the offshore effects of the Transmission Assets project-alone (C=construction, O=operation and maintenance, D=decommissioning)

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
Physical processes	Increases in suspended sediment concentrations (SSC) due to construction, operation and maintenance and/or decommissioning related activities, and the potential impact to physical features.	C: Negligible O: Negligible D: Negligible	N/A	Negligible
Physical processes	Impacts to the wave regime due to presence of infrastructure and the associated potential impacts along adjacent shorelines.	C: Negligible O: Negligible D: Negligible	N/A	Negligible
Physical processes	Impacts to the tidal regime due to presence of infrastructure and the associated potential impacts along adjacent shorelines.	C: Negligible O: Negligible D: Negligible	N/A	Negligible
Physical processes	Impacts to sediment transport and sediment transport pathways due to presence of infrastructure and associated potential impacts to physical features and bathymetry.	C: Negligible O: Negligible D: Negligible	N/A	Negligible
Physical processes	Impacts to sediment transport and sediment pathways at the export cable landfall.	C: Negligible O: N/A D: N/A	N/A	N/A to Negligible

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
Benthic subtidal and intertidal ecology	Temporary habitat loss/disturbance	C, O, D ▪ Subtidal habitat Important Ecological Feature (IEF): Minor Adverse ▪ Fylde Marine Conservation Zone (MCZ) IEFs: Minor Adverse ▪ Intertidal habitat IEFs: Minor Adverse	N/A	Minor Adverse
Benthic subtidal and intertidal ecology	Increased SSC and associated deposition	C, D: ▪ Subtidal habitat IEFs: Negligible Adverse ▪ Shell Flat and Lune Deep Special Area of Conservation (SAC) IEFs: Negligible Adverse ▪ Fylde MCZ IEFs: Negligible Adverse/Minor Adverse ▪ West of Walney MCZ IEFs: Negligible Adverse ▪ West of Copeland MCZ IEFs: Negligible Adverse ▪ Intertidal IEFs: Negligible Adverse O:	N/A	Negligible to Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
		▪ Subtidal habitat IEFs: Negligible Adverse ▪ Shell Flat and Lune Deep SAC IEFs: Negligible Adverse ▪ Fylde MCZ IEFs: Negligible Adverse ▪ West of Walney MCZ IEFs: Negligible Adverse ▪ West of Copeland MCZ IEFs: Negligible Adverse ▪ Intertidal IEFs: Negligible Adverse		
Benthic subtidal and intertidal ecology	Disturbance/remobilisation of sediment-bound contaminants	C, O, D: ▪ Subtidal habitat IEFs: Negligible Adverse ▪ Shell Flat and Lune Deep SAC IEFs: Negligible Adverse ▪ Fylde MCZ IEFs: Negligible Adverse ▪ West of Walney MCZ IEFs: Negligible to Minor Adverse ▪ West of Copeland MCZ IEFs: Negligible Adverse ▪ Intertidal IEFs: Negligible Adverse	N/A	Negligible to Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
Benthic subtidal and intertidal ecology	Long term habitat loss	C, O: ▪ Subtidal habitat IEFs: Minor Adverse ▪ Fylde MCZ IEFs: Minor Adverse D: ▪ Subtidal habitat IEFs: Minor Adverse ▪ Fylde MCZ IEFs: Minor Adverse	N/A	Minor Adverse
Benthic subtidal and intertidal ecology	Introduction of artificial structures	C, O: ▪ Subtidal habitat IEFs: Minor Adverse ▪ Fylde MCZ IEFs: Minor Adverse	N/A	Minor Adverse
Benthic subtidal and intertidal ecology	Increased risk of introduction and spread of Invasive Non-Native Species (INNS)	C, O, D: ▪ Subtidal habitat IEFs: Minor Adverse ▪ Fylde MCZ IEFs: Minor Adverse	N/A	Minor Adverse
Benthic subtidal and intertidal ecology	Removal of hard substrates	D: ▪ Subtidal habitat IEFs: Minor Adverse	N/A	Minor Adverse
Benthic subtidal and intertidal ecology	Changes in physical processes	C, D:	N/A	No effect to Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
		▪ Subtidal habitat IEFs: Negligible Adverse ▪ Shell Flat and Lune Deep SAC IEFs: No Effect ▪ Fylde MCZ IEFs: Minor Adverse ▪ West of Walney MCZ IEFs: No Effect ▪ West of Copeland MCZ IEFs: No Effect ▪ Intertidal IEFs: Negligible Adverse		
Benthic subtidal and intertidal ecology	Impacts to benthic invertebrates due to Electromagnetic Field (EMF)	O: ▪ Subtidal habitat IEFs: Negligible Adverse ▪ Fylde MCZ: Negligible Adverse	N/A	Negligible Adverse
Benthic subtidal and intertidal ecology	Heat from subsea electrical cables	O: ▪ Subtidal habitat IEFs: Negligible Adverse ▪ Fylde MCZ: Negligible Adverse	N/A	Negligible Adverse
Fish and shellfish ecology	Temporary habitat loss/disturbance	C: ▪ Marine (fish and shellfish): Minor Adverse	N/A	Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
		▪ Diadromous: Minor Adverse O: ▪ Marine (fish and shellfish): Minor Adverse ▪ Diadromous: Minor Adverse D: ▪ Marine (fish and shellfish): Minor Adverse ▪ Diadromous: Minor Adverse		
Fish and shellfish ecology	Underwater sound from piling, Unexploded Ordnance (UXO) clearance and geophysical surveys impacting fish and shellfish receptors	C: Minor Adverse	N/A	Minor Adverse
Fish and shellfish ecology	Underwater sound from all other activities	C: Negligible O: Negligible D: Negligible	N/A	Negligible
Fish and shellfish ecology	Increased SSCs and associated sediment deposition	C: ▪ Marine (fish and shellfish): Minor Adverse ▪ Diadromous: Negligible O: ▪ Marine (fish and shellfish): Negligible to Minor Adverse	N/A	Negligible to Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
		▪ Diadromous: Negligible D: ▪ Marine (fish and shellfish): Negligible to Minor Adverse ▪ Diadromous: Negligible		
Fish and shellfish ecology	Long term habitat loss	C: ▪ Marine (fish and shellfish): Minor Adverse ▪ Diadromous: Minor Adverse O: ▪ Marine (fish and shellfish): Minor Adverse ▪ Diadromous: Minor Adverse D: ▪ Marine (fish and shellfish): Minor Adverse ▪ Diadromous: Minor Adverse	N/A	Minor Adverse
Fish and shellfish ecology	EMFs from subsea electrical cabling	O: ▪ Marine (fish and shellfish): Minor Adverse	N/A	Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
		▪ Diadromous: Minor Adverse		
Fish and shellfish ecology	Introduction of hard substrata	C: ▪ Marine (fish and shellfish): Minor Adverse ▪ Diadromous: Minor Adverse O: ▪ Marine (fish and shellfish): Minor Adverse ▪ Diadromous: Minor Adverse D: ▪ Marine (fish and shellfish): Minor Adverse ▪ Diadromous: Minor Adverse	N/A	Minor Adverse
Fish and shellfish ecology	Injury due to increased risk of collision with vessels	C: Minor Adverse O: Minor Adverse D: Minor Adverse	N/A	Minor Adverse
Fish and shellfish ecology	Disturbance/remobilisation of sediment-bound contaminants	C: ▪ Marine (fish and shellfish): Minor Adverse ▪ Diadromous: Minor Adverse	N/A	Negligible to Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
		O: ▪ Marine (fish and shellfish): Negligible ▪ Diadromous: Negligible D: ▪ Marine (fish and shellfish): Minor Adverse ▪ Diadromous: Minor Adverse		
Marine mammals	Injury and disturbance from elevated underwater sound during piling	C: ▪ Harbour porpoise: Minor Adverse (injury/disturbance) ▪ Bottlenose dolphin: Minor Adverse (injury/disturbance) ▪ Shortbeaked common dolphin: Minor Adverse (injury/disturbance) ▪ Risso's dolphin: Minor Adverse (injury/disturbance) ▪ Minke whale:	N/A	Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
		Minor Adverse (injury/disturbance) ▪ Grey seal: Minor Adverse (injury/disturbance)		
Marine mammals	Injury and disturbance from underwater sound generation from UXO detonation	C: ▪ Harbour porpoise: Minor Adverse (injury/disturbance) ▪ Bottlenose dolphin: Minor Adverse (injury/disturbance) ▪ Shortbeaked common dolphin: Minor Adverse (injury/disturbance) ▪ Risso's dolphin: Minor Adverse (injury/disturbance) ▪ Minke whale: Minor Adverse (injury/disturbance) ▪ Grey seal: Minor Adverse (injury/disturbance)	N/A	Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
Marine mammals	Injury and disturbance to marine mammals from vessel use and other (non-piling) sound producing activities	C, O, D: ▪ Harbour porpoise: Minor Adverse (injury/disturbance) ▪ Bottlenose dolphin: Minor Adverse (injury/disturbance) ▪ Shortbeaked common dolphin: Minor Adverse (injury/disturbance) ▪ Risso's dolphin: Minor Adverse (injury/disturbance) ▪ Minke whale: Minor Adverse (injury/disturbance) ▪ Grey seal: Minor Adverse (injury/disturbance)	N/A	Minor Adverse
Marine mammals	Injury to marine mammals due to collision with vessels	C, O, D: ▪ Harbour porpoise: Minor Adverse (injury/disturbance) ▪ Bottlenose dolphin:	N/A	Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
		Minor Adverse (injury/disturbance) ▪ Shortbeaked common dolphin: Minor Adverse (injury/disturbance) ▪ Risso's dolphin: Minor Adverse (injury/disturbance) ▪ Minke whale: Minor Adverse (injury/disturbance) ▪ Grey seal: Minor Adverse (injury/disturbance)		
Marine mammals	Effects on marine mammals due to changes in prey availability	C, O, D: ▪ Harbour porpoise: Minor Adverse (injury/disturbance) ▪ Bottlenose dolphin: Minor Adverse (injury/disturbance) ▪ Shortbeaked common dolphin: Minor Adverse (injury/disturbance)	N/A	Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
		▪ Risso's dolphin: Minor Adverse (injury/disturbance) ▪ Minke whale: Minor Adverse (injury/disturbance) ▪ Grey seal: Minor Adverse (injury/disturbance)		
Marine mammals	Injury and disturbance from underwater sound generated from pre-construction survey sources	C: ▪ Harbour porpoise: Minor Adverse (injury/disturbance) ▪ Bottlenose dolphin: Minor Adverse (injury/disturbance) ▪ Shortbeaked common dolphin: Minor Adverse (injury/disturbance) ▪ Risso's dolphin: Minor Adverse (injury/disturbance) ▪ Minke whale: Minor Adverse (injury/disturbance)	N/A	Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
		▪ Grey seal: Minor Adverse (injury/disturbance)		
Offshore ornithology	Disturbance and displacement from airborne sound, underwater sound, and presence of vessels and infrastructure	C, O, D: ▪ Scaup: Minor Adverse ▪ Eider: Minor Adverse ▪ Common scoter: Minor Adverse ▪ Red-breasted merganser: Minor Adverse ▪ Kittiwake: Negligible ▪ Black-headed gull: Negligible ▪ Little gull: Negligible ▪ Common gull: Negligible ▪ Great black backed gull: Negligible ▪ Herring gull: Negligible ▪ Lesser black backed gull: Negligible ▪ Sandwich tern: Negligible ▪ Common tern: Negligible ▪ Guillemot: Negligible or Minor Adverse	Best practice vessel management measures.	Negligible to Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
		▪ Razorbill: Negligible or Minor Adverse ▪ Puffin: Negligible or Minor Adverse ▪ Red-throated diver: Minor Adverse ▪ Fulmar: Negligible ▪ Manx shearwater: Negligible ▪ Gannet: Negligible ▪ Cormorant: Minor Adverse		
Offshore ornithology	Indirect impacts from underwater sound affecting prey species	C, O, D: ▪ Scaup: Minor Adverse ▪ Eider: Minor Adverse ▪ Common scoter: Minor Adverse ▪ Red-breasted merganser: Minor Adverse ▪ Kittiwake: Negligible ▪ Black-headed gull: Negligible ▪ Little gull: Negligible ▪ Common gull: Negligible ▪ Great black backed gull: Negligible	N/A	Negligible to Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
		▪ Herring gull: Negligible ▪ Lesser black backed gull: Negligible ▪ Sandwich tern: Negligible ▪ Common tern: Negligible ▪ Guillemot: Negligible ▪ Razorbill: Negligible ▪ Puffin: Negligible ▪ Red-throated diver: Minor Adverse ▪ Fulmar: Negligible ▪ Manx shearwater: Negligible ▪ Gannet: Negligible ▪ Cormorant: Minor Adverse		
Offshore ornithology	Temporary habitat loss/disturbance and increased SSCs	C, O, D: ▪ Scaup: Minor Adverse ▪ Eider: Minor Adverse ▪ Common scoter: Minor Adverse ▪ Red-breasted merganser: Minor Adverse ▪ Kittiwake: Negligible ▪ Black-headed gull: Negligible	N/A	Negligible to Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
		▪ Little gull: Negligible ▪ Common gull: Negligible ▪ Great black backed gull: Negligible ▪ Herring gull: Negligible ▪ Lesser black backed gull: Negligible ▪ Sandwich tern: Negligible ▪ Common tern: Negligible ▪ Guillemot: Negligible ▪ Razorbill: Negligible ▪ Puffin: Negligible ▪ Red-throated diver: Minor Adverse ▪ Fulmar: Negligible ▪ Manx shearwater: Negligible ▪ Gannet: Negligible ▪ Cormorant: Minor Adverse		
Offshore ornithology	Lighting and potential collision risk (Manx shearwaters and puffins)	Scoped out for all receptors	N/A	None
Commercial fisheries	Loss or restricted access to fishing grounds	▪ Inshore static gear vessels C: Minor Adverse O: Negligible D: Negligible	N/A	Negligible to Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
		▪ Offshore static gear vessels C: Negligible O: Negligible D: Negligible ▪ Beam trawl vessels C: Negligible O: Negligible D: Negligible ▪ Scallop vessels – Scottish west coast C: Minor Adverse O: Minor Adverse D: Minor Adverse ▪ Scallop vessels – Isle of Man C: Negligible O: Negligible D: Negligible ▪ Other scallop vessels C: Negligible O: Negligible D: Negligible ▪ Herring vessels C: Negligible		

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
		O: Negligible D: Negligible		
Commercial fisheries	Displacement of fishing activity into other areas	▪ Inshore static gear vessels C: Negligible O: Negligible D: Negligible ▪ Offshore static gear vessels C: Negligible O: Negligible D: Negligible ▪ Beam trawl vessels C: Negligible O: Negligible D: Negligible ▪ Scallop vessels – Scottish west coast C: Negligible O: Negligible D: Negligible ▪ Scallop vessels – Isle of Man C: Negligible O: Negligible D: Negligible	N/A	Negligible

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
		▪ Other scallop vessels C: Negligible O: Negligible D: Negligible ▪ Herring vessels C: Negligible O: Negligible D: Negligible ▪ Norway lobster (Nephrops) vessels C: Negligible O: Negligible D: Negligible		
Commercial fisheries	Loss or damage to fishing gear due to snagging	▪ Inshore static gear vessels C: Negligible O: Negligible D: Negligible ▪ Offshore static gear vessels C: Negligible O: Negligible D: Negligible ▪ Beam trawl vessels C: Negligible O: Negligible	N/A	Negligible to Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
		D: Negligible ▪ Scallop vessels – Scottish west coast C: Minor Adverse O: Minor Adverse D: Minor Adverse ▪ Scallop vessels – Isle of Man C: Negligible O: Negligible D: Negligible ▪ Other scallop vessels C: Negligible O: Negligible D: Negligible ▪ Herring vessels C: Negligible O: Negligible D: Negligible		
Commercial fisheries	Potential impacts on commercially important fish and shellfish resources	Assessed as part of Fish and Shellfish Ecology.	N/A	N/A
Commercial fisheries	Supply chain opportunities for local fishing vessels	▪ Inshore static gear vessels C: Negligible	N/A	Negligible to Minor Beneficial

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
		O: Negligible D: Negligible ▪ Offshore static gear vessels C: Minor Beneficial O: Minor Beneficial ▪ Beam trawl vessels C: Negligible O: Negligible D: Negligible ▪ Scallop vessels – Scottish west coast C: Minor Beneficial O: Negligible ▪ Scallop vessels – Isle of Man C: Minor Beneficial O: Minor Beneficial D: Minor Beneficial ▪ Other scallop vessels C: Minor Beneficial O: Negligible D: Minor Beneficial ▪ Herring vessels C: Minor Beneficial		

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
		O: Minor Beneficial D: Minor Beneficial		
Shipping and Navigation	Impact on recognised sea lanes essential to international navigation.	C: Negligible O: Negligible D: Negligible	N/A	Negligible
Shipping and Navigation	Impact to commercial operators including strategic routes and lifeline ferries	C: Minor O: Negligible D: Minor	N/A	Negligible to Minor Adverse
Shipping and Navigation	Impact to Adverse weather routeing	C: Minor Adverse O: Negligible D: Minor Adverse	N/A	Negligible to Minor Adverse
Shipping and Navigation	Impact on access to ports and harbours	C: Minor Adverse O: Minor Adverse D: Minor Adverse	N/A	Minor Adverse
Shipping and Navigation	Impact on emergency response capability due to increased incident rates and reduced access for Search and Rescue (SAR) responders.	C: Negligible O: Negligible D: Negligible	N/A	Negligible
Shipping and Navigation	Impact on vessel-to-vessel collision risk	C: Minor Adverse O: Minor Adverse D: Minor Adverse	N/A	Minor Adverse
Shipping and Navigation	Impact on allision (contact) risk to vessels	C: Minor Adverse O: Negligible D: Minor Adverse	N/A	Negligible to Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
Shipping and Navigation	Impact on marine navigation, communications, electromagnetic interference and radar and positioning systems	C: Negligible O: Negligible D: Negligible	N/A	Negligible
Shipping and Navigation	Impact on recreational craft passages and safety	C: Minor Adverse O: Negligible D: Minor Adverse	N/A	Negligible to Minor Adverse
Shipping and Navigation	Impact on snagging risk to vessel anchors and fishing gear	C: Minor Adverse O: Negligible D: Minor Adverse	N/A	Negligible to Minor Adverse
Shipping and Navigation	Impact on oil and gas navigation, operations, and safety	C: Minor Adverse O: Minor Adverse D: Minor Adverse	N/A	Minor Adverse
Shipping and Navigation	Impact on under keel clearance	C: Negligible O: Negligible D: Negligible	N/A	Negligible
Marine Archaeology	Sediment disturbance and deposition leading to indirect impacts on marine archaeology receptors	C: Minor Adverse O: Minor Adverse D: Minor Adverse	N/A	Minor Adverse
Marine Archaeology	Direct damage to marine archaeology receptors (e.g., wrecks, debris, submerged prehistoric receptors (palaeolandscapes and associated archaeological receptors))	C: Minor Adverse O: Minor Adverse D: Minor Adverse	N/A	Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
Marine Archaeology	Direct damage to deeply buried marine archaeology receptors – submerged prehistoric receptors (e.g. palaeolandscapes and associated archaeological receptors)	C: Minor Adverse	N/A	Minor Adverse
Marine Archaeology	Alteration of sediment transport regimes	O: Minor Adverse	N/A	Minor Adverse
Marine Archaeology	Effects on Historic Seascape Characterisation (HSC)	C: No change O: No change D: No change	N/A	No Change
Other sea users	Displacement of recreational activities.	C: Minor Adverse O: Negligible Adverse D: Minor Adverse	N/A	Negligible to Minor Adverse
Other sea users	Increased SSC and associated deposition affecting recreational diving sites and designated bathing water sites.	C: Minor Adverse O: Negligible Adverse D: Minor Adverse	N/A	Negligible to Minor Adverse
Other sea users	Impacts to existing cables or pipelines or restrictions on access to cables or pipelines	C: Minor Adverse O: Minor Adverse D: Minor Adverse	N/A	Minor Adverse
Other sea users	Increased SSC and associated deposition affecting aggregate areas	C: Negligible Adverse O: Negligible Adverse D: Negligible Adverse	N/A	Negligible Adverse
Other sea users	Alterations to sediment transport pathways affecting aggregate areas	C: Negligible Adverse O: Negligible Adverse D: Negligible Adverse	N/A	Negligible Adverse

Topic	Impact	Significance of effect of the Transmission Assets project-alone	Additional Mitigation proposed	Residual effect
Other sea users	Reduction or restriction of oil and gas activities (including surveys, decommissioning, Carbon Capture and Storage (CCS), and underground gas storage)	C: Minor Adverse O: Negligible Adverse D: Minor Adverse	N/A	Negligible to Minor Adverse

Table 23.3 Results of the assessment of the onshore effects of the Transmission Assets project alone. (C=construction, O=operation and maintenance, D=decommissioning)

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
Geology, hydrogeology and ground conditions	The impact of partial loss or damage to designated geological or geomorphological sites.	C: Minor Adverse	N/A	Minor Adverse
Geology, hydrogeology and ground conditions	The impact of mobilisation of existing areas of contamination causing a deterioration of groundwater quality in underlying aquifer units: Landfall and onshore export cable corridor near Blackpool Airport.	C: Moderate Adverse O: Negligible adverse D: Minor Adverse	Method statements and remediation strategies will be agreed with the relevant authorities prior to construction.	Negligible to Minor Adverse
Geology, hydrogeology and ground conditions	The impact of mobilisation of existing areas of contamination causing a deterioration of groundwater quality in underlying aquifer units: 400kV grid connection cable corridor search area.	C: Moderate Adverse O: Negligible Adverse D: Minor Adverse	A site-specific crossing method statement will be developed to ensure land or groundwater contamination is managed and new pathways are not created.	Negligible to Minor Adverse
Geology, hydrogeology and ground conditions	The impact of mobilisation of existing areas of contamination causing a deterioration of groundwater quality in underlying aquifer units: Other areas	C: Minor Adverse O: Negligible Adverse D: Minor Adverse	N/A	Negligible to Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
Geology, hydrogeology and ground conditions	The impact of reduced groundwater quantity or quality in aquifer units: Superficial deposit Secondary A aquifer unit: Dewatering.	C: Minor Adverse or Negligible	N/A	Negligible to Minor Adverse
Geology, hydrogeology and ground conditions	The impact of reduced groundwater quantity or quality in aquifer units: Superficial deposit Secondary A aquifer unit: Foundations.	C: Negligible O: Negligible D: Minor Adverse	N/A	Negligible to Minor Adverse
Geology, hydrogeology and ground conditions	The impact of reduced groundwater quantity or quality in aquifer units: Superficial deposit Secondary A aquifer unit: Discharges to ground.	C: Minor Adverse O: Negligible Adverse D: Minor Adverse	N/A	Negligible to Minor Adverse
Geology, hydrogeology and ground conditions	The impact of reduced groundwater quantity or quality in aquifer units: Superficial deposit Secondary A aquifer unit: HDD.	C: Minor Adverse	N/A	Minor Adverse
Geology, hydrogeology and ground conditions	The impact of reduced groundwater quantity or quality in aquifer units: Bedrock Principal aquifer unit.	C: Minor Adverse O: No effect D: Minor Adverse	N/A	No effect to Minor Adverse
Geology, hydrogeology and ground conditions	The impact of reduced groundwater quantity or quality in aquifer units: Impact on existing	C: Major Adverse O: Minor Adverse D: Minor Adverse	HDD assessment; detailed cable siting	Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
	groundwater abstractions: Licensed Abstraction GW_01		assessment; replacement source.	
Geology, hydrogeology, and ground conditions	The impact of reduced groundwater quantity or quality in aquifer units: Impact on existing groundwater abstractions Other Licensed Abstractions.	C: Minor Adverse or negligible O: Negligible D: Negligible	N/A	Negligible to Minor Adverse
Geology, hydrogeology, and ground conditions	The impact of reduced groundwater quantity or quality in aquifer units: Impact on existing groundwater abstractions Private groundwater supplies.	C: Moderate Adverse O: Minor Adverse D: Minor Adverse	Private groundwater supply source risk assessment.	Minor Adverse
Geology, hydrogeology, and ground conditions	The impact of existing contamination to human receptors.	C: Minor Adverse	N/A	Minor Adverse
Geology, hydrogeology, and ground conditions	Change in groundwater quality through the accidental release or spillage of potentially polluting substances.	C: Minor Adverse D: Minor Adverse	N/A	Minor Adverse
Geology, hydrogeology, and ground conditions	The impact of ground gas generation on human health and other environmental receptors.	C: Moderate Adverse O: No effect D: Minor Adverse	Ground investigation and associated monitoring to determine ground gas concentrations and flows. Design of ground gas mitigation measures.	No Effect to Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
Geology, hydrogeology, and ground conditions	Sterilisation of safeguarded mineral resource.	C: Minor Adverse	N/A	Minor Adverse
Hydrology and flood risk	The impact of contaminated runoff on the quality of surface water and ground receptors.	C: Minor Adverse D: Minor Adverse	Proposed Project commitments.	Minor Adverse
Hydrology and flood risk	The impact of increased flood risk arising from the diversion of watercourses.	C: Minor Adverse	N/A	Minor Adverse
Hydrology and flood risk	The impact of increased flood risk arising from additional surface water runoff.	C: Minor Adverse O: No effect	N/A	No Effect to Minor Adverse
Hydrology and flood risk	The impact of increased flood risk arising from damage to existing flood defences.	C: Minor Adverse D: Minor Adverse	Proposed Project commitments.	Minor Adverse
Hydrology and flood risk	The impact of damage to existing field drainage.	C: Minor Adverse D: Minor Adverse	N/A	Minor Adverse
Hydrology and flood risk	The impact of damage to existing water pipelines.	C: Minor Adverse D: Minor Adverse	N/A	Minor Adverse
Onshore ecology and nature conservation	The impact of temporary and permanent habitat loss.	▪ Coastal Sand Dune C: No effect D: No effect ▪ Coastal and Floodplain grazing marsh C: Minor Adverse D: Minor Adverse	Proposed Project commitments.	No Effect to Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
		▪ Coastal saltmarsh C: Minor Adverse D: Minor Adverse ▪ Lytham Moss BHS C: Minor Adverse D: Minor Adverse ▪ Woodland C: Minor Adverse D: Minor Adverse ▪ Ecological Networks C: Minor Adverse D: Minor Adverse ▪ Mature broadleaved trees C: Minor to Moderate Adverse D: Minor to Moderate Adverse ▪ Waterbodies C: Minor Adverse D: Minor Adverse ▪ Hedgerows C: Minor to Moderate Adverse D: Minor to Moderate Adverse ▪ Bats		

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
		C: Minor Adverse D: Minor Adverse ▪ Badger C: Minor Adverse D: Minor Adverse ▪ Great crested newt C: Moderate Adverse D: Moderate Adverse ▪ Otter C: Moderate Adverse D: Moderate Adverse ▪ Water vole C: Moderate Adverse D: Moderate Adverse		
Onshore ecology and nature conservation	The impact of disturbance.	▪ Coastal Sand Dune C: Minor Adverse O: Minor Adverse D: Minor Adverse ▪ Coastal and Floodplain grazing marsh C: Minor Adverse O: Minor Adverse D: Minor Adverse ▪ Coastal saltmarsh C: Minor Adverse	Proposed Project commitments.	Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
		O: Minor Adverse D: Minor Adverse ▪ Lytham Moss BHS C: Minor Adverse O: Minor Adverse D: Minor Adverse ▪ Woodland C: Minor Adverse O: Minor Adverse D: Minor Adverse		
Onshore ecology and nature conservation	The impact of disturbance (continuation).	▪ Ecological Networks C: Minor Adverse O: Minor Adverse D: Minor Adverse ▪ Mature broadleaved trees C: Minor Adverse O: Minor Adverse D: Minor Adverse ▪ Waterbodies C: Minor Adverse O: Minor Adverse D: Minor Adverse ▪ Hedgerows C: Minor Adverse O: Minor Adverse	Proposed Project commitments.	Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
		D: Minor Adverse ▪ Bats C: Minor Adverse O: Minor Adverse D: Minor Adverse ▪ Badger C: Minor Adverse O: Minor Adverse D: Minor Adverse ▪ Great crested newt C: Minor Adverse O: Minor Adverse D: Minor Adverse		
Onshore ecology and nature conservation	The impact of disturbance (continuation).	▪ Otter C: Minor Adverse O: Minor Adverse D: Minor Adverse ▪ Water vole C: Minor Adverse O: Minor Adverse D: Minor Adverse	Proposed Project commitments.	Minor Adverse
Onshore ecology and nature conservation	The impact of habitat fragmentation and species isolation (all IEFs).	C: Minor Adverse O: Minor Adverse D: Minor Adverse	Proposed Project commitments.	Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
Onshore ecology and nature conservation	The impact of pollution caused by accidental spills/containment (all IEFs).	C: Minor to Moderate Adverse D: Minor to Moderate Adverse	Proposed Project commitments.	Negligible to Minor Adverse
Onshore ecology and nature conservation	The impact of spreading INNS (all IEFs).	C: Negligible Adverse D: Negligible Adverse	Proposed Project commitments.	Negligible Adverse
Onshore and intertidal ornithology	The impact of temporary and permanent habitat loss.	▪ Waterbirds (Option 1 (north) / Option 2 (south)) C: Moderate Adverse/ Moderate to Major Adverse D: Minor Adverse ▪ Owl and raptor C: Minor Adverse D: Minor Adverse ▪ Gull, tern, diver and cormorant C: Minor Adverse D: Minor Adverse ▪ Passerine and other species C: Minor Adverse. D: Minor Adverse	Proposed Project commitments.	Minor to Moderate Adverse
Onshore and intertidal ornithology	The impact of disturbance.	▪ Waterbirds (Option 1 (north)/Option 2 (south))	Proposed Project commitments.	Minor to Moderate Adverse

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
		C: Moderate Adverse/Moderate to Major Adverse O: Minor Adverse D: Minor Adverse ▪ Owl and raptor C: Minor Adverse O: Minor Adverse D: Minor Adverse ▪ Gull, tern, diver and cormorant C: Minor Adverse O: Minor Adverse D: Minor Adverse ▪ Passerine and other species C: Minor Adverse O: Minor Adverse D: Minor Adverse		
Onshore and intertidal ornithology	The impact of habitat fragmentation and species isolation.	▪ All IEFs C: Minor Adverse O: No effect D: Negligible adverse	N/A	No Effect to Minor Adverse
Onshore and intertidal ornithology	The impact of pollution caused by accidental spills/contaminant release.	▪ All IEFs: C: Negligible adverse	N/A	Negligible Adverse

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
		D: Negligible adverse		
Onshore and intertidal ornithology	The impact of spreading of INNS.	▪ All IEFs: C: Negligible Adverse D: Negligible Adverse	N/A	Negligible Adverse
Onshore and intertidal ornithology	The long-term creation of areas of ecological mitigation and BNG.	▪ All IEFs: C: No effect O: Potentially significant D: No effect	N/A	No Effect to Potentially Significant
Historic environment	Loss of, or harm to, buried archaeological remains and deposits of geoarchaeological and palaeoenvironmental interest.	C: Unknown O: Unknown	Proposed Project commitments.	Unknown (Relates to areas where survey work remains to be completed. As discussed within the PEIR, this level of uncertainty will be addressed through the further surveys).
Historic environment	The impact of the Transmission Assets onshore works (other than the onshore substations) on above ground heritage assets as a result of change within their setting.	C: Up to Minor Adverse O: No Effect D: Up to Minor Adverse	Proposed Project commitments.	No Effect to Minor Adverse
Historic environment	The impact of the Transmission Assets onshore works on the character of the historic landscape.	C: Negligible or Minor Adverse O: Negligible or Minor Adverse	Proposed Project commitments.	Negligible to Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
		D: Negligible or Minor Adverse		
Historic environment	The impact of the onshore substations on above ground heritage assets as a result of change within their setting.	O: Up to Minor Adverse	Proposed Project commitments.	Up to Minor Adverse
Historic environment	The impact of the OSP(s) and Morgan OBS on above ground heritage assets as a result of change within their setting.	C: No change O: No change D: No change	N/A	No change
Land use and recreation	The temporary loss of agricultural land including Best and Most Versatile (BMV).	C: Minor Adverse D: Minor Adverse	Proposed Project commitments.	Minor Adverse
Land use and recreation	The permanent loss of agricultural land including BMV.	C: Moderate Adverse D: No effect	Proposed Project commitments.	No Effect to Moderate Adverse
Land use and recreation	The temporary disruption caused to the operation of agricultural land holdings.	C: Minor Adverse D: Minor Adverse	Proposed Project commitments.	Minor Adverse
Land use and recreation	The permanent disruption caused to the operation of agricultural land holdings.	C: Minor Adverse D: No effect	N/A	No Effect to Minor Adverse
Land use and recreation	The temporary impact on the recreational use of coastal areas.	C: Minor Adverse	N/A	Minor Adverse
Land use and recreation	The temporary impact on access land.	No effect	N/A	No Effect

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
Land use and recreation	The temporary impact on open greenspace.	No effect	N/A	No Effect
Land use and recreation	The temporary effects on National Cycle Network (NCN), Coastal Path and Long Distance Routes.	C: Minor Adverse	Proposed Project commitments.	Minor Adverse
Land use and recreation	Other Public Rights of Way (PRoW).	C: Minor to Moderate Adverse D: Minor Adverse	N/A	Minor Adverse
Land use and recreation	The temporary impact on the recreational use of recreational resources.	C: Minor Adverse	N/A	Minor Adverse
Traffic and transport	The impact on driver delay (including temporary delays to public transport services) caused by construction works or construction traffic using the Local Road Network (LRN) and Strategic Road Network (SRN).	C: Negligible to Minor Adverse (if cables not installed within highways) or Minor Adverse to Major Adverse (if cables installed within highways near Blackpool Airport).	Where practicable, reductions to be made to the peak daily construction vehicle movements. Bespoke traffic management to be identified for any works within the highway.	Minor Adverse
Traffic and transport	The impact on pedestrian delay caused by construction works or construction traffic using the LRN and SRN.	C: Negligible to Minor Adverse	Where practicable, reductions to be made to the peak daily construction vehicle movements.	Negligible to Minor Adverse
Traffic and transport	The impact on pedestrian amenity caused by construction works or	C: Negligible to Major Adverse	Where practicable, reductions to be	Negligible to Major Adverse

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
	construction traffic using the LRN and SRN.		made to the peak daily construction vehicle movements.	
Traffic and transport	The impact on severance caused by construction works or construction traffic.	C: Negligible to Minor Adverse	Where practicable, reductions to be made to the peak daily construction vehicle movements.	Negligible to Minor Adverse
Traffic and transport	The impact on accidents and safety caused by construction traffic.	C: Negligible to Minor Adverse	Where practicable, reductions to be made to the peak daily construction vehicle movements.	Negligible to Minor Adverse
Noise and vibration	Noise impacts due to offshore piling activities.	C: Minor Adverse D: Minor Adverse	Proposed Project commitments.	Minor Adverse
Noise and vibration	Noise impacts due to the onshore infrastructure area landward of Mean Low Water Springs (MLWS) (open trench).	C: Minor Adverse D: Minor Adverse	Proposed Project commitments.	Minor Adverse
Noise and vibration	Noise impacts due to the onshore infrastructure area landward of MLWS HDD.	C: Major Adverse D: Minor Adverse	Proposed Project commitments.	Minor Adverse
Noise and vibration	Vibration impacts due to the onshore infrastructure area landward of MLWS.	C: Major Adverse D: Minor Adverse	Proposed Project commitments.	Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
Noise and vibration	Noise and vibration impacts due to the construction of the onshore substations.	C: Minor Adverse D: Minor Adverse	N/A	Minor Adverse
Noise and vibration	The impact of noise generated by additional vehicle movements on the local highway network during the construction and decommissioning phase for the Transmission Assets on human receptors.	C: Minor Adverse D: Minor Adverse	N/A	Minor Adverse
Noise and vibration	The impact of noise generated during operation and maintenance of the onshore substations on human receptors.	O: Minor Adverse	N/A	Minor Adverse
Air quality	The impact of dust soiling (nuisance) on property arising from dust emissions generated by onsite construction and decommissioning activities.	C: Negligible D: Negligible	No further mitigation required beyond measures based on highly recommended measures for sites with high dust risk (Institute of Air Quality Management (IAQM), 2014).	Negligible
Air quality	The impact of an increase in suspended particulate matter on people arising from dust emissions generated by onsite construction and decommissioning activities.	C: Negligible D: Negligible	No further mitigation required beyond measures based on highly recommended measures for sites	Negligible

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
			with high dust risk (IAQM, 2014).	
Air quality	The impact of an increase in suspended particulate matter on ecological receptors arising from dust emissions generated by onsite construction and decommissioning activities.	C: Negligible D: Negligible	No further mitigation required beyond measures based on highly recommended measures for sites with high dust risk (IAQM, 2014).	Negligible
Air quality	The impact of vehicle emissions on human health and ecological receptors during construction and decommissioning.	C: Potentially significant D: Potentially significant	This will be considered in further detail in the ES based on refined traffic flows and detailed dispersion modelling.	To be confirmed in the Transmission Assets Environmental Statement.

Table 23.4 Results of the assessment of the offshore and onshore effects of the Transmission Assets project-alone. (C=construction, O=operation and maintenance, D=decommissioning)

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
Seascape and landscape character: offshore	Marine Character Area (MCA) 34 Blackpool Coastal Waters and Ribble Estuary	C: Minor Adverse O: Minor Adverse D: Minor Adverse	N/A	Minor Adverse
Seascape and landscape character: offshore	MCA 38 Irish Sea South	C: Moderate Adverse O: Moderate Adverse D: Moderate Adverse	N/A	Moderate Adverse
Seascape and landscape character: offshore	MCA 32 Walney Coastal Waters and Duddon Estuary	C: Negligible to Minor Adverse O: Negligible to Minor Adverse D: Negligible to Minor Adverse	N/A	Negligible to Minor Adverse
Seascape and landscape character: offshore	MCA 35 Inner Liverpool Bay	C: Negligible to Minor Adverse O: Negligible to Minor Adverse D: Negligible to Minor Adverse	N/A	Negligible to Minor Adverse
Seascape and landscape character: offshore	MCA A: Dreswick Point to Maughold Head Isle of Man	C: Minor Adverse O: Minor Adverse D: Minor Adverse	N/A	Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
Seascape and landscape character: offshore	Seascape Sensitivity Zone (SSZ) 2 North East Wales Offshore	C: Negligible Adverse O: Negligible Adverse D: Negligible Adverse	N/A	Negligible Adverse
Seascape and landscape character: offshore	SSZ 4 North Wales and North Anglesey Inshore	C: Negligible O: Negligible D: Negligible	N/A	Negligible Adverse
Seascape and landscape character: offshore	SSZ 5 North Wales and Anglesey Outer Offshore	C: Minor Adverse O: Minor Adverse D: Minor Adverse	N/A	Minor Adverse
Seascape and landscape character: offshore	19a: Coastal Dunes – Fylde Coast Dunes	C: Minor Adverse O: Minor Adverse to no effect D: Minor Adverse	N/A	No Effect to Minor Adverse
Seascape and landscape character: offshore	Industrial Age Urban	C: Minor Adverse O: Minor Adverse to no change D: Minor Adverse	N/A	No Change to Minor Adverse
Onshore landscape character – landfall and onshore export cable corridor	19a: Coastal Dunes – Fylde Coast Dunes	C: Moderate to major Adverse	Proposed Project commitments.	Moderate to Major Adverse
Onshore landscape	Industrial Age Urban	C: Negligible to Minor Adverse	N/A	Negligible to Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
character – landfall and onshore export cable corridor				
Onshore landscape character – landfall and onshore export cable corridor	Suburban Urban	C: Minor Adverse	N/A	Minor Adverse
Onshore landscape character – landfall and onshore export cable corridor	16b Mosslands – South Fylde Mosses	C: Moderate Adverse (direct), Negligible Adverse (indirect)	Proposed Project commitments.	Negligible to Moderate Adverse
Onshore landscape character – landfall and onshore export cable corridor	15d Coastal Plain – The Fylde	C: Moderate Adverse (direct), Negligible Adverse (indirect)	Proposed Project commitments.	Negligible to Moderate Adverse
Onshore landscape character – substation scenario 1	15d Coastal Plain: Fylde	C: Major Adverse (direct), Moderate Adverse (indirect) O (year 1): Major Adverse (direct), Moderate Adverse (indirect) D: Major Adverse (direct), Moderate Adverse (indirect)	Proposed Project commitments.	Moderate to Major Adverse

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
Onshore landscape character – substation scenario 1	15b Coastal Plain: Longton to Bretherton	C: Negligible Adverse O: (year 1) Negligible Adverse D: Negligible Adverse	Proposed Project commitments.	Negligible Adverse
Onshore landscape character – substation scenario 1	17a Enclosed Coastal Marsh: Clifton and Hutton	C: Negligible Adverse O: (year 1) Minor Adverse D: Negligible Adverse	Proposed Project commitments.	Negligible to Minor Adverse
Onshore landscape character – substation scenario 1	18a Open Coastal Marsh: Ribble Marsh	C: Negligible Adverse O: (year 1) Negligible Adverse D: Negligible Adverse	Proposed Project commitments.	Negligible Adverse
Onshore landscape character – substation scenario 2	15d Coastal Plain: Fylde	C: Major Adverse (direct), Moderate Adverse (indirect) O (year 1): Major Adverse (direct), Moderate Adverse (indirect) D: Major Adverse (direct), Moderate Adverse (indirect)	Proposed Project commitments.	Moderate to Major Adverse
Onshore landscape character – substation scenario 2	15b Coastal Plain: Longton to Bretherton	C: Negligible adverse O: (year 1) Negligible adverse D: Negligible adverse	Proposed Project commitments.	Negligible Adverse

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
Onshore landscape character – substation scenario 2	17a Enclosed Coastal Marsh: Clifton and Hutton	C: Negligible adverse O: (year 1) Minor Adverse D: Negligible adverse	Proposed Project commitments.	Negligible to Minor Adverse
Onshore landscape character – substation scenario 2	18a Open Coastal Marsh: Ribble Marsh	C: Negligible adverse O: (year 1) Negligible adverse D: Negligible adverse	Proposed Project commitments.	Negligible Adverse
Onshore landscape character – 400 kV grid connection cable corridor	15d Coastal Plain: Fylde	C: Moderate Adverse (direct), Negligible Adverse (indirect)	Proposed Project commitments.	Moderate Adverse (direct), Negligible (indirect)
Onshore landscape character – 400 kV grid connection cable corridor	17a Enclosed Coastal Marsh: Clifton and Hutton	C: Moderate Adverse (direct), Negligible Adverse (indirect)	Proposed Project commitments.	Moderate Adverse (direct), Negligible Adverse (indirect)
Onshore landscape character – 400 kV grid connection cable corridor	18a Open Coastal Marsh: Ribble Marsh	C: Moderate Adverse (direct), Negligible Adverse (indirect))	Proposed Project commitments.	Moderate Adverse (direct), Negligible Adverse (indirect)

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
Onshore landscape character – 400 kV grid connection cable corridor	15b Coastal Plain: Longton to Bretherton	C: Minor Adverse (direct), Negligible Adverse (indirect)	Proposed Project commitments.	Negligible to Minor Adverse
Visual impacts: Onshore – substation scenario 1	Representative viewpoint VP1: Bridleway south of Morgan substation site	C: Minor to Major Adverse O: Major Adverse (year 1) D: Minor to Major Adverse	Proposed Project commitments.	Moderate to Major Adverse
Visual impacts: Onshore – substation scenario 1	Representative viewpoint VP2: Strike Lane, west of Morecambe substation south site	C: Minor Adverse O: Minor Adverse (year 1) D: Minor Adverse	Proposed Project commitments.	Minor Adverse
Visual impacts: Onshore – substation scenario 1	Representative viewpoint VP3: View from bridleway BW0505016	C: Major Adverse O: Major to minor Adverse (year 1) D: Major Adverse	Proposed Project commitments.	Moderate to Major Adverse
Visual impacts: Onshore – substation scenario 1	Representative viewpoint VP4: Parrox Lane east of Morecambe substation north site	C: Minor Adverse O: Moderate to Minor Adverse (year 1) D: Minor Adverse	Proposed Project commitments.	Minor Adverse
Visual impacts: Onshore – substation scenario 1	Representative viewpoint VP5: View northwest from footpath FP0509005	C: Minor Adverse O: Minor Adverse (year 1) D: Minor Adverse	Proposed Project commitments.	Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
Visual impacts: Onshore – substation scenario 1	Representative viewpoint VP6: View from footpath north of A584	C: Minor Adverse O: Minor Adverse (year 1) D: Minor Adverse	Proposed Project commitments.	Minor Adverse
Visual impacts: Onshore – substation scenario 1	Representative viewpoint VP7: Kirkham Bypass north of Freckleton Road	C: Minor Adverse O: Minor Adverse (year 1) D: Minor Adverse	Proposed Project commitments.	Negligible to Minor Adverse
Visual impacts: Onshore – substation scenario 1	Representative viewpoint VP8: Kirkham Road, NCN route 62	C: Negligible Adverse O: Negligible Adverse (year 1) D: Negligible Adverse	Proposed Project commitments.	Negligible Adverse
Visual impacts: Onshore – substation scenario 1	Representative viewpoint VP9: Footpaths FP0510007 and FP0510008 at Brown's Lane	C: Minor Adverse O: Minor Adverse (year 1) D: Minor Adverse	Proposed Project commitments.	Minor Adverse
Visual impacts: Onshore – substation scenario 1	Representative viewpoint VP10: Footpath FP0513016 and NCN route 62 (Treales Road)	C: Minor Adverse O: Minor Adverse (year 1) D: Minor Adverse	Proposed Project commitments.	Minor Adverse
Visual impacts: Onshore – substation scenario 1	Representative viewpoint VP11: Ribble Way	C: Minor Adverse O: Minor Adverse (year 1) D: Minor Adverse	Proposed Project commitments.	Minor Adverse
Visual impacts: Onshore – substation scenario 2	Representative viewpoint VP1: Bridleway south of Morgan substation site	C: Major to Minor Adverse O: Major Adverse (year 1) D: Major to Moderate Adverse	Proposed Project commitments.	Minor to Major Adverse

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
Visual impacts: Onshore – substation scenario 2	Representative viewpoint VP2: Strike Lane, west of Morecambe substation south site	C: Minor Adverse O: Minor Adverse (year 1) D: Minor Adverse	Proposed Project commitments.	Minor Adverse
Visual impacts: Onshore – substation scenario 2	Representative viewpoint VP3: View from bridleway BW0505016	C: Major Adverse O: Moderate to Major Adverse (year 1) D: Major Adverse	Proposed Project commitments.	Moderate to Major Adverse
Visual impacts: Onshore – substation scenario 2	Representative viewpoint VP4: Parrox Lane east of Morecambe substation north site	C: Minor Adverse O: Moderate to Minor Adverse (year 1) D: Minor Adverse	Proposed Project commitments.	Minor Adverse
Visual impacts: Onshore – substation scenario 2	Representative viewpoint VP5: View northwest from footpath FP0509005	C: Minor Adverse O: Minor Adverse (year 1) D: Minor Adverse	Proposed Project commitments.	Minor Adverse
Visual impacts: Onshore – substation scenario 2	Representative viewpoint VP6: View from footpath north of A584	C: Minor Adverse C: Minor Adverse (year 1) C: Minor Adverse	Proposed Project commitments.	Minor Adverse
Visual impacts: Onshore – substation scenario 2	Representative viewpoint VP7: Kirkham Bypass north of Freckleton Road	C: Minor Adverse O: Minor Adverse (year 1) D: Minor Adverse	Proposed Project commitments.	Negligible to Minor Adverse
Visual impacts: Onshore – substation scenario 2	Representative viewpoint VP8: Kirkham Road, NCN route 62	C: Minor Adverse O: Minor Adverse (year 1) D: Minor Adverse	Proposed Project commitments.	Negligible to Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
Visual impacts: Onshore – substation scenario 2	Representative viewpoint VP9: Footpaths FP0510007 and FP0510008 at Brown's Lane	C: Minor Adverse O: Minor Adverse (year 1) D: Minor Adverse	Proposed Project commitments.	Minor Adverse
Visual impacts: Onshore – substation scenario 2	Representative viewpoint VP11: Ribble Way	C: Minor Adverse O: Minor Adverse (year 1) D: Minor Adverse	Proposed Project commitments.	Minor Adverse
Visual impacts: landfall and onshore export cable route	People using the beach for leisure and recreation	C: Moderate to Major Adverse	Proposed Project commitments.	Moderate to Major Adverse
Visual impacts: landfall and onshore export cable route	People using Lancashire Coastal Way and National Cycle Route 62	C: Minor to Moderate Adverse	Proposed Project commitments.	Minor to Moderate Adverse
Visual impacts: landfall and onshore export cable route	People using local footpaths and bridleways within 1km of the corridor route	C: Major to Minor Adverse	Proposed Project commitments.	Negligible to Major Adverse
Visual impacts: landfall and onshore export cable route	Occupiers of residential properties	C: Major to Minor Adverse	Proposed Project commitments.	Negligible to Major Adverse
Visual impacts: 400 kV grid connection cable	People using local footpaths and bridleways within 1km of the corridor route	C: Major to Minor Adverse	Proposed Project commitments.	Minor to Major Adverse

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
Visual impacts: 400 kV grid connection cable	Occupiers of residential properties	C: Major to Minor Adverse	Proposed Project commitments.	Minor to Major Adverse
Visual impacts: Offshore	Representative viewpoint VP12: Heysham to Douglas ferry	C: Moderate to Negligible Adverse O: Moderate to Negligible Adverse D: Moderate to Negligible Adverse	N/A	Negligible to Moderate Adverse
Visual impacts: Offshore	Representative viewpoint VP13: Liverpool to Douglas ferry	C: Moderate to Negligible Adverse O: Moderate to Negligible Adverse D: Moderate to Negligible Adverse	N/A	Negligible to Moderate Adverse
Visual impacts: Offshore	Representative viewpoint VP14: Landfall, Blackpool Beach South	C: Moderate to Minor Adverse O: Minor Adverse D: Moderate to Minor Adverse	N/A	Minor to Moderate Adverse
Visual impacts: Offshore	Representative viewpoint VP15: Blackpool Tower viewing platform	C: Minor Adverse O: Minor to Moderate Adverse D: Minor Adverse	N/A	Minor to Moderate Adverse
Aviation and radar	Trenching activity - Creation of an onshore obstacle	C: ▪ Blackpool: Moderate ▪ Warton: Minor	Blackpool Airport: A construction works mitigation protocol and	Negligible to Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
		▪ St Anne's: Minor ▪ Inskip: Moderate O: ▪ Blackpool: Minor ▪ Warton: Minor ▪ St Anne's: Minor ▪ Inskip: Minor D: ▪ Blackpool: Moderate ▪ Warton: Minor ▪ St Anne's: Minor ▪ Inskip: Moderate	plan to operationally and temporaneous address the works (trenching) requirements and magnitude (extent) of the effects within the airport flight operations environment. Trench routing of the export cable should take into account the safeguarded/protected area of Defence Communication Services Agency (DCSA) Inskip and avoid that area.	
Aviation and radar	EMF	O: ▪ Blackpool: Moderate ▪ St Anne's: Minor	Blackpool Airport: An export cable route plan will avoid infringement of the safeguarded/ protected areas by the export cable EMF to address the magnitude (extent) of the effects within the airport CNS environment. Export cable corridor route should take into account the safeguarded/ protected area of NATS	Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
			St Anne's and avoid EMF effects in that area.	
Aviation and radar	OSPs and Morgan OBS - Creation of an offshore obstacle	C: Low flying aircraft and Helicopter Main Route Indicator (HMRI) operators – Minor O: Low flying aircraft and HMRI operators – Minor D: Low flying aircraft and HMRI operators – Minor	N/A	Minor Adverse
Climate change	The impact of Greenhouse Gas (GHG) emissions arising from the manufacturing and installation of the Transmission Assets.	C: Moderate Adverse	Proposed Project commitments.	Minor Adverse
Climate change	The impact of GHG emissions arising from the consumption of materials and activities required to facilitate the operation and maintenance of the Transmission Assets.	O: Minor Adverse	N/A	Minor Adverse
Climate change	The impact of GHG emissions arising from decommissioning works (e.g., plant, fuel and vessel use) and the recovery (or disposal) of materials.	D: Minor Adverse	N/A	Minor Adverse

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
Climate change	The impact of GHG emissions arising from land use change during the construction, operation and maintenance and decommissioning phase.	C: Negligible O: Negligible D: Negligible	N/A	Negligible Adverse
Climate change	The impact of climate change on the Transmission Assets.	O: Negligible D: Negligible	N/A	Negligible Adverse
Socio-economics	The potential impact on economic receptors including employment, Gross Value Added (GVA), and supply chain demand on the Northwest England socioeconomics offshore regional study area and tourism regional study area.	C: Minor Beneficial O: N/A D: Minor Beneficial	N/A	Minor Beneficial
Socio-economics	The potential impact of increased employment opportunities on the Northwest England socioeconomics offshore regional study area and tourism regional study area.	C: Negligible Beneficial O: N/A D: Negligible Beneficial	N/A	Negligible Beneficial
Socio-economics	The potential impact on population, housing, and accommodation on the Northwest England	C: Negligible Beneficial O: N/A D: Negligible Beneficial	N/A	Negligible Beneficial

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
	socioeconomics offshore regional study area and tourism regional study area.			
Socio-economics	The potential impact on tourism on the Northwest England socioeconomics offshore regional study area and tourism regional study area.	C: Minor Adverse O: Minor Adverse D: Minor Adverse	N/A	Minor Adverse
Socio-economics	The potential impact on economic receptors including employment, GVA, and supply chain demand on the onshore sub-regional study area.	C: Minor Beneficial O: Minor Beneficial D: Minor Beneficial	N/A	Minor Beneficial
Socio-economics	The potential impact of increased employment opportunities on the onshore sub-regional study area.	C: Negligible Beneficial O: Negligible Beneficial D: Negligible Beneficial	N/A	Negligible Beneficial
Socio-economics	The potential impact on population, housing, and accommodation on the onshore sub-regional study area.	C: Negligible Beneficial O: Minor Beneficial D: Negligible Beneficial	N/A	Negligible to Minor Beneficial
Socio-economics	The potential impact on economic receptors including employment, GVA, and supply chain	C: Moderate Beneficial O: Minor Beneficial D: Minor Beneficial	N/A	Minor to Moderate Beneficial

Topic	Impact	Significance of effect of the Transmission Assets project alone	Additional Mitigation proposed	Residual effect
	demand on the North Wales socioeconomics offshore regional study area.			
Socio-economics	The potential impact of increased employment opportunities on the North Wales socioeconomics offshore regional study area.	C: Minor Beneficial O: Minor Beneficial D: Minor Beneficial	N/A	Minor Beneficial
Socio-economics	The potential impact on population, housing, and accommodation on the North Wales socioeconomics offshore regional study area.	C: Moderate Beneficial O: Moderate Beneficial D: Minor Beneficial	N/A	Minor to Moderate Beneficial
Socio-economics	The potential impact on tourism on the North Wales socioeconomics offshore regional study area.	C: Minor Adverse O: Minor Adverse D: Minor Adverse	N/A	Minor Adverse

23.4 Transmission Assets PEIR and Generation Assets ES summary

39. This section provides a summary of the results of the assessment of the effects of the Transmission Assets project as presented in its PEIR (Morgan Offshore Wind Limited and Morecambe Offshore Windfarm Ltd, 2023a), alongside a summary of the Project (Generation Assets) ES findings.

40. **Table 23.5, Table 23.6** and **Table 23.7** below present the respective range of significance of residual effect of the project-alone impact assessment of each offshore, onshore and offshore and onshore receptors as defined by the Transmission Assets PEIR (Morgan Offshore Wind Limited and Morecambe Offshore Windfarm Ltd, 2023a) alongside results from the Project ES.

Table 23.5 Range of significance of residual effect of the impact assessment for offshore receptors (C=construction, O=operation and maintenance, D=decommissioning)

Receptor	Transmission Assets range of significance of effect (project-alone residual effect)		Generation Assets range of significance of effect (Project-alone residual effect)	
Physical processes and sediment and water quality	C: Negligible O: Negligible D: Negligible	Not significant in EIA terms	C: No change to Minor Adverse O: No change to Negligible Adverse D: No change to Minor Adverse	Not significant in EIA terms
Benthic subtidal and intertidal ecology	C: No Effect to Minor Adverse O: Negligible Adverse to Minor Adverse D: No Effect to Minor Adverse	Not significant in EIA terms	C: No Change to Minor Adverse O: No Change to Minor Adverse D: No Change to Minor Adverse	Not significant in EIA terms
Fish and shellfish ecology	C: Negligible to Minor Adverse O: Negligible to Minor Adverse D: Negligible to Minor Adverse	Not significant in EIA terms	C: No change to Minor Adverse O: No change to Minor Adverse D: Minor Adverse	Not significant in EIA terms
Marine mammals	C: Minor Adverse O: Minor Adverse D: Minor Adverse	Not significant in EIA terms	C: Negligible to Minor Adverse O: Negligible to Minor Adverse D: Negligible to Minor Adverse	Not significant in EIA terms
Offshore ornithology	C: Negligible to Minor Adverse O: Negligible to Minor Adverse	Not significant in EIA terms	C: Minor Adverse O: No change to Minor Adverse D: Minor Adverse	Not significant in EIA terms

Receptor	Transmission Assets range of significance of effect (project-alone residual effect)		Generation Assets range of significance of effect (Project-alone residual effect)	
	D: Negligible to Minor Adverse			
Commercial fisheries	C: Negligible to Minor Adverse O: Negligible to Minor Adverse D: Negligible to Minor Adverse	Not significant in EIA terms	C: Negligible to Minor Adverse O: Negligible to Minor Adverse D: Negligible to Minor Adverse	Not significant in EIA terms
Shipping and navigation	C: Negligible to Minor Adverse O: Negligible to Minor Adverse D: Negligible to Minor Adverse	Not significant in EIA terms	C: Negligible to Moderate Adverse (navigational safety As Low As Reasonably Possible (ALARP)) O: Negligible to Moderate Adverse (navigational safety ALARP) D: Negligible to Moderate Adverse (navigational safety ALARP)	Not significant in EIA terms (navigational safety ALARP)
Marine archaeology	C: No change to Minor Adverse O: No change to Minor Adverse D: No change to Minor Adverse	Not significant in EIA terms	C: No Change to Minor Adverse O: No Change to Minor Adverse D: No Change to Minor Adverse	Not significant in EIA terms
Other sea users	C: Negligible to Minor Adverse O: Negligible to Minor Adverse D: Negligible to Minor Adverse	Not significant in EIA terms	C: Negligible to Minor Adverse O: Negligible to Minor Adverse D: Negligible to Minor Adverse	Not significant in EIA terms

Table 23.6 Range of significance of residual effect of the impact assessment of each onshore receptor considered (C=construction, O=operation and maintenance, D=decommissioning)

Receptor	Transmission Assets range of significance of effect (residual effect)		Generation Assets range of significance of effect (residual effect)
Geology, hydrogeology, and ground conditions	C: Negligible to Minor Adverse O: No Effect to Minor Adverse D: Negligible to Minor Adverse	Not significant in EIA terms	N/A – no onshore receptors
Hydrology and flood risk	C: Minor Adverse O: No Effect to Minor Adverse D: Minor Adverse	Not significant in EIA terms	N/A – no onshore receptors
Onshore ecology and nature conservation	C: No Effect to Minor Adverse O: Minor Adverse D: No Effect to Minor Adverse	Not significant in EIA terms	N/A – no onshore receptors
Onshore and intertidal ornithology	C: No effect to Moderate Adverse O: No Effect to Minor Adverse D: No Effect to Minor Adverse	During the construction and decommissioning phases, it is possible to have significant effects: Moderate Adverse: ▪ Of temporary and permanent habitat loss on waterbirds ▪ Of disturbance on waterbirds During the operation phase, there is potential for a significant beneficial effect from the long-term creation of areas of ecological mitigation and BNG.	N/A – no onshore/intertidal receptors
Historic environment	C: Unknown up to Minor Adverse O: Unknown up to Minor	Not significant in EIA terms	Onshore receptors assessed within a setting assessment – identifying no significant effects

Receptor	Transmission Assets range of significance of effect (residual effect)		Generation Assets range of significance of effect (residual effect)
	Adverse D: Negligible to Minor Adverse		
Land use and recreation	C: No effect to Moderate Adverse O: No effect D: No effect to Minor Adverse	During the construction phase, it is possible to have Moderate Adverse effects: ▪ The permanent loss of agricultural land including BMV land ▪ Other PRoW No significant effects in EIA terms have been identified for this receptor during the operation or decommissioning phases.	N/A – no onshore/intertidal receptors
Traffic and transport	C: Negligible to Major Adverse	During the construction phase, it is possible to have significant effects: Major Adverse: ▪ On driver delay (including temporary delays to public transport services) caused by construction works or construction traffic using the LRN and SRN ▪ On pedestrian amenity caused by construction works or construction traffic using the LRN and SRN No changes have been identified for this receptor during the operation or decommissioning phases.	Onshore receptors to be defined upon selection of the Port(s) used to service the Project. No significant impacts identified due to the commitment of a Port Access and Transport Plan (PATP), where required

Receptor	Transmission Assets range of significance of effect (residual effect)		Generation Assets range of significance of effect (residual effect)
Noise and vibration	C: Minor Adverse O: No change to Minor Adverse D: Minor Adverse	Not significant in EIA terms	N/A – no onshore receptors, although noise impacts would be considered as required in the PATP
Air quality	C: Negligible to potentially significant O: No change D: Negligible to potentially significant	During the construction and decommissioning phases, it is possible to have potentially significant effects of vehicle emissions on human health and ecological receptors during construction and decommissioning. No changes have been identified for this receptor during the operation phase.	N/A – no onshore receptors, although air quality impacts would be considered as required in the PATP

Table 23.7 Range of significance of residual effect of the impact assessment of each offshore and onshore receptor (C=construction, O=operation and maintenance, D=decommissioning)

Receptor	Transmission Assets range of significance of effect (residual effect)		Generation Assets range of significance of effect (residual effect)	
Seascape, landscape and visual resources	C: Negligible to Major Adverse O: No Change to Major Adverse D: Negligible to Major Adverse	During the construction, operation and decommissioning phases, it is possible to have significant effects: Major Adverse: ▪ Onshore landscape character – landfall and onshore export cable corridor (C: 19a: Coastal Dunes – Fylde Coast Dunes) ▪ Onshore landscape character – substation scenario 1 (C, O, D: 15d Coastal Plain: Fylde) ▪ Onshore landscape character – substation scenario 2 (C, O, D: 15d Coastal Plain: Fylde) ▪ Visual impacts: Onshore – substation scenario 1 (C, O, D: Representative VP1: Bridleway south of Morgan substation site; Representative VP3: View from bridleway BW0505016)	O: Negligible to Major Adverse	During the operation phase it is possible to have significant visual effects: Major/Moderate Adverse: *Northwest England* ▪ Viewpoint 9 Blackpool (near tower) ▪ Viewpoint 10 Lytham St. Anne's - from the seafront. Not significant (Minor) from areas set-back from seafront within Lytham St. Anne's ▪ Blackpool - from the seafront. Not significant (Minor) from areas set-back from seafront within Blackpool ▪ Lytham St Anne's major/moderate from the seafront. Not significant (Minor) from areas set-back from seafront within Lytham St Anne's *Merseyside* ▪ Viewpoint 11 Southport Pier major/moderate.

Receptor	Transmission Assets range of significance of effect (residual effect)		Generation Assets range of significance of effect (residual effect)	
		▪ Visual impacts: Onshore – substation scenario 2 (C, O, D: Representative VP1: Bridleway south of Morgan substation site, Representative VP3: View from bridleway BW0505016) ▪ Visual impacts: landfall and onshore export cable route (C: People using local footpaths and bridleways within 1km of the corridor route, Occupiers of residential properties) ▪ Visual impacts: 400 kV grid connection cable (C: People using local footpaths and bridleways within 1km of the corridor route; Occupiers of residential properties) Moderate Adverse: ▪ Onshore landscape character – landfall and onshore export cable corridor (C: 16b Mosslands – South Fylde Mosses; 15d Coastal Plain – The Fylde) ▪ Onshore landscape character – 400 kV grid		Moderate Adverse: *Northwest England* ▪ Viewpoint 8 Fleetwood (Rossall Point) ▪ Fleetwood – moderate from the seafront. Not significant (Minor) from areas set-back from seafront within Fleetwood ▪ Lancashire Coastal Way – moderate between Fleetwood and Lytham St. Anne's. Not Significant (Minor) along the southern edges of Morecambe Bay. Not Significant (Negligible) from the remaining sections ▪ Wyre Way – moderate around Rossall Point (between Rossall School, Rossall Point and the River Wyre). Not Significant (Minor) from remaining inland sections *Merseyside* ▪ Southport – moderate from the seafront. Not Significant (Minor) from areas set-back from seafront within Southport

Receptor	Transmission Assets range of significance of effect (residual effect)		Generation Assets range of significance of effect (residual effect)	
		connection cable corridor (C: 15d Coastal Plain: Fylde; 17a Enclosed Coastal Marsh: Clifton and Hutton; 18a Open Coastal Marsh: Ribble Marsh) ▪ Visual impacts: Onshore – substation scenario 1 (O: Representative VP4: Parrox Lane east of Morecambe substation north site) ▪ Visual impacts: Onshore – substation scenario 2 (O: Representative VP4: Parrox Lane east of Morecambe substation north site) ▪ Visual impacts: landfall and onshore export cable route (C: People using the beach for leisure and recreation, People using Lancashire Coastal Way and National Cycle Route 62)		▪ Trans Pennine Trail (coastal section) moderate from coastal section between Ainsdale and Southport. Not Significant (minor) from inland section between Ainsdale and Liverpool
Aviation and radar	C: Minor Adverse O: Negligible to Minor Adverse D: Minor Adverse	Not significant in EIA terms	C: No Change to Not significant O: Not significant D: No Change to Not significant	Not significant in EIA terms

Receptor	Transmission Assets range of significance of effect (residual effect)		Generation Assets range of significance of effect (residual effect)	
Climate change	C: Negligible to Minor Adverse O: Negligible to Minor Adverse D: Negligible to Minor Adverse	Not significant in EIA terms	C: Minor Adverse O: Beneficial D: Negligible Adverse	Not Significant in EIA terms
Socio-economics	C: Negligible to Moderate (Beneficial/Adverse) O: N/A to Minor (Beneficial/Adverse) D: Negligible to Minor (Beneficial/Adverse)	During the construction phase, it is possible to have significant effects: Moderate beneficial: ▪ On economic receptors including employment, GVA, and supply chain demand No significant effects in EIA terms have been identified for this receptor during the operation or decommissioning phases.	C: Negligible Beneficial, Negligible Adverse/no impact O: Negligible Beneficial, Negligible Adverse/no impact D: Negligible Beneficial, Negligible Adverse/no impact	Not Significant in EIA terms Beneficial effects are associated with GVA, and employment

Receptor	Transmission Assets range of significance of effect (residual effect)	Generation Assets range of significance of effect (residual effect)	
Human health	No separate chapter, with human health impacts addressed in other relevant chapters above.	C: Negligible to Minor Beneficial/ Adverse O: Negligible to Minor Beneficial/ Adverse and Moderate Beneficial D: Negligible to Minor Beneficial/ Adverse	Not Significant to Significant Beneficial Beneficial effects are associated with education, employment, investment, climate change and wider societal benefits

23.5 Cumulative effects between Generation Assets and Transmission Assets

41. This section presents a summary of the "combined assessment" undertaken by the Project of the cumulative effects of the Project (Generation Assets) with the Transmission Assets – i.e. considering impact interactions and additive effects[3] to determine if any effects would be materially elevated than assessed for each project- alone.

42. Given the interconnected nature of the Project and the Transmission Assets, such combined assessments are included within the cumulative effects assessment (CEA) for each technical topic of the Project ES (chapters 7-22). These are included as an additional step in the CEA before the cumulative assessment for each topic thereafter considers all plans, projects and activities screened into the CEA. Further details of the combined cumulative effects assessments are provided within chapters 7-22 of this Project ES, where applicable.

[3] In this context interactions are considered were there may be spatial overlap of effects and additive effects are considered where there may be incremental effects on the same receptor, including increased temporal effects.

Table 23.8 Combined assessment summary

Receptor/topic	Transmission Assets residual effect	Generation Assets residual effect	Combined Assessment
Physical processes	Not significant (Negligible Adverse)	Not significant (No change to Negligible Adverse)	No significant cumulative effects identified, despite some interaction expected between sediment plumes and additive effects.
Marine Sediment and Water Quality		Not significant (Negligible to Minor Adverse)	
Benthic subtidal and intertidal ecology	Not significant (No effect to Minor Adverse)	Not significant (No change to Minor Adverse)	
Fish and shellfish ecology	Not significant (Negligible to Minor Adverse)	Not significant (No change to Minor Adverse)	No significant cumulative effects identified, particularly given the limited piling activity and effects expected from the Transmission Assets.
Marine mammals	Not significant (Minor Adverse)	Not significant (Negligible to Minor Adverse)	
Offshore ornithology	Not significant (Negligible to Minor Adverse)	Not significant (No Change to Minor Adverse)	No significant cumulative effects identified, despite some additive effects in relation to disturbance in construction.
Commercial fisheries	Not significant (Negligible to Minor Adverse/Beneficial)	Not significant (Negligible to Minor Adverse)	No significant cumulative effects identified despite some additive effects across the region.
Shipping and navigation	Not significant (Negligible to Minor Adverse)	Not Significant (Negligible - Moderate (navigational safety ALARP) Adverse)	No significant cumulative effects identified, given the limed operational impact of the Transmission Assets.

Receptor/topic	Transmission Assets residual effect	Generation Assets residual effect	Combined Assessment
Marine archaeology	Not significant (No Change to Minor Adverse)	Not significant (No Change to Minor Adverse)	No significant cumulative effects identified, given the mitigations identified for both projects.
Other sea users	Not significant (Negligible to Minor Adverse)	Not significant (Negligible to Minor Adverse)	No significant cumulative effects identified, given the mitigations identified for both projects.
Geology, hydrogeology and ground conditions	Not Significant (No Effect to Minor Adverse)	NA – no pathway to receptors	No combined effects – no overlap in receptors
Hydrology and flood risk	Not Significant (No Effect to Minor Adverse)	NA – no pathway to receptors	No combined effects – no overlap in receptors
Onshore ecology and nature conservation	Not Significant (No Effect to Minor Adverse)	NA – no pathway to receptors	No combined effects – no overlap in receptors
Onshore and intertidal ornithology	**Significant** (Negligible to Moderate Adverse) (No Effect to potentially Significant Beneficial)	NA – no pathway to receptors	No combined effects – no overlap in receptors
Historic environment (onshore)	Not Significant (No Effect to Minor Adverse) Unknown (Areas where survey work remains to be completed)	NA – no pathway to receptors	No cumulative effects, noting that onshore assets assessed (settings assessment) for the Project (Generation Assets) are largely separate from the Transmission Assets onshore receptors.

Receptor/topic	Transmission Assets residual effect	Generation Assets residual effect	Combined Assessment
Land use and recreation	Not Significant (No Effect to Moderate Adverse)	NA – no pathway to receptors	No combined effects – no overlap in receptors.
Traffic and transport	**Significant** (Negligible to potentially significant Adverse)	Limited pathway to be identified upon Port(s) selection	No significant cumulative effects identified, given the mitigations identified for both projects.
Noise and vibration	Not Significant (No Change to Minor Adverse)	NA – no pathway to receptors	No combined effects – no overlap in receptors
Air quality	**Potentially Significant**[4] (Negligible to potentially significant Adverse)	NA – no pathway to receptors	No combined effects – no overlap in receptors
Seascape, landscape and visual resources	**Significant** (Negligible to Major Adverse)	Effects ranging from Negligible to Moderate (Not Significant) to Moderate to Major Adverse (**Significant**) visual effects identified along the adjacent Lancashire coast to the Project.	No combined effects - noting that onshore receptors assessed for the Project (Generation Assets) are largely separate to the Transmission Assets onshore receptors and there are limited offshore visual effects for the Transmission Assets given the majority of infrastructure is subsea.
Aviation and radar	Not Significant (Negligible to Minor Adverse)	No significant effects identified with effects ranging from No Change to not significant.	No cumulative effects identified beyond each project alone significance,

[4] To be confirmed following further assessments and mitigations expected as part of the Transmission Assets ES

Receptor/topic	Transmission Assets residual effect	Generation Assets residual effect	Combined Assessment
			given the mitigations identified for both projects.
Climate change	Not Significant (Negligible to Minor Adverse)	No significant effects identified with effects ranging from Negligible to Minor Adverse and Beneficial.	Consideration has been made to the emissions of the Transmission Assets, combined with the Project (Generation Assets). It is concluded the Beneficial effects remain.
Socio-economics	**Significant** (Negligible to Moderate Beneficial) Not Significant (Minor Adverse)	No significant effects identified with effects ranging from Negligible Adverse to Negligible Beneficial.	Consideration has been given to both the Beneficial and Adverse effects from both projects. No significant cumulative effects identified, but additional effects were noted.
Human Health	No separate chapter but potentially significant adverse effects identified for Human heath within Chapter 9: Air Quality and not significant effects Chapter 1: Geology, hydrology, and ground conditions and Chapter 8: Noise and Vibration.	No adverse significant effects identified with effects ranging from Negligible to Minor Adverse, and **Significant (Moderate) Beneficial effects**.	

23.6 Cumulative effects with all relevant projects, plans and activities

43. As highlighted in **Section 23.4,** when considering both the Project (Generation Assets) and the Transmission Assets together no combined effects have been identified that represent a cumulative effect beyond the effects identified for each project alone.

44. As also noted in **Section 23.4**, both the Project ES and the Transmission Assets PEIR include a cumulative effects assessment that covers all relevant projects, plans and activities. A summary of the significant cumulative effects presented by each project when considering all relevant projects, plans and activities is provided below, noting further details are provided in the Project ES (chapters 7-22) and the Transmission Assets PEIR (Morgan Offshore Wind Limited and Morecambe Offshore Windfarm Ltd, 2023a).

23.6.1 Transmission Assets – significant cumulative effects

23.6.1.1 Offshore effects

45. Potential significant cumulative effects (considering all plans and projects) identified in the Transmission Assets PEIR are listed below, noting assessments would be updated in the Transmission Assets ES in line with further assessment and project refinements.

- **Benthic subtidal and intertidal ecology:** A significant cumulative effect of temporary habitat disturbance has been identified with the Morgan Offshore Wind Project. It is predicted that, over time, the significance effect will decrease as sediments and associated benthic communities recover. No significant cumulative effects are predicted in the longer term and project design refinements are under consideration to reduce the contribution to this effect from the Transmission Assets.
- **Marine Mammals:** There is a potential for significant cumulative effects for bottlenose dolphins regarding behavioural disturbance as a result of piling. The cumulative impact of piling at projects across the Irish Sea could result in potential reductions to lifetime reproductive success for some individuals in the Irish Sea population. Disturbance in offshore areas during piling could lead to a longer duration over which individuals may be displaced from key feeding areas. Further project design

refinements are under consideration to reduce the contribution to this effect from the Transmission Assets[5].

- **Commercial Fisheries:** Potential significant cumulative effects to loss or restricted access to fishing grounds for Scottish west coast scallop vessels from the Transmission Assets have been assessed alongside the Morgan Offshore Wind Project Generation Assets, as well as other projects. Commitments are being developed as part of the Morgan Offshore Wind Project and the Mona Offshore Wind Project to address this.
- **Shipping and Navigation:** The assessment of the Transmission Assets, together with other projects, identified significant cumulative effects. Although the contribution of the Transmission Assets to the cumulative effects is relatively small, further work is being undertaken to consider these effects. Embedded mitigation set out by the Morgan Offshore Wind Project, Mona Offshore Wind Project and Morecambe Offshore Windfarm will also mitigate against the effects on commercial operators (e.g. Notices to Mariners, Kingfisher bulletins and marine co-ordination) and refinements have since been made to the site boundaries of the Morecambe, Morgan and Mona projects to reduce shipping and navigaiton impacts, which had not been considered within the Transmission Assets PEIR assessment[6]. The cumulative effects assessed include:
  - Impact to commercial operators including strategic routes and lifeline
  - Ferries
  - Impact to adverse weather routeing
  - Impact on vessel-to-vessel collision risk
  - Impact on allision risk
  - Impact on oil and gas navigation, operations and safety

23.6.1.2 Onshore effects

46. Potential significant cumulative effects (considering all plans and projects) identified in the Transmission Assets PEIR are listed below, noting assessments would be updated in the Transmission Assets ES in line with further assessment and project refinements.

[5] It is noted that since the Transmission Assets PEIR both the OSPs and the Morgan OBS have been removed from the Transmission Assets Application, eliminating the need for piling activities for the Transmission Assets, thereby reducing associated noise impacts.

[6] Since the production of the Transmission Assets PEIR, boundary changes have been made to the Morecambe, Mona and Morgan boundaries to reduce impacts.

- **Onshore and intertidal ornithology:** Potential for significant cumulative effects for habitat loss and disturbance during construction and decommissioning has been identified by the assessment. The updated Transmission Assets ES will continue working on mitigation during the EIA process as further details of other projects become available.
- **Land use and recreation:** The assessment of the Transmission Assets, combined with other projects, identified the potential for significant adverse cumulative effects for permanent loss of BMV land. An updated assessment will be provided in the Transmission Assets ES.
- **Traffic and transport:** The assessment of the Transmission Assets has identified three proposed road schemes for consideration in terms of cumulative effects. Additional data will be considered in the updated assessment for the Transmission Assets ES.
- **Noise and vibration:** The assessment of the Transmission Assets has identified the potential for significant adverse cumulative effects with other projects for construction noise and vibration at specific locations. Mitigation options under consideration include adjustments to the construction programme to avoid works occurring at the same time as those on other nearby sites. Additionally, other noise control measures may be implemented, such as acoustic enclosures or barriers. An updated assessment will be provided in the Transmission Assets ES.

23.6.1.3 Offshore and onshore effects

47. Potential significant cumulative effects (considering all plans and projects) identified in the Transmission Assets PEIR are listed below, noting assessments would be updated in the Transmission Assets ES in line with further assessment and project refinements.

- **Seascape, landscape and visual resources:** The assessment of the Transmission Assets has identified potential for temporary and permanent cumulative effects with other projects[7].
    - Temporary cumulative effects have been identified for visual amenity of walkers using PRoWs and people living in residential properties as a result of onshore cable construction activities in combination with onshore cumulative projects
    - Permanent cumulative effects on the seascape character of MCA 38: Irish Sea South, SSZ 2: North East Wales Offshore, SSZ 4: North Wales and Anglesey Inshore, SSZ 5 North Wales and Anglesey Outer Offshore and MCA A: Dreswick Point to Maughold Head Isle of Man as a result of offshore elements of the

[7] Noting that subsequent to the Transmission Assets PEIR assessment that the OSPs and the Morgan OBS are no longer included/required as part of the Transmission Assets project.

Transmission Assets in combination with offshore cumulative windfarm projects

- Permanent cumulative effects on views gained by passengers and staff on the Heysham to Douglas Ferry and Liverpool to Douglas Ferry as a result of offshore elements of the Transmission Assets in combination with offshore cumulative windfarm projects

- **Climate change:** Significant beneficial cumulative effect of the Transmission Assets, together with other projects, are expected.
- **Socio-economics:** Significant beneficial cumulative effects of the Transmission Assets with other projects are expected during construction on:
  - Economic receptors, including GVA, employment, and supply chain demand in the North Wales socio-economics offshore regional study area and North West England socio-economics offshore regional study area
  - The potential impact on population, housing, and accommodation in the North Wales socio-economics offshore regional study area
  - There will be significant beneficial cumulative effects, during operation, on the potential impact on population, housing, and accommodation in the North Wales socio-economics offshore regional study area

23.6.2 Generation Assets – significant cumulative effects

48. As identified in detail in the Project ES, significant adverse (residual) cumulative effects are identified for commercial fisheries during construction, however effects are as a result of the wide scale development across the Irish Sea. Further, cumulative adverse significant effects are identified for Greater Black Backed Gull during operation for collision risk, with a low contribution from the Project and with no interaction with the Transmission Assets. Project-alone significant adverse effects identified in the seascape, landscape and visual impact assessment, concentrated around the closest adjacent Lancashire coastline are not further elevated when considering other projects, with no interaction with the Transmission Assets. Moderate effects were identified for shipping and navigation but navigational safety was assessed to be as low as reasonably possible and not significant in EIA terms where the Project contributes to effects. Significant effects in EIA terms were identified for ferry routeing (deviations) in adverse weather, however the Project is considered to have a low contribution to these effects. Significant beneficial effects are also identified for wider societal benefits as part of the Human Health assessment.

23.7 Designated sites

49. Designated sites are assessed as part of the EIA for both the Project (Generation Assets) and Transmission Assets. In addition, each project has produced a Report to Inform Appropriate Assessment (RIAA)[8] (under the Habitats Directive Regulations) (Document Reference 4.9) and a Marine Conservation Zone Assessment (MCZA) (Document Reference 4.13) under the Marine and Coastal Access Act 2009 (draft assessments are available for the Transmission Assets). Within the Project MCZA and the Project RIAA, a combined assessment has been undertaken to consider effects of designated sites as a result of both projects.

50. Given the location of the MCZs in relation to both projects, there is limited interaction of effects as assessed separately. The key site with the highest potential for combined effects is the Fylde MCZ, however, as this site is over 8km from the Project (Generation Assets), no measurable contribution to effects is expected, and as such, the assessments made for the Transmission Assets is considered to be uninfluenced by the Generation Assets.

51. Considering the European Sites, the Information to Support an Appropriate Assessment (ISAA) produced for the Transmission Assets (Morgan Offshore Wind Limited and Morecambe Offshore Windfarm Ltd, 2023b), identified no adverse effect on integrity to any SACs, SPAs and Ramsar sites (noting this would be confirmed in the final ISAA for the Transmission Assets, with further assessment being undertaken for the Lleyn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC and Cardigan Bay/Bae Ceredigion SAC).

52. As detailed in the Project RIAA, no adverse effects on integrity have been identified, with limited interaction on designated sites between the Project and the Transmission Assets (for example the Transmission Assets do not contribute to bird collisions). While there are some additive effects, where there is a pathway for the same sites to be affected, when considering in-combination effects, these result largely from other offshore wind projects, existing and in planning, rather than the Transmission Assets.

23.8 Environmental Net Gain

53. An Environmental Benefit and Net Gain Statement has been provided as part of the Project DCO Application (Document Reference 4.4), in line with the Overarching National Policy Statement for Energy (EN-1) (DESNZ, 2023). A separate statement is being developed for the Transmission Assets.

[8] Entitled the Information to Support an Appropriate Assessment (ISAA) for the Transmission Assets

23.9 Conclusion

54. This document provides an overview of the effects of the Transmission Assets impacts as they are understood so far at this stage and based on the publicly available Transmission Assets PEIR (Morgan Offshore Wind Limited and Morecambe Offshore Windfarm Ltd, 2023a). The ES for the Transmission Assets is expected to be submitted in 2024.

55. Taking an overview of the Transmission Assets PEIR, project-alone significant environmental effects are expected for some receptors, although, notably only onshore. Where an assessment identifies likely significant adverse effects, further mitigation measures may be applied. For cumulative effects, assessments carried out by each project are largely influenced by the number of other projects within the assessment, with limited combined effects between the Project (Generation Assets) and the Transmission Assets.

56. There are no effects identified where the project-alone assessments for the Project (Generation Assets) and the Transmission Assets are materially changed by a combined cumulative effect with the other project. This is due to the (very limited) level of interaction of effects between the projects. Significant adverse effects as a result of each project are not influenced by each other given the separation of receptors, limited additive nature or interaction of effects. The beneficial effects of both projects are also noted, in particular in relation to socio-economics and human health.

23.10 References

DESNZ (2023). Overarching National Policy Statement for Energy (EN-1). November 2023.

IAQM (2014) Guidance on the assessment of dust from demolition and construction. Available at: https://iaqm.co.uk/guidance/ (Accessed July 2023).

Morgan Offshore Wind Limited and Morecambe Offshore Windfarm Ltd (2023a). Morgan and Morecambe Offshore Wind Farms: Transmission Assets. Preliminary Environmental Information Report Preliminary Environmental Information Report (PEIR). Available at: https://morecambeandmorgan.com/transmission/informationhub/ (Accessed February 2024)

Morgan Offshore Wind Limited and Morecambe Offshore Windfarm Ltd (2023b). Morgan and Morecambe Offshore Wind Farms: Transmission Assets. Habitats Regulations Assessment Stage 2 Information to Support an Appropriate Assessment. Available at: https://bp-mmt.s3.eu-west-2.amazonaws.com/transmission/PEIR/Other+documents/Transmission+Assets+ISAA.pdf (Accessed January 2024)

NGESO (2022). Pathway to 2030. A holistic network design to support offshore wind deployment for net zero. July 2022.