



# Awel y Môr Offshore Wind Farm

## Category 6: Environmental Statement

### Volume 4, Annex 3.1: Water Framework Directive Compliance Assessment

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# Contents

1	Introduction.....	11
1.1	Project Background .....	11
1.2	Purpose of this document .....	12
1.3	Structure of this document .....	13
2	Policy and legislative context.....	15
2.1	Introduction .....	15
2.2	Water Framework Directive.....	15
2.3	WFD Regulations.....	17
2.3.1	Development Consent Order .....	17
2.3.2	Marine Licence .....	17
2.4	Groundwater Directive .....	17
2.5	Protected Areas.....	17
2.5.1	Bathing Water Directive .....	18
2.5.2	Shellfish Waters Directive.....	19
2.5.3	Urban Waste Water Treatment Directive.....	19
2.5.4	Nitrates Directive .....	19
2.5.5	Habitats/ Birds Directives and Ramsar Convention.....	20
2.5.6	Drinking Water Protected Areas .....	21
2.6	Requirement to consider the WFD in the context of the Planning Act 2008	21
2.7	Requirement to consider the WFD under the Marine Coastal and Access Act 2009 .....	22
3	Consultation.....	23
3.1	Approach .....	23
3.2	Consultation to date .....	24
4	Assessment methodology .....	44
4.1	Guidance .....	44
4.2	Data sources .....	44

4.3	Process .....	45
4.3.1	Screening .....	45
4.3.2	Scoping .....	45
	Marine.....	47
	Freshwater .....	48
	Groundwater .....	49
4.3.3	Impact assessment .....	49
5	Screening .....	52
5.1	General.....	52
5.2	Proposed activities offshore .....	52
5.2.1	Construction .....	52
5.2.2	O&M .....	54
5.2.3	Decommissioning.....	54
5.3	Proposed activities onshore .....	55
5.3.1	Construction .....	55
	Cable circuit installation.....	55
	Crossings .....	56
	Substation.....	64
	Connection to National Grid .....	65
5.3.2	O&M .....	65
5.3.3	Decommissioning.....	66
5.4	Mitigation measures .....	66
5.4.1	Offshore.....	67
	Pollution prevention .....	67
	INNS .....	67
	Cable Specification and Installation Plan.....	68
5.4.2	Onshore.....	68
	Code of Construction Practice .....	68
	Permits.....	69
	Soil management.....	69

Drainage and dewatering .....	69
Pollution prevention .....	70
5.5 Zone of Influence.....	71
5.6 Waterbodies screening.....	71
5.7 Protected areas screening.....	76
6 Scoping.....	79
6.1 Relevant waterbodies status.....	79
6.1.1 Relevant coastal and transitional waterbodies status.....	79
Biological habitats.....	80
6.1.2 Relevant river waterbodies status.....	83
6.1.3 Relevant groundwater bodies status .....	86
6.2 Status of relevant protected areas .....	87
6.3 Marine waterbodies scoping .....	91
6.4 Freshwater waterbodies scoping .....	103
6.5 Groundwater scoping.....	110
6.6 Cumulative effects .....	114
6.7 Scoping conclusions.....	114
7 Impact Assessment .....	118
7.1 Marine elements .....	118
7.1.1 Hydromorphology .....	118
7.1.2 Biological habitats .....	124
7.1.3 Fish ecology .....	127
7.1.4 Water Quality.....	129
7.1.5 Marine Invasive Non-Native Species.....	132
7.2 Freshwater elements .....	134
7.2.1 Physical habitat .....	134
7.2.2 Water quality .....	135
Construction.....	135
Water quality mitigation measures .....	135
Landfall activities.....	136

Trenchless crossings.....	137
Trenching of onshore cables .....	138
Construction of the onshore substation .....	138
O&M.....	139
Decommissioning .....	139
7.2.3 Fish and eels .....	140
Trenchless crossings.....	140
7.3 Groundwater elements.....	140
7.3.1 Creation of pathways .....	140
Landfall .....	140
Trenchless crossings.....	142
Trenching and substation construction .....	143
7.4 Protected areas.....	143
7.4.1 National Site Network sites.....	143
7.4.2 Bathing Waters .....	147
7.4.3 Nitrate Vulnerable Zones .....	154
7.5 Cumulative effects .....	154
7.5.1 Marine elements .....	155
7.5.2 Freshwater elements.....	157
8 Summary.....	159
9 References .....	165

## Figures

Figure 1: AyM Order Limits, including array area and offshore ECC.....	14
Figure 2: AyM proposed approach to WFD consultation (source: PINS, 2017). .....	24
Figure 3: Locations of watercourse crossings along the onshore ECC.....	63
Figure 4: Geographical overview of coastal and transitional WFD waterbodies. .....	73

Figure 5: Geographical overview of freshwater (riverine and lake) WFD waterbodies.....	74
Figure 6: Geographical overview of groundwater WFD waterbodies.....	75
Figure 7: Geographical overview of marine WFD protected areas of relevance to AyM. ....	77
Figure 8: Geographical overview of marine and terrestrial WFD protected areas relevance to AyM. ....	78
Figure 9: Benthic habitats (source: Lle, 2020). ....	82
Figure 10: Maximum SSC plume extent from Mass Flow Excavation within offshore ECC with Bathing Water monitoring points (spring tide). ....	152
Figure 11: Maximum SSC plume extent from Mass Flow Excavation within offshore ECC with Bathing Water monitoring points (neap tide). ....	153

## Tables

Table 1: Summary of consultation relating to the WFD. ....	25
Table 2: Identified watercourse crossings along the onshore ECC. ....	58
Table 3: Waterbodies screened into the WFD compliance assessment. ....	71
Table 4: Current status of scoped in coastal and transitional waterbodies (source: Cycle 3 Classifications (NRW, 2021b)). ....	79
Table 5: Current status of scoped in river waterbodies (source: Cycle 3 Classifications (NRW, 2021b)). ....	84
Table 6: Current status of scoped in groundwater waterbodies (source: Cycle 3 Classifications (NRW, 2021b)). ....	86
Table 7: Bathing Water classification and distances.....	88
Table 8: Designated feature(s) of the identified SACs and SPAs.....	88
Table 9: Scoping assessment of marine (coastal and transitional) WFD waterbodies.....	92
Table 10: Scoping assessment of freshwater (riverine) WFD waterbodies and non-reportable watercourses.....	104
Table 11: Scoping assessment of groundwater WFD waterbodies. ....	111
Table 12: WFD scoping conclusions.....	114
Table 13: Existing mitigation measures for the North Wales coastal waterbody. ....	121
Table 14: Hearing categories of fish receptors.....	128
Table 15: Summary of the potential for Adverse Effect from AyM Alone and In-combination for National Site Network.....	145
Table 16: WFD compliance assessment conclusions. ....	160

## Glossary of terms

TERM	DEFINITION
Coastal WFD water bodies	These are surface waters which are fully saline.
Groundwaters	Groundwater is the water present beneath the surface in rock and soil pore spaces and in the fractures of rock formations.
River Basin Management Plan	The River Basin Management Plan is a detailed account of how the objectives set for the river basin (ecological status, quantitative status, chemical status and protected area objectives) are to be reached within the timescale required.
Riverine WFD waterbodies	These are surface waters which are typically main rivers and large streams.
Transitional WFD water bodies	These are surface waters which are estuaries and so have variable salinity throughout tidal cycles.

## Abbreviations and acronyms

TERM	DEFINITION
AyM	Awel y Môr Offshore Wind Farm
CSIP	Cable Specification and Installation Plan
CoCP	Code of Construction Practice
DCO	Development Consent Order
ECC	Export Cable Corridor
EIA	Environmental Impact Assessment



TERM	DEFINITION
E. coli	Escherichia coli
EU	European Union
GyM	Gwynt y Môr Offshore Wind Farm
HDD	Horizontal Directional Drilling
HMWB	Heavily Modified Water Body
INNS	Invasive Non-native Species
MPCP	Marine Pollution Contingency Plan
NSIP	Nationally Significant Infrastructure Project
NRW	Natural Resources Wales
NVZ	Nitrate Vulnerable Zones
OnSS	Onshore Substation
O&M	Operation and Maintenance
PINS	Planning Inspectorate
PPEIRP	Pollution Prevention and Emergency Incident Response Plan
PEIR	Preliminary Environmental Information Report
RIAA	Report to Inform Appropriate Assessment
rBWD	revised Bathing Water Directive
RBMPs	River Basin Management Plans
SABP	St Asaph Business Park
SACs	Special Areas of Conservation
SPAs	Special Protection Areas
GWD	The Groundwater Directive

TERM	DEFINITION
WFD	Water Framework Directive
ZoI	Zone of Influence

## Units

UNIT	DEFINITION
dB	Decibel
km	kilometres
km <sup>2</sup>	Square kilometre
km <sup>3</sup>	Cubic kilometre
mg/l	Milligrams per litre
nm	Nautical mile

# 1 Introduction

## 1.1 Project Background

- 1 Awel y Môr Offshore Wind Farm (AyM) is a proposed sister project to the operational Gwynt y Môr Offshore Wind Farm (GyM) off the coast of north Wales (Figure 1). GyM has been operational since 2015. GyM has invested £90m in Wales during construction, and has since created more than 100 long-term, skilled jobs at the Port of Mostyn.
- 2 AyM will comprise an array of offshore Wind Turbine Generators (WTGs) with an overall capacity of over 100 Megawatts (MW) and therefore constitutes a Nationally Significant Infrastructure Project (NSIP) under Section 15(3) of the Planning Act 2008. Such projects require a Development Consent Order (DCO) to be granted by the relevant UK Secretary of State (SoS); in this case, the SoS for Business, Energy and Industrial Strategy (BEIS). Marine planning is a matter which is devolved to the Welsh Government, and therefore a marine licence is also required under the Marine and Coastal Access Act 2009. The Applicant is seeking these consents through parallel applications to the SoS for BEIS and Welsh Government, respectively.
- 3 The Project is being developed under a joint venture arrangement, through the company Awel y Môr Offshore Wind Farm Limited (AyMOWFL; the 'Applicant'). The project partners of AyMOWFL are RWE (60%), Stadtwerke München (30%) and Siemens Financial Services (10%). RWE is leading the development of the project on behalf of the project partners.

## 1.2 Purpose of this document

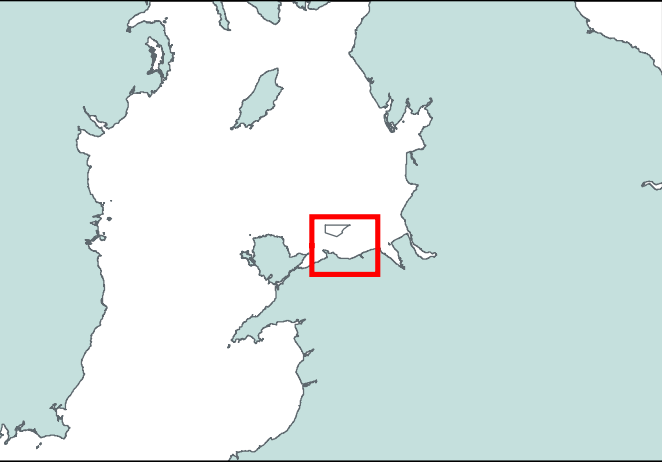
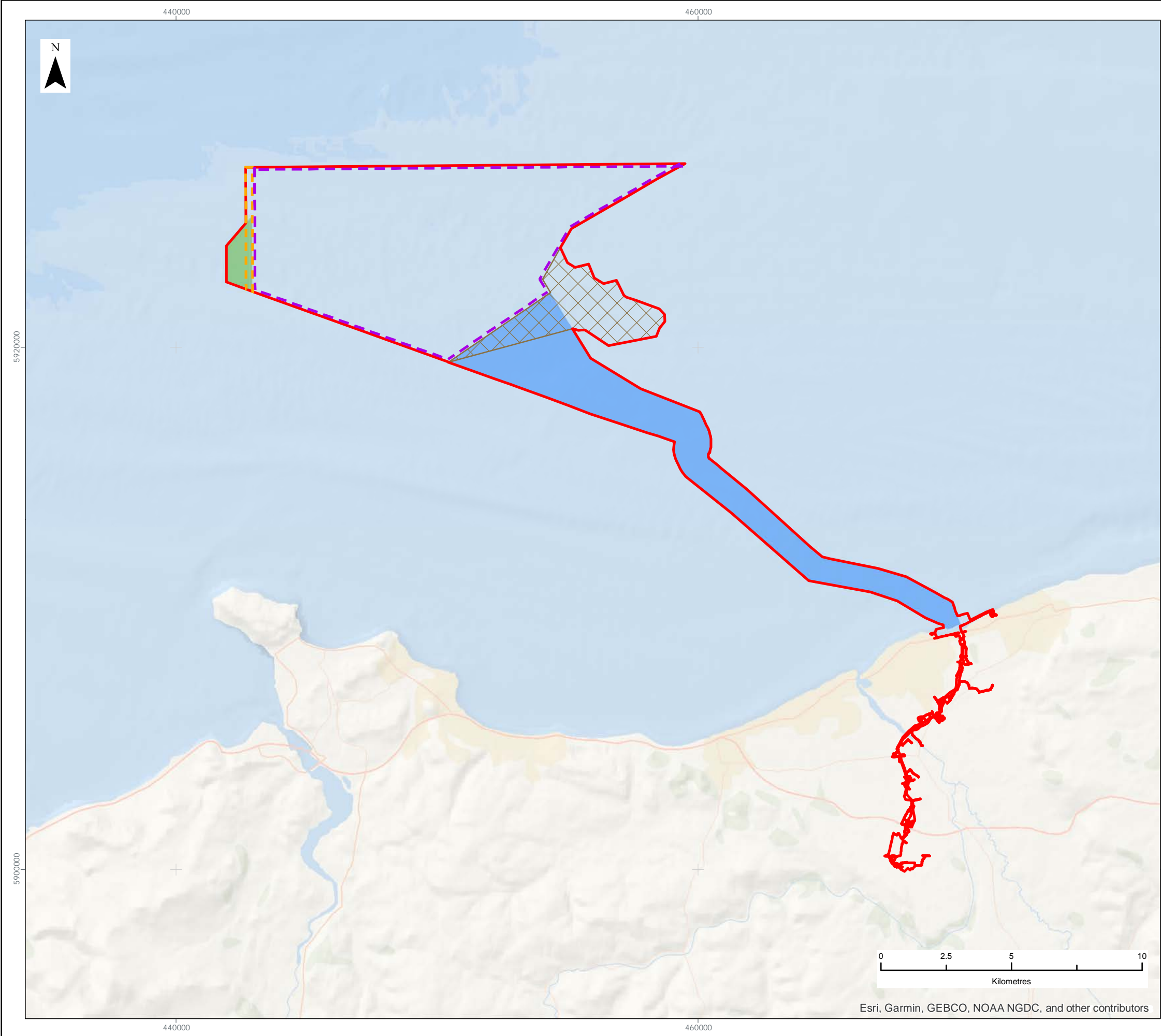
- 4 This document has been prepared to present the findings of the compliance assessment of Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy, commonly known as the Water Framework Directive (WFD), for the potential impacts of AyM. Hereafter, this document is referred to as the WFD compliance assessment. The purpose of this assessment is to demonstrate the proposed project's compliance with the WFD by ensuring that the proposed activities associated with AyM do not result in a deterioration in a designated water body (or protected area) and do not jeopardise the attainment of good status (or the potential to achieve good ecological and chemical status).
- 5 This assessment has been informed by the assessments presented within this Environmental Statement (ES) and provides a summary of the key findings. This document seeks to draw from, and signpost to where relevant information is provided within, the ES and to demonstrate compliance with the WFD, rather than duplicate assessment. Therefore, this document should be read in conjunction with:
  - ▲ Volume 2: Chapter 1: Offshore Project Description (application ref: 6.2.1);
  - ▲ Volume 2: Chapter 2: Marine Geology, Oceanography and Physical Processes (application ref: 6.2.2);
  - ▲ Volume 4, Annex 2.1: Physical Processes Baseline(application ref: 6.4.2.1);
  - ▲ Volume 4, Annex 2.3: Physical Processes Modelling Results (application ref: 6.4.2.3);
  - ▲ Volume 2, Chapter 3: Marine Water and Sediment Quality (application ref: 6.2.3);
  - ▲ Volume 2 Chapter 5: Benthic Subtidal and Intertidal Ecology (application ref: 6.2.5),
  - ▲ Volume 2, Chapter 6: Fish and Shellfish Ecology (application ref: 6.2.6);
  - ▲ Volume 3: Chapter 1: Onshore Project Description (application ref: 6.3.1);

- ▲ Volume 3, Chapter 5: Onshore Biodiversity and Nature Conservation (application ref: 6.3.5);
- ▲ Volume 3, Chapter 6: Ground Conditions and Land Use (application ref: 6.3.6);
- ▲ Volume 3, Chapter 7: Hydrology, Hydrogeology and Flood Risk (application ref: 6.3.7);
- ▲ Document 8.13: Outline Code of Construction Practice (application ref: 8.13);
- ▲ Document 8.13.1: Outline Construction Method Statement (application ref: 8.13.1);
- ▲ The Flood Consequence Assessments:
  - Volume 5, Annex 7.1: Onshore ECC Flood Consequence Assessment (application ref: 6.5.7.1);
  - Volume 5, Annex 7.2: Onshore Substation Flood Consequence Assessment (application ref: 6.5.7.2); and
- ▲ Report 5.2: Report to Inform Appropriate Assessment (RIAA) (application ref: 5.2).

## 1.3 Structure of this document

6 The remainder of this document has the following structure:

- ▲ Section 2 – Provides an overview of the relevant policy and legislative context for the AyM WFD compliance assessment;
- ▲ Section 3 – Details the proposed approach to consultation and consultation received to date for the AyM WFD compliance assessment;
- ▲ Section 4 – Provides the proposed methodology for undertaking the AyM WFD compliance assessment;
- ▲ Section 5 – Reports the findings of the AyM WFD Screening exercise;
- ▲ Section 6 – Presents the findings of the AyM WFD Scoping exercise;
- ▲ Section 7 – Presents the detailed impact assessment for the scoped elements; and
- ▲ Section 8 – Reports the summary of the impact assessment.



LEGEND

- Order Limits
- Array Area
- Offshore Export Cable Corridor
- Other Wind Farm Infrastructure Zone
- Subsea Infrastructure and Temporary Works Area
- GyM Interlink Zone

Data Source:

PROJECT TITLE:

*AWEL Y MÔR OFFSHORE WINDFARM*

FIGURE TITLE:

The AyM Order Limits

VER	DATE	REMARKS	Drawn	Checked
1	03/03/2022	For Issue for ES	BPHB	RM

FIGURE NUMBER:

Figure 1

SCALE: 1:150,000	PLOT SIZE: A3	DATUM: WGS84	PROJECTION: UTM30N
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Fferm Wynt Alltraeth  
**AWEL Y MÔR**  
Offshore Wind Farm

Esri, Garmin, GEBCO, NOAA NGDC, and other contributors

## 2 Policy and legislative context

### 2.1 Introduction

- 7 The following section provides information regarding the legislative context surrounding the assessment of potential effects in relation to the WFD. The UK left the European Union (EU) on 31 January 2020 and entered a period of transition that ended on 31 December 2020. The transition period is defined in the European Union (Withdrawal) Act 2018 and the European Union (Withdrawal Agreement) Act 2020 which transposed EU law into UK domestic law. References to Directives mean the Directive as applied in UK law by the Withdrawal Acts.

### 2.2 Water Framework Directive

- 8 The EU WFD (2000/60/EC) (hereafter referred to as the Directive) was established in 2000 in order to provide a single framework for the protection of surface waterbodies (including rivers, lakes, coastal waterbodies (out to 1 nm) and estuaries) and groundwater<sup>1</sup>. Each surface waterbody has an ecological status which is assigned by considering biological, hydromorphological, physico-chemical and specific chemical parameters. The different ecological statuses are:

- ▲ High;
- ▲ Good;
- ▲ Moderate;
- ▲ Poor; and
- ▲ Bad.

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<sup>1</sup> Volume 3, Chapter 7 (Hydrology, Hydrogeology and Flood Risk; application ref: 6.3.7) demonstrates due regard to the Environmental Permitting (England and Wales) Regulations 2010.

- 9 The current WFD status, the pressures affecting the water environment, the objectives for protecting and improving it, and the programme of measures needed to achieve the statutory environmental objectives of the Directive for each waterbody were set out in the 2015 River Basin Management Plans (RBMPs). There are three RBMPs which cover watercourses and coastal waterbodies in Wales. The RBMPs set out the objectives for the waterbodies and summarise the measures required to achieve these outcomes (NRW, 2015a). AyM is located within the Western Wales RBMP (NRW, 2015b) which has been reviewed to inform this WFD compliance assessment. This assessment aims to ensure that AyM complies with the requirements under the Directive which seeks to ensure there is no deterioration in quality (as presented in the Western Wales RBMP) of the protected areas and waterbodies.
- 10 The Directive's objective of 'good chemical status' is defined in terms of compliance with all the quality standards, within the waterbody, as established for chemical substances at a European level. The Directive also provides a process for renewing these standards and establishing new ones by means of a prioritisation mechanism for hazardous chemicals. This will ensure at least a minimum chemical quality, particularly in relation to very toxic substances.
- 11 The Directive's objective of 'good ecological status' also requires certain chemical conditions. The chemical requirements include the achievement of environmental quality objectives for discharged priority substances. It also identifies any other substances liable to cause pollution or being discharged in significant quantities.
- 12 The Environmental Quality Standards Directive (EQSD) list (Environment Agency, 2016a) identifies priority substances and polluting chemicals which should be considered in WFD compliance assessments for transitional and coastal waterbodies. The Directive and EQSD seek to reduce these substances entering into the marine environment, primarily from discharges and outfalls. Priority substances include, but are not limited, to benzene, nickel and lead.



## 2.3 WFD Regulations

- 13 The Directive (and Protected Areas) and aspects of the Groundwater Directive (2006/118/EC; GWD) were transposed into English and Welsh law by The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (hereafter referred to as the WFD Regulations 2017).

### 2.3.1 Development Consent Order

- 14 The WFD Regulations 2017 assign responsibility to the SoS for Business, Energy and Industrial Strategy (BEIS) and NRW to secure compliance with the Directive in Wales by exercising their 'relevant functions'. As AyM is a Nationally Significant Infrastructure Project (NSIP), the SoS will need to be satisfied that the objectives of the Directive have been complied with.

### 2.3.2 Marine Licence

- 15 Prior to granting the Marine Licence under the Marine and Coastal Access Act 2009, the Welsh Ministers and NRW will secure compliance with the Directive.

## 2.4 Groundwater Directive

- 16 The GWD (2006/118/EC, including amendments to Annex II detailed under Directive 2014/80/EU) is designed to combat groundwater pollution and sets out procedures for assessing quality of groundwater. Aspects of the GWD are transposed and implemented through the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 and the Environmental Permitting (England and Wales) Regulations 2016.

## 2.5 Protected Areas

- 17 Under the WFD, member states are required to establish a register of protected areas. Protected areas for the purposes of WFD include:
- ▲ Bathing Waters;
  - ▲ Shellfish Water Protected Areas;

- ▲ Nutrient-sensitive areas, including those identified as Sensitive Areas (e.g., Bathing Water, Eutrophic) and Nitrate Vulnerable Zones (NVZs);
- ▲ Relevant National Site Network sites; and
- ▲ Drinking Water Protected Areas.

### 2.5.1 Bathing Water Directive

- 18 The EU's revised Bathing Water Directive (rBWD; 2006/7/EC) came into force in March 2006. The rBWD has four different classifications of performance, these are:
  - ▲ Excellent - the highest, cleanest class;
  - ▲ Good - generally good water quality;
  - ▲ Sufficient - the water meets minimum standards; and
  - ▲ Poor - the water has not met the minimum required standards.
- 19 NRW measures, monitors and reports the number of certain types of bacteria which may indicate the presence of pollution, mainly from sewage or animal faeces, these are *Escherichia coli* (*E. coli*) and intestinal enterococci. An increase in the concentrations of these bacteria indicates a decrease in water quality.
- 20 NRW collects at least eight samples from each Bathing Water in Wales each year during the bathing season (15<sup>th</sup> May to 30<sup>th</sup> September). An overall classification for the Bathing Water is then determined by creating a distribution from the monitoring data for the last four years. A separate distribution is calculated for both *E. coli* and intestinal enterococci. This then enables the determination of the classification for each bacterium for the Bathing Water.
- 21 If the classification for both types of bacteria is different, then the overall compliance of the Bathing Water is the lowest classification achieved by either type. For example, if *E. coli* were performing at 'Good' but intestinal enterococci was performing at 'Sufficient', then the Bathing Water would be classified as performing at 'Sufficient'.

## 2.5.2 Shellfish Waters Directive

- 22 The Shellfish Waters Directive (2006/113/EC) was repealed in December 2013 and subsumed within the WFD. However, the Shellfish Water Protected Areas (England and Wales) Directions 2016 require NRW (in Wales) to endeavour to observe microbial standards in all 'Shellfish Water Protected Areas'. The microbial standard is 300 or fewer colony forming units of *E. coli* per 100 ml of shellfish flesh and intervalvular liquid. The Directions also requires NRW to assess compliance against this standard to monitor microbial pollution (75% of samples taken within any period of 12 months below the microbial standard and sampling/ analysis in accordance with the Directions).

## 2.5.3 Urban Waste Water Treatment Directive

- 23 The Urban Waste Water Treatment Directive (91/271/EEC) aims to protect the environment from the adverse effects of the collection, treatment and discharge of urban waste water. It sets treatment levels on the basis of sizes of sewage discharges and the sensitivity of waters receiving the discharges. In general, the Urban Waste Water Treatment Directive requires that collected waste water is treated to at least secondary treatment standards for significant discharges. Secondary treatment is a biological treatment process where bacteria are used to break down the biodegradable matter (already much reduced by primary treatment) in waste water. 'Sensitive Areas' under the Urban Waste Water Treatment Directive are water bodies affected by eutrophication due to elevated nitrate concentrations and act as an indication that action is required to prevent further pollution caused by nutrients.

## 2.5.4 Nitrates Directive

- 24 The Nitrates Directive (91/676/EEC) aims to reduce water pollution from agricultural sources and to prevent such pollution occurring in the future (nitrogen is one of the nutrients that can affect plant growth). Under the Nitrates Directive, surface waters are identified if too much nitrogen has caused a change in plant growth which affects existing plants and animals, and the use of the water body. Nitrate Vulnerable Zones (NVZs) are areas designated as being at risk from agricultural nitrate pollution.

## 2.5.5 Habitats/ Birds Directives and Ramsar Convention

- 25 The Council Directive (92/43/EEC) on the conservation of natural habitats and of wild fauna and flora (the “Habitats Directive”), protects habitats and species of European nature conservation importance. Together with the Council Directive (2009/147/EC) on the conservation of wild birds (the “Birds Directive”), the Habitats Directive establishes a network of internationally important sites, designated for their ecological status. Special Areas of Conservation (SACs) are designated under the Habitats Directive and promote the protection of flora, fauna and habitats. Special Protection Areas (SPAs) are designated under the Birds Directive in order to protect rare, vulnerable and migratory birds.
- 26 The Conservation of Habitats and Species Regulations 2017 (as amended) transposed the Habitats and Birds Directives into English and Welsh law. However, since the UK left the EU, the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 has transferred functions from the European Commission to the appropriate authorities in England and Wales, with SACs and SPAs in the UK no longer forming part of the EU’s Natura 2000 ecological network. The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 have created a National Site Network on land and at sea, including both the inshore and offshore marine areas in the UK. This includes all existing SACs and SPAs, and new SACs and SPAs designated under the Conservation of Habitats and Species Regulations 2017 and the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019.
- 27 Under the 1971 Ramsar Convention on Wetlands of International Importance, it is a requirement of signatory states to protect wetland sites of international importance, including those that are important waterfowl habitats. These internationally designated nature conservation sites are referred to as Ramsar sites. Whilst the UK has now left the EU, all Ramsar sites remain protected in the same way as SACs and SPAs (although they do not form part of the National Site Network).

### 2.5.6 Drinking Water Protected Areas

- 28 All waterbodies where water is used for human consumption are deemed protected areas under Article 7.3 of the Directive, known as Drinking Water Protected Areas. These are areas where raw water is abstracted to provide water for people to drink and includes water from reservoirs and rivers (surface waters) and the ground (groundwaters).

## 2.6 Requirement to consider the WFD in the context of the Planning Act 2008

- 29 Consideration of the Directive is required for any DCO Application. Consideration is specifically required for NSIPs, under various National Policy Statements (NPSs) including EN-1 (Department of Energy and Climate Change, 2011), to assess and provide sufficient information on any potential impacts arising from the proposed development on the waterbodies or protected areas under the Directive. In addition to the current NPS, draft revised NPSs were consulted upon in 2021 (consultation closed on 30 November 2021). This includes the Draft revised Overarching NPS EN-1 (Department for Business, Energy and Industrial Strategy (BEIS), 2021a) Draft revised NPS for Renewable Energy Infrastructure EN-3 (BEIS, 2021b) and Draft revised NPS for Electricity Networks Infrastructure EN-5 (BEIS, 2021c).
- 30 The SoS, NRW and other public bodies have a specific duty to have regard to the relevant RBMPs in exercising their functions, including the determinations of applications under the Planning Act 2008. This WFD compliance assessment, undertaken by the Applicant, has been prepared to provide information on the potential for AyM to cause deterioration within waterbodies (including the ecological and chemical status of waterbodies) or the potential to compromise improvements which might otherwise lead to a waterbody meeting its Directive objectives.

## 2.7 Requirement to consider the WFD under the Marine Coastal and Access Act 2009

- 31 The Marine and Coastal Access Act 2009 provides the framework for a marine licensing system which, in Wales, is administered by NRW on behalf of the Welsh Government, which is also a statutory consultee in the DCO application process. All marine licence applications (above Band 1) must be accompanied by a WFD compliance assessment, to demonstrate that the proposed development 'will not cause deterioration' in WFD waterbodies between MHWS and one nautical mile seaward.

## 3 Consultation

### 3.1 Approach

32 As recommended by the Planning Inspectorate (PINS) in Advice Note Eighteen: The Water Framework Directive (PINS, 2017), the Applicant sought NRW's views (and other members of the AyM Evidence Plan as appropriate) early in the pre-application phase. The consultation process has informed the development of this WFD compliance assessment which supports both the Applicant's Marine Licence and DCO Applications. The Applicant sought to agree the following with NRW, as recommended by PINS (2017), as part of the AyM Evidence Plan process, prior to the DCO Application being made:

- ▲ the need or otherwise for a specific WFD assessment;
- ▲ the scope and methodology of any WFD assessment;
- ▲ the potential impact of the proposed development on waterbodies within the relevant RBMP and compliance with the objectives of the WFD;
- ▲ any mitigation measures required to ensure compliance; and
- ▲ the information to be submitted as part of the DCO application to inform the tests of Article 4.7, if the WFD impact assessment concludes a derogation is necessary.

33 As part of the early engagement, the Application sought to agree the need, scope, methodology and potential impacts of the proposed development with NRW. This consultation has informed the development of this WFD compliance assessment (see Section 3.2 below). The WFD consultation is at Stage 3 of the proposed approach detailed in Figure 2. It is noted that if a material design change should occur, though none are currently anticipated, then Stage 2 and items of Stage 3 may need to be repeated. This WFD compliance assessment, prepared to support the ES, has been revised since the Preliminary Environmental Information Report (PEIR) stage to incorporate all consultation responses.



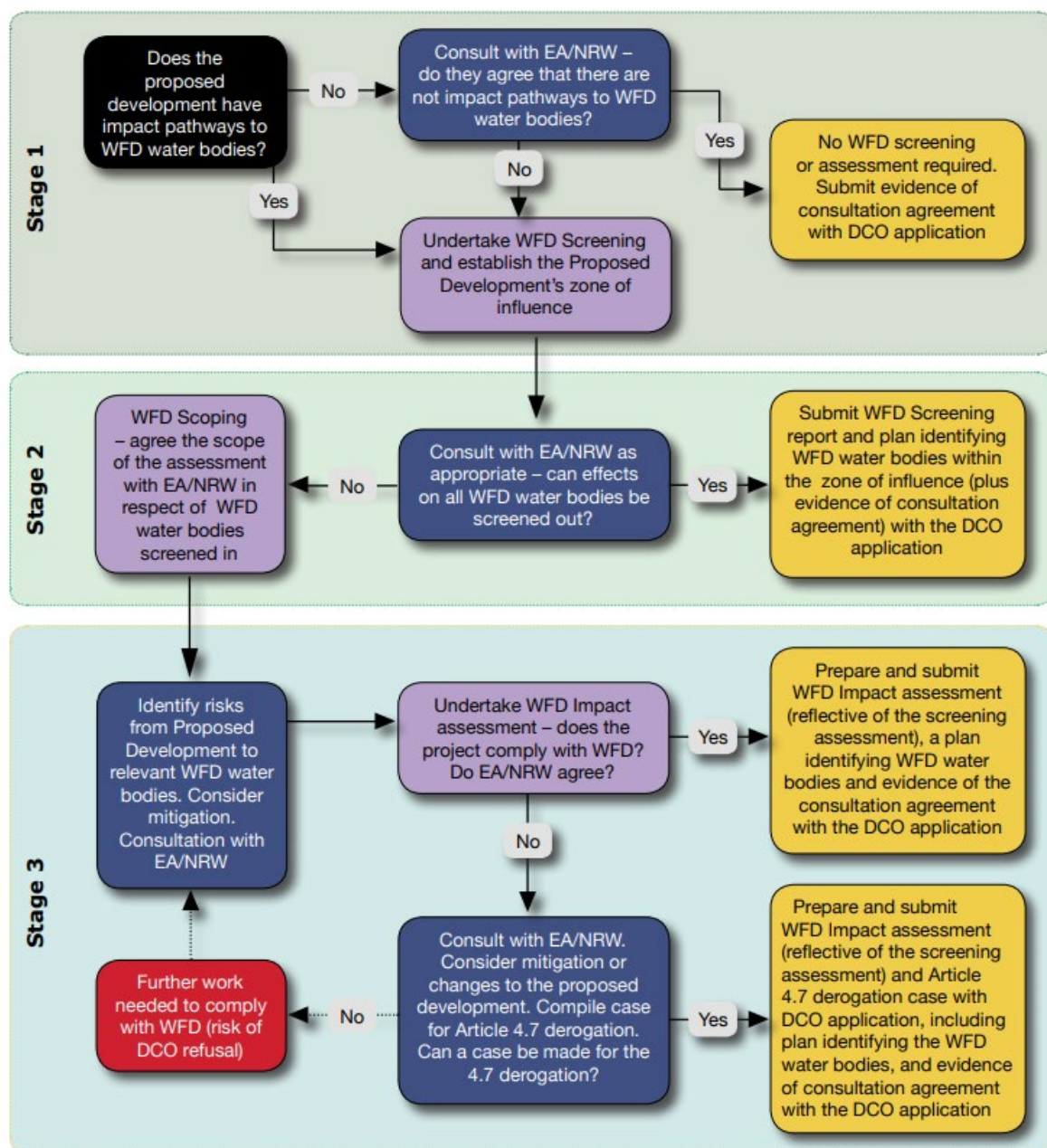


Figure 2: AyM proposed approach to WFD consultation (source: PINS, 2017).

## 3.2 Consultation to date

- 34 A summary of the consultation, received to date, in relation to AyM's WFD compliance assessment is provided in Table 1.



Table 1: Summary of consultation relating to the WFD.

CONSULTATION PHASE/ TYPE	CONSULTATION AND KEY ISSUES RAISED	WHERE THIS COMMENT IS ADDRESSED
Pre-Scoping Evidence Plan meeting (November 2019)	It was agreed that, in addition to the Clearing the Waters guidance, the principles in the NRW guidance notes (OGN 72 and OGN 77) should be followed.	Section 4.1 of this document provides details of the guidance followed in the production of this assessment, including OGN 72.
Pre-Scoping Evidence Plan meeting (November 2019)	Wales Watch Water and the Bathing Water explorer data should be used to inform the characterisation of the baseline.	As presented in Section 4.2, data from both Wales Watch Water and the Bathing Water explorer has been used in the production of this assessment.
Pre-Scoping Evidence Plan meeting (November 2019)	A WFD compliance assessment will be undertaken at the PEIR/ ES stage.	This commitment has been maintained. This document provides the WFD compliance assessment to accompany the ES.
Pre-Scoping Evidence Plan meeting (November 2019)	A discussion was held regarding the distance on which protected sites should be scoped in.	Section 5.7 presents the identified protected areas screened in for further consideration.
Pre-Scoping Evidence Plan meeting (November 2019)	It was agreed that the scoping outcomes would be presented to the ETG prior to publication of the PEIR.	A document was provided to the ETG prior to the publication of PEIR to agree the scope of this assessment.
Pre-Scoping Evidence Plan meeting (November 2019)	It was agreed that migratory fish would be considered as part of the WFD scoping.	Section 7.1.3 considers fish ecology.
Scoping (March 2020)	The Applicant committed to preparing a standalone WFD assessment.	This commitment has been maintained and this WFD compliance assessment has submitted alongside the ES.
Scoping Response (NRW, July 2020)	NRW strongly advises that the WFD be considered at an early stage to assess whether any deterioration will occur in WFD water bodies.	This is agreed by the Applicant. The Applicant's approach to early consultation is included in Section 3.1.

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coping Response (NRW, July 2020)	Chemical status extends to 12 nm while ecological status extends to 1 nm.	This is acknowledged by the Applicant and addressed in Section 4.3.2 of this document.
Scoping Response (NRW, July 2020)	NRW recommend obtaining Environment Agency and Natural Resources Wales data which is used to support the Water Framework Directive. This data will give an indication of trends within water bodies (such as the Dee and Mersey).	The Applicant has obtained NRW data from Water Watch Wales to inform this assessment, which is presented in Section 6.1. Deterioration on English WFD designated sites is not anticipated due to the proposed activities.
Scoping Response (NRW, July 2020)	"It would also be useful to present any information indicating a failure i.e. any element below Good status as this will give us an indication of what the issues are within the water body."	Sections 6.1 provides indications of any failing elements.
Scoping Response (NRW, July 2020)	Contaminant levels should also be compared to CEFAS action levels, where available; if these are not available, then PELs and TELs can be used.	Sediment contaminant levels are scoped out of this WFD compliance assessment in Table 9 due to low concentrations, with survey results presented in Volume 2, Chapter 3: Marine Water and Sediment Quality (application ref: 6.2.3), including comparison to Cefas Guideline Action Levels and PELs/TELs.
Scoping Response (NRW, July 2020)	NRW also advise that spills should be included in the WFD compliance assessment and should be scoped into the assessment, as per the HRA; mitigation via a PEMP should not be considered until a later stage (i.e. detailed assessment stage 3).	Section 7.1.4 of this document assesses accidental spills.
Scoping Response (NRW, July 2020)	NRW understand that works may take place on the beach and, as such, the risk to Bathing Waters via suspension of sediments and potential release of bacteria should be considered.	Section 7.4.2 assesses the risk of Bathing Waters via suspended sediment and increased microbiological counts.
Scoping Response (NRW, July 2020)	The requirement to assess turbid run-off from freshwater to marine waters.	Section 7.2.2 of this document considers the risk of turbid run-off from the freshwater environment into the marine.
Scoping Response (NRW, July 2020)	NRW note that measures described in NRW Guidance for Pollution Prevention will be formalised in the draft CoCP (Code of Construction Practice). NRW advise that accidental spills at sea and on land both be included in the PEMP.	This is noted by the Applicant.
Scoping Response (NRW, July 2020)	Scoping is a key stage of the WFD Assessment process and will need to be carried out for all WFD parameters, including hydromorphology, biological elements and water quality aspects. Please refer to Clearing the Waters for All and OGN 72 for further information in this regard.	Section 6 provides the methodology and scoping for all relevant elements of the WFD scoping stage.

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Scoping Response (NRW, July 2020)	The WFD assessment should draw upon information gathered as part of the EIA process and can be provided either as a chapter of the EIA or as a separate document to be submitted as part of the EIA package.	This is agreed by the Applicant. Information gathered as part of the EIA has inform the detailed impact assessment in this document.
Scoping Response (NRW, July 2020)	The assessment must align with the chapters of the EIA where there are synergies with WFD – these include, but are not limited to, physical processes, benthic invertebrates, water quality and migratory fish.	Where synergies exist, the Applicant has aligned the assessments within this document with those in the EIA.
Scoping Response (NRW, July 2020)	There is likely to be WFD data available for the biological and hydromorphological elements in addition to the water quality data for WFD water bodies within the search area, this will be available from NRW or the Environment Agency.	Section 6.1 presents the WFD elements for all screened in water bodies.
Scoping Response (NRW, July 2020)	As the North Wales water body is designated as Heavily Modified, it would be classified according to its potential, rather than its status and is therefore currently at overall moderate potential, as opposed to moderate status. Please refer to "Guidance on the Classification of Ecological Potential for Heavily Modified Water Bodies and Artificial Water Bodies", UKTAG, 2008 for further information regarding the classification of heavily modified water bodies. Please refer to Section 4.4 of OGN 72 or the section entitled "Jeopardising Mitigation Measures" in "Clearing the Waters for All" for information on how to consider heavily modified water bodies in an assessment.	This is noted by the Applicant and has been reviewed as suggested, see Section 7.1.1.
Scoping Response (NRW, July 2020)	NRW ask the Applicant to consider how they intend to provide the WFD Assessment, it can be carried out and submitted as a chapter of the EIA, or as a separate document and provided as an Annex.	This WFD compliance assessment has been submitted to accompany the ES as a standalone report which signposts to the relevant parts of the EIA.
Scoping Response (NRW, July 2020)	NRW advise that any effects identified as part of the assessment of physical processes, including both direct and indirect effects e.g. cable protection and sediment transport, must Scoping Response (NRW, July 2020) be transposed into the WFD assessment of hydromorphological elements where there is potential to impact on a WFD water body/ies. These include, but are not limited to the following components:  Construction phase– morphological changes including impacts to the nearshore area up to 1nm from removal of sediment from the system by dredging; seabed excavation in shallow nearshore associated with cable burial;  Operational phase– effects on hydrodynamics and sediment transport arising from scour protection of cables inshore to 1nm.	Section 7.1.1 provides details of potential impacts to hydromorphology.

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	NRW does not agree with the proposal to rule out the potential need for further modelling to inform the impact assessment. This information will also be relevant to the assessment of the WFD hydromorphological element.	
Scoping Response (NRW, July 2020)	Any effects arising from the scheme with the potential to impact upon benthic habitats in WFD water bodies will need to be adequately assessed under the provisions of the WFD. These may be direct – i.e. cable protection in inshore waters; or indirect i.e. changes to the sediment transport regime that may impact upon coastal areas and inshore waters out to 1nm.	Section 7.1.2 presents the assessment of benthic habitats.
Scoping Response (NRW, July 2020)	Any effects arising from the scheme which may impact upon migratory fish must be adequately considered under the provisions of WFD. It is important to ensure all hydrologically connected.  Any effects arising from the scheme which may impact upon migratory fish must be adequately considered under the provisions of WFD. It is important to ensure all hydrologically connected.	Sections 7.1.3 provides the assessment of fish.
Post-Scoping Evidence Plan meeting (September 2020)	The Applicant proposed to provide a standalone WFD report covering both offshore and onshore to accompany PEIR and application.	The WFD compliance assessment is provided within this document.
Post-Scoping Evidence Plan meeting (October 2020)	The Applicant proposed to provide a standalone WFD report covering both offshore and onshore to accompany PEIR and application. This will be based on the NRW OGN 72 guidance. Clearing the waters guidance will supplement the guidance for offshore elements of the WFD.	The WFD compliance assessment is provided within this document.
Post-Scoping Evidence Plan meeting (October 2020)	It was agreed with NRW, that the WFD assessment will primarily be a signposting report however will cover aspects relating to the WFD and that a Habitats Regulations Assessment (HRA) will inform the protected areas assessment.	This approach has been adopted for the WFD compliance assessment presented in this document.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan	Please note this paragraph taken from 'WFD Cycle 2 Interim Classifications FAQs English' from the Water Watch Wales website when referring to the 2018 interim WFD classification:  "How robust was the quality assurance of the estuarine and coastal classification compared to previous years?"	This WFD compliance assessment has considered the latest classification (published in December 2021).

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(NRW, April 2021)	Due to limited resources it was not possible to carry out a full quality assurance of the estuarine and coastal classification as undertaken in previous years. Where there is a change in status, the interim classification result must be used alongside the 2015 classification to provide context. Any decisions based on the interim classification will need to be carefully considered and will need to be informed by any investigations into the status change."	
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	We welcome the inclusion of this table addressing out previous comments.	This noted and welcomed by the Applicant.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	We welcome the use of the OGN 72 guidance which has been provided in previous advice from NRW.	This noted and welcomed by the Applicant.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	<p>We advise that key aspects of assessing whether the fish biological element is affected and must be scoped in include:</p> <ul style="list-style-type: none"> <li>➤ whether the activity could impact on normal fish behaviour and movement/migration/spawning</li> <li>➤ whether the activity could impact on species composition and abundance</li> <li>➤ whether the activity could impacts on sensitive species and/or age structure of fish populations</li> <li>➤ whether mechanical injury or death could occur as a result of the activity</li> </ul> <p>These aspects should be included when scoping, in addition to the impacts proposed in section 40 by the Applicant. Please refer to OGN 72 (section 3. Scoping) which has been provided to the Applicant previously.</p>	Scoping process for fish outlined in Section 4.3.2. The corresponding assessment is presented in Section 7.1.3.

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Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	Further information is needed on the statement “the monitoring period (...) is understood to be six years”. Many elements are monitored at intervals of less than 6 years and interim classification is provided at the mid-point of the cycle as well (3 years).	Clarification provided in Section 4.3.3 regarding the temporal periods considered within this WFD compliance assessment.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	<p>The purpose of the Screening Stage of the WFD Compliance Assessment is to ensure that activities that may cause deterioration or prevent a waterbody from meeting its objectives are assessed further. The Directive requires that waterbodies that are likely to be impacted by the project are identified and screened in, so that the potential impacts can be scoped in the next stage. A statement is needed to show which waterbodies have been screened in and why.</p> <p>For example, a sentence such as those regarding the North Wales Coastal and Clwyd Transitional waterbodies in paragraph 68 would suffice to address the Screening Stage of the Assessment. Detail of how each aspect of the project (detailed in the Screening Section (5)) could cause an impact would be useful as well.</p>	Screening is presented in Section 5.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	<p>Biology - Habitats</p> <p>We advise that there are <i>Sabellaria</i> reefs within 2km of the proposed cable route which have not been presented in this figure and which must be scoped in. In addition, we advise the presentation of the map is not clear and could be improved. In future, we advise that Lle be used to procure data and GIS layers rather than Magic.</p>	Figure 9 has been updated using Lle and as such the location of <i>Sabellaria</i> reefs are shown. The presentation of the figure has consequently changed due to the use of Lle data.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	<p>Hydromorphology</p> <p>We do not agree that hydromorphology can be scoped out at this stage as we do not yet know for certain what cable protection will be used or how it might affect hydromorphology in the waterbody. Cable protection would be a permanent alteration to the coastal form, and therefore changes to hydromorphology cannot be scoped out until more detail of the potential changes to the seabed are known.</p>	An assessment of the cable protection impacts upon hydromorphology is provided in Section 7.1.1.
Response to the WFD Scoping Position Paper	<p>HMWB</p> <p>We advise that the justification for ‘no impact’ could be misinterpreted. The Applicant is correct in stating that the waterbodies are not Modified for renewable energy, however this</p>	The Applicant welcomes this information and the opportunity to kept abreast of any changes to the current



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submitted under the Evidence Plan (NRW, April 2021)	<p>means that the potential impacts of the project on the Mitigation Measures or potential Mitigation Measures of the HMWB do not need to be considered, and the project “should be treated as a new modification”. It does not mean that no further consideration needs to be taken of all potential impacts within the waterbody. Section A1.4. of the OGN 72 provides more detail.</p> <p>On Water Watch Wales, the Mitigation Measures for the HMWB North Wales Coastal waterbody (GB641011650000) are recorded as “not applicable - not required in this waterbody”. However we advise that we are currently reviewing these, and will keep the Applicant apprised of any developments. Any updated Mitigation Measures for the HMWB will need to be taken into account in the WFD Compliance Assessment to ensure that the project does not compromise the improvement of the waterbody.</p>	requirements for considering the Mitigation Measures for the HMWB North Wales Coastal waterbody.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	<p>Biology - Fish</p> <p>We agree that entrainment/impingement of fish can be scoped out as although possible, these are unlikely to be at a level of concern.</p>	This is noted and welcomed by the Applicant.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	The purpose of the assessment is wider than potential for deterioration, it is also about ensuring that activities do not jeopardise the attainment of good status or of good ecological potential and good chemical status by the date laid down by the Directive.	This has been addressed in Section 1.2.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	We note recognition of the changed legislative context since leaving the European Union - please note that there may be different legislative positions in England and Wales so this section needs to reflect that. The draft updated river basin management plan currently out for consultation includes some information on exit from the European Union on page 6 section 1.1.1.	This is noted by the Applicant and this has been reflected in Section 2.

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Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	We advise that NRW now refers to "WFD Regulations 2017" since EU exit. WFD regulations 2017 is a shortened version of Water Environment (Water Framework Directive) (England & Wales) Regulations 2017.	This is noted by the Applicant and this has been reflected in Section 2.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	Daughter directives - these are usually referred to as Protected Areas rather than daughter directives. Shellfish directive was repealed by the Water Framework Directive (2000/60/EC) in December 2013. There are other protected areas (that were formerly directives) that are applicable to the terrestrial environment that aren't mentioned here, reason for singling out these two is unclear.	This is noted by the Applicant and this has been reflected in Section 2.5.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	Invertebrates are missing from the list of freshwater receptors.	Invertebrates have been included in Section 4.3.2 and Table 10.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	Please note that eels are included within "fish" element.	Eels have been assessed with fish in Sections 7.1.3 and 7.2.3.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	Macrophytes and diatoms - we advise while nutrient enrichment is the primary pressure indicated by these elements, there are other pressures that can affect these elements. For example, macrophytes can be affected by hydromorphology and pollution by toxic chemicals.	Consideration of the potential changes to macrophytes from alterations in hydromorphology and the introduction of chemical is provided in Table 10.



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Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	Groundwater - we advise that there are other aspects for impacts on groundwater body, as groundwater status is assessed via quantitative as well as qualitative elements. Groundwater can be a pathway and a receptor.	Section 7.3 provides the assessment of groundwater waterbodies.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	<i>"In this assessment, the monitoring period interval is aligned with that of the RBMP, which is understood to be six years."</i> Please can further explanation of this statement be provided. Monitoring frequencies are different for different elements of the classification, many are less than 6 years. An interim classification is provided at the mid point of the cycle as well. This relates to the point made above about para 46 and the definition of temporary.	Clarification provided in Section 4.3.3 regarding the temporal periods considered within this WFD compliance assessment.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	We agree with the scoping in of the 5 river water bodies identified.	This is welcomed by the Applicant.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	We also advise that the project area also crosses "non-reportable water bodies" – the area of land between the coast and the Gele and Glandfyddion water body catchments.  The small water courses in the Prestatyn and Rhyl areas were water bodies in their own right in cycle 1 but removed following a review of water body delineation for the current cycle 2 plan (2015-2021). Any potential impacts on these non-reportable water bodies from the onshore works should be assessed in terms of the impact on the downstream receiving transitional or coastal water courses. The flow is managed in these water bodies with flood risk management structures. Further advice can be provided as required.	Non-reportable watercourses are considered as part of the freshwater assessment in Section 7.2.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan	There is a further advice on non-reportable water bodies in OGN 72 section 3.1 reproduced below, with particularly relevant points boldened:  "Small non reportable water bodies  Some stretches of water are too small to be a formal WFD water body, or are too small to show up on a map of the water body such as reens, ditches, streams or brackish lagoons.	This information is welcomed by the Applicant.  Consideration of non-reportable water bodies is provided in Sections 7.2.

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(NRW, April 2021)	These are still legally protected from pollution, modification and abstraction and where an environmental issue is identified, it can still be improved where local actions and assessments deem it a priority. Where a new activity or project is planned then assessment and licensing should be made to protect, and where necessary improve them to the extent needed to achieve the Directive's objectives for water bodies to which they are directly or indirectly connected. It is likely that these stretches of water are not monitored by NRW and their status will not be reported. In the absence of any classification it should be assumed that they are at 'good' status and any deterioration from 'good status' be assessed as a result of a new activity. Some of the published WFD assessment tools may not be appropriate for these stretches of water due to their unique nature and you should contact the NRW UK Technical Advisory Group (WFD team) to discuss appropriate standards and tools. In the absence of any monitoring or classification data, or for more complex situations, an expert judgement assessment of the potential impact of a proposed activity against the normative definitions of status in Annex V of the WFD would be appropriate."	
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	Although Prestatyn Bathing Water is outside of the 2km WFD buffer zone, the tidal currents in that area will push any suspended sediment concentrations arising from the cabling works towards the shore. We therefore advise that Prestatyn bathing water should be scoped into the WFD assessment.	Prestatyn Bathing Water is included within the WFD compliance assessment, as presented in Section 7.4.2.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	Physical habitat (hydromorphology) - Although trenchless crossings are "proposed", until it is confirmed that all water course crossings will be undertaken using trenchless techniques, we advise this should be scoped in.	Further details about the proposed locations and types of crossing techniques are included in Section 71.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	Water quality scoping – it is unclear from the table if "accident spills and pollution events" scoping include the potential impact on water clarity from soil being leached into water courses. We advise that there is not yet sufficient information evidenced to support scoping out risk of turbid run-off from the assessment. Such evidence needs to be signposted from this document. There may be different risks in different freshwater water bodies depending on, for example, the exact cabling route, length of cabling, proximity to watercourses, duration/timing of works. Turbid run-off from the freshwater environment also has the	Additional information regarding the proposed mitigation measures to ensure that sediments do not enter watercourses are provided in Volume 8, Annex 3.1: Code of Construction Practice and summarised in Section 5.4.2 of this assessment. On the basis of these measures the

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	<p>potential to also affect protected area (Bathing Waters), particularly if there were microbial contaminants associated with this.</p> <p>Invertebrates are currently missing from the assessment.</p>	<p>Applicant has scoped out the impacts from turbid run-off on the fresh and marine water environments.</p> <p>Consideration of impacts on invertebrates has been included in Section 4.3.2 and Table 10 in this assessment.</p>
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	<p>Macrophytes and diatoms. We advise these should be scoped in until further information is available on mitigating risks to water clarity (see comment on water quality scoping).</p> <p>Freshwater scoping table does not have any information on protected areas or INNS, unlike the marine Table 7, although we note that Table 10 has potential impact scoped in for Protected areas.</p>	As per the row above, impacts on macrophytes and diatoms have been scoped out from risks of water clarity on the basis of the soil management measures embedded within the proposed development. Table 10 has been updated to incorporate consideration of protected areas and INNS.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	NRW will publish an updated 2021 WFD classification in the final river basin plan, due December 2021.	This is noted by the Applicant and this WFD compliance assessment has been updated using waterbody classification data published in December 2021.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	<p>Groundwater</p> <p>We note this only considers the risk of contamination during excavations and trenching of cables – mainly form leaks and spills of plant as work is undertaken (land contamination from historical contaminative land uses is not considered – but this is generally dealt with via conditions). We advise that the effect of dewatering of the excavation and trenches during the construction phase (which could potentially be cumulative along the cable corridor) should be considered.</p>	Table 11 of this assessment has been expanded to include additional potential risks to groundwaters. The effect of dewatering of the excavations and trenches on groundwaters is included.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	<p>More detail is needed regarding which parts of the cable corridor will need dewatering and for how long. An abstraction licence would be required for dewatering over 6 months or within set distances from sensitive receptors.</p> <p>The operational phase should be very low risk and dewatering may only be needed during maintenance of cable failures etc..</p>	
Response to the WFD Scoping Position Paper	We refer you to the '2009-2015 Classification Data' and '2018 Cycle 2 Interim Classification Data' which can be downloaded from the Water Watch Wales menu. These spreadsheets show that the chemical fail for the North Wales waterbody is driven by a mercury fail. This	The Applicant welcomes the explanation of the classification for the North Wales coastal waterbody, and recognises that a waterbody would fail based on the one-

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submitted under the Evidence Plan (NRW, April 2021)	<p>failure first occurred in the 2015 classification and was 'rolled over' into the 2018 interim classification. The data used for the 2015 chemistry classification would have been collected in 2012, 2013 and 2014.</p> <p>NRW apply a classification 'one out all out' methodology for chemistry. This means that if one component fails, e.g. Mercury, that waterbody would fail for chemistry.</p> <p>The below excerpt is from NRW's internal Rules Document for WFD chemical classifications. Point iii explains why the term 'Fail' is used. The term 'Fail' in this instance can be used interchangeably with 'Moderate'. In relation to a chemistry classification Fail=Moderate which means less than Good.</p>	out, all-out methodology. This WFD compliance assessment has referenced the latest (2021) waterbody classifications available via Water Watch Wales.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	<p>There are two Rhyl Bathing Waters. Rhyl and Rhyl East. Clarification on whether both are included in the Bathing Water polygon is requested.</p> <p>Although Prestatyn Bathing Water is outside of the 2km WFD buffer zone, the tidal currents in that area will push any suspended sediment concentrations arising from the cabling works towards the shore. We therefore advise that Prestatyn Bathing Water should be scoped into the WFD assessment.</p>	The Abergele (Pensarn), Kimmel Bay (Sandy Cove), Rhyl, Rhyl East, Marine Lake, Rhyl and Prestatyn Bathing Waters are included within the WFD compliance assessment, and assessed in Section 7.4.2.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	We agree that effects on temperature or salinity as a result of export cable installation activities can be scoped out.	This is welcomed by the Applicant.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	We welcome the scoping in of the effects of increased suspended sediment concentrations as a result of construction activities, particularly due to the proximity of Rhyl and Rhyl East Bathing Waters which could be impacted by changes in microbiological patterns.	This is welcomed by the Applicant. Water quality and Bathing Waters are assessed in Section 7.1.4 and 7.4.2, respectively.
Response to the WFD Scoping Position Paper	Phytoplankton status in the North Wales waterbody is Moderate and as such must be scoped in.	This is now scoped in and assessed in Section 7.1.4.

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submitted under the Evidence Plan (NRW, April 2021)		
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	We agree to scope out bentonite as a separate impact pathway however we would expect any increase in SSC loads caused by the drilling to be included in the 'could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbiological patterns' section. We welcome the scoping in of the potential for accidental spills and pollution events.	This is welcomed by the Applicant. An assessment of the Water Quality impacts is provided in Section 7.1.4.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	Due to proposed methodology design no sediments will be disturbed in the Clwyd waterbody. If this is the case and this methodology is chosen going forward, then we agree that the activity 'disturbance of sediments with contaminants above Cefas Action Level 1' can be scoped out for the Clwyd waterbody.	This is welcomed by the Applicant.
Response to the WFD Scoping Position Paper submitted under the Evidence Plan (NRW, April 2021)	We welcome the provision of the document Post ETG Note – Sediment Contaminant Results following the ETG meeting on 31st March 2021. With regards to the North Wales waterbody, Table 7 of the WFD Scoping Paper discusses project specific surveys which confirmed grain size as being predominantly sand with limited gravel fractions, metals below Cefas AL1 and PAHs below ERL values. Having reviewed the Post ETG Note – Sediment Contaminant Results alongside the WFD Scoping paper we can agree to scope out the activity 'disturbance of sediments above Cefas Action Level 1'.	This is welcomed by the Applicant.
PEIR Section 42 Response (NRW, October 2021)	In paragraph 23 it is stated that NRW collects 20 samples per year for each Bathing Water site. This was historically true but now NRW collects at least 8 per annum.	Text amended to reflect annual Bathing Water sampling regime by NRW.
PEIR Section 42 Response (NRW, October 2021)	Note that OGN 72 has since been updated and no longer includes the phrase "longer than a spring/neap tidal cycle" when considering water clarity, temperature, salinity, bacteria, etc (paragraph 49 pg 60). These parameters should be considered at any timescale and a decision will be made via evidence whether they may impact the receptor.	Text relating to previously advised duration removed and assessment in Section 7.1.4 amended to consider any timescales for impacts to receptors.



CONSULTATION PHASE/ TYPE	CONSULTATION AND KEY ISSUES RAISED	WHERE THIS COMMENT IS ADDRESSED
PEIR Section 42 Response (NRW, October 2021)	The applicant states that while activities may be temporary, the impacts on ecology may be longer lasting (paragraph 58 pg 63). This is the case for bacteria also, specifically in terms of the monitoring which occurs. Should the monitoring pick up elevated bacterial counts, those results are kept in the system for four years and will impact the Bathing Water classification for those four years.	This is noted by the Applicant. Text added to reflect potential longer-term impacts to Bathing Water classifications in Section 7.4.2.
PEIR Section 42 Response (NRW, October 2021)	In the water quality section of Table 9 (pgs 99-100), NRW agree that most of the sediment would remain localised and any suspension would be short-lived. However, some of the finer grained sediment will stay in suspension for several tidal cycles. It was stated in Volume 2 Chapter 2 (pg 52) that the residual sediment transport is eastwards and as such, we believe that some assessment on the impact to Prestatyn Bathing Water should also be conducted. It would be useful to see the distances from the Bathing Waters to the landfall area.	Text added to reflect potential longer-term impacts to Bathing Water classifications in Section 7.4.2, with distances from Bathing Water monitoring points to the offshore ECC/ landfall provided in Table 15. Assessment of potential impact to Prestatyn Bathing Water also included in Section 7.4.2.
PEIR Section 42 Response (NRW, October 2021)	Bentonite appears to have been scoped in under EQSD in Table 9 of the WFD assessment; however, Table 3 of Volume 2 Chapter 3 (pg 42) suggests that there was agreement that non-turbidity impacts on water quality can be scoped out.	Text added to Table 9 to clarify the potential for accidental spills and pollution events relates to other substances (e.g., fuel oil). Bentonite has only been assessed in relation to turbidity in Section 7.1.4.
PEIR Section 42 Response (NRW, October 2021)	NRW agree that no impact assessment is needed for contaminants released from sediment (Table 9 pg 101).	This is welcomed by the Applicant.
PEIR Section 42 Response (NRW, October 2021)	See comments for Volume 2 Chapter 3 paragraph 110 regarding phytoplankton status. While NRW agree that no nutrient pathways have been identified (paragraph 110 pg 101), the potential impact of elevated Suspended Sediment Concentration (SSC) has been missed in the discussion around "Magnitude of Impact". Paragraph 111 goes on to discuss how 100 mg/l would be ranked as intermediate by UKTAG but says no more. There should be further discussion on this topic in relation to phytoplankton.	Text added to Section 7.1.4 in relation to potential impacts of the proposed development on phytoplankton status.
PEIR Section 42 Response (NRW, October 2021)	Section 5.7 Protected areas screening – The Dee Estuary SAC also falls within the North Wales coastal waterbody as highlighted in Figure 8. The site will need to be screened in to the assessment as there is the potential for changes in suspended sediment concentration to impact the "mudflat and sandflats not covered by seawater at low tide" feature of the Dee Estuary SAC (Volume 2, Chapter 2 Marine Geology, Oceanography and Physical Processes and Volume 2, Chapter 5: Benthic Subtidal and Intertidal Ecology).	The Dee Estuary/ Aber Dyfrdwy SAC has been included as part of consideration of WFD protected areas, with reference made to the conclusions of Report 5.2: RIAA (application ref: 5.2).

CONSULTATION PHASE/ TYPE	CONSULTATION AND KEY ISSUES RAISED	WHERE THIS COMMENT IS ADDRESSED
PEIR Section 42 Response (NRW, October 2021)	Paragraph 113 “Within the proximity of the offshore ECC, there are– Mussel beds, <i>Sabellaria alveolata</i> (distance to offshore ECC approximately 400 m)” – It is not clear if this includes the <i>Sabellaria</i> that was found during the ECC survey. NRW note the <i>Sabellaria</i> found during the survey is considered further under the biological habitats assessment but are uncertain on whether it is highlighted here as well.	Text added to Table 9 and Section 7.1.2 to highlight the presence of <i>Sabellaria</i> observed during the ECC survey.
PEIR Section 42 Response (NRW, October 2021)	Table 9 “The proposed development is not within 500 m of any Higher Sensitivity habitats for the North Wales coastal body – see Figure 5. However, the proposed development is with 500 m of saltmarsh habitats in the Clwyd waterbody. A consideration to lower sensitivity habitats is also proposed to be considered in the impact assessment” – As noted by the applicant in section 7.1.2, the proposed development also falls within 500m of other sensitive habitats: Mussel beds and <i>Sabellaria alveolata</i> reef. NRW advise this is reflected in Table 9 and assessed accordingly.	The higher sensitivity habitats mussel beds and polychaete reef ( <i>Sabellaria alveolata</i> ) added to Table 9 and assessed in Section 7.1.2.
PEIR Section 42 Response (NRW, October 2021)	Table 10 INNS – “During all phases of AyM, there is the potential for the introduction and spread of INNS. However, as presented in Volume 3, Chapter 5: Biodiversity and Nature Conservation, due to the time that will have elapsed since the last project specific surveys and the possibility that INNS could have changed in the intervening period.” – NRW advise this wording is revised as it is currently unclear what the applicant is trying to convey.	Text amended in Table 10.
PEIR Section 42 Response (NRW, October 2021)	“If avoidance is not possible a detailed mitigation plan will be produced and agreed as part of the CEMP to ensure compliance with the relevant legislation.” – Please also note further mitigation includes the production and adherence to a Biosecurity Risk Assessment as discussed in Volume 2, Chapter 5: Benthic Subtidal and Intertidal Ecology.	Text added to Table 10 referring to provision of a Biosecurity Plan.
PEIR Section 42 Response (NRW, October 2021)	Table 12 “ <i>Considered in table 7</i> ” – Table number references need revising i.e. Table 7 refers to “ <i>Bathing water status</i> ” not the potential risk to receptors.	Table numbers and cross referencing updated throughout document.
PEIR Section 42 Response (NRW, October 2021)	Table 14 Summary of the potential for Adverse effect from AyM Alone and In-combination for Liverpool Bay SPA - This table needs revising. As NRW understand from paragraph 212, this table is a summary of the conclusions on the potential for adverse effect on integrity (AEol) from the project on the screened in European sites. However, the title of the table refers to impacts on Liverpool SPA only and the assessment on the Menai Strait and Conwy Bay SAC is repeated. Furthermore as noted in an earlier comment, the Dee Estuary SAC should also	Title of Table 15 (previously Table 14) has been amended. The Dee Estuary / Aber Dyfrdwy SAC has been included and duplication of Menai Strait and Conwy Bay SAC removed.

CONSULTATION PHASE/ TYPE	CONSULTATION AND KEY ISSUES RAISED	WHERE THIS COMMENT IS ADDRESSED
	be assessed as there is the potential for the development to impact features of the SAC through changes in suspended sediment concentration.	
PEIR Section 42 Response (NRW, October 2021)	Section 7.5 Cumulative effects –Cumulative and in-combination effects have not been appropriately assessed in the WFD assessment. Whilst cumulative effects were assessed for each specialisms in the relevant EIA chapters and the assessments concluded that potential effects were negligible, negligible adverse or minor adverse, NRW still expect a summary of these conclusions and of the activities that have the potential to act in-combination with the proposal to be presented in the WFD assessment. The EIA does not assess whether the activity may act cumulatively and impact a WFD water body and as such it is important to consider the in combination and/or cumulative effects of pressures in the WFD assessment to ensure impacts on the water bodies have been appropriately assessed.	The cumulative effects assessment in Section 7.5 has been amended to reflect the potential impacts to WFD waterbodies.
PEIR Section 42 Response (NRW, October 2021)	Paragraph 130. States “Rock berm within the nearshore: height of 1.4 m, total width of 15.2 m. Of note is that current expectations are that the rock berm will be buried to depths greater than the winter storm depth and as such will not result in any changes to the existing hydromorphological regime.” Please note that this statement is incorrect. Burial of the cable protection refers to the cable mattress protection and not the rock berm which will remain exposed above the seabed.	Text amended in Section 7.1.1.
PEIR Section 42 Response (NRW, October 2021)	Volume 2 Chapter 2 Marine Geology, oceanography and physical Processes Paragraph 121 states “the rock berm is expected to have ~15.2 m base width, 1.4 m overall height and sloped sides up to a 4.5 m wide berm crest. The exact location of the rock berms and orientation relative to the beach is presently unknown”. Paragraph 122 further states “whilst it can reasonably be expected to be the case that there will be some localised change to waves and hydrodynamics immediately within the vicinity of the rock berms, the potential for wider morphological change to the beach at the landfall is considered to be limited”. Paragraph 125 then states “The (probable) shore-normal orientation of the rock berms could in theory, temporarily intercept the longshore movement of sediment. However, regular re-working by waves at lower states of the tide is likely to mean that this material would be rapidly re-distributed and could easily pass over the obstacle in suspension.”  NRW agree that the potential for wider morphological changes caused by interruption to sediment movement in the nearshore caused by presence of the rock berms is unlikely to measurably affect the form and function of the seabed locally or regionally.	This is welcomed by the Applicant.



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PEIR Section 42 Response (NRW, October 2021)	<p>However, NRW reiterate (from Marine and Coastal Physical Processes comments) that the assessment of impact caused by presence of the rock berms on the hydrodynamics (waves and currents) is all based on expert judgement and no quantitative analysis has been conducted to determine the potential for wave focussing (proximity to shore, water depth, wave height etc) caused by the presence of the berms and whether over time prolonged wave focussing could cause areas of the beach to erode (depending on the stability of the beach face and sediment composition) potentially resulting in long term lowering and the requirement for beach management intervention. NRW advise that the potential impacts to the coast caused by the presence of the rock berms should be re-assessed for WFD following a more detailed analysis of potential alteration to the hydrodynamics and sediment transport processes.</p> <p>As such NRW cannot yet agree with the conclusion in paragraph 135 which states “As such there is not predicted to be a deterioration in the hydromorphology status of the North Wales coastal waterbody. The proposed development is therefore considered to be compliant with the WFD requirements and therefore would not result in a deterioration of the current status of the North Wales coastal waterbody”.</p>	Text amended in Section 7.1.1 to reflect updated consideration of the potential impacts to hydromorphology under the Directive.
PEIR Section 42 Response (NRW, October 2021)	Depending on its location in the intertidal/subtidal, the presence of the berm will also determine the magnitude of impact to down drift locations caused by interruption to sediment transport alongshore which will depend on the rate of sediment transport, orientation of the berm and length of the berm which has not been provided. NRW advise that the potential impacts to the coast caused by the presence of the rock berms should be re-assessed following a more detailed analysis of potential alteration to the hydrodynamics and sediment transport processes (please see comments above and in the Marine and Coastal Physical Processes section).	Text amended in Section 7.1.1 to reflect updated consideration of the potential impacts to hydromorphology under the Directive. This includes further assessment of the potential for rock berms to interfere with sediment transport and beach morphology.
PEIR Section 42 Response (NRW, October 2021)	There is no inclusion in the assessment of the decommissioning activities caused by removing scour protection and/or cable protection. It is not clear if the rock protection used for scour protection and cable protection remain on the seabed following decommissioning.	Text added to Section 5.3.3 on decommissioning activities, including potential removal of scour/ cable protection, as well as the marine assessment in Section 7.1.
PEIR Section 42 Response (NRW, October 2021)	Page 51: in the April 2021 response to the WFD scoping position paper submitted under the Evidence Plan, NRW informed the applicant that “NRW will publish an updated 2021 WFD classification in the final river basin plan, due December 2021.” However, NRW have had to extend the timeline for the publication of the final River Basin Management (RBMP) Plans for	This is noted by the Applicant.

CONSULTATION PHASE/ TYPE	CONSULTATION AND KEY ISSUES RAISED	WHERE THIS COMMENT IS ADDRESSED
	the Dee and Western Wales. Several outstanding issues have had to be addressed before finalising the plans including the publication of the Standards and Classification Directions, which is a joint instruction with England. Welsh Government have agreed with this assessment and new timeframe.	
PEIR Section 42 Response (NRW, October 2021)	NRW intend to submit the final River Basin Management Plans (RBMPs) for the Dee and Western Wales to the Minister in April 2022 and publish the final plans in July 2022. However, NRW intend to release the updated 2021 water body classification ahead of the final plan publication - probably in December 2021. These dates are approximate and not yet confirmed.	This is noted by the Applicant. The latest classifications, as presented via Water Watch Wales, have been included for relevant WFD waterbodies (Cycle 3; published December 2021).
PEIR Section 42 Response (NRW, October 2021)	Page 59, Freshwater para. 50: water quality should not be limited to physico-chemical and specific pollutants. NRW advise that chemicals should also be included as for the marine environment (para. 49).	Chemicals added to Section 4.3.1. However, as note in Table 10, assessment of impacts to water quality for freshwater (riverine) waterbodies and non-reportable watercourses limited to accidental spills due to project design (mitigation).
PEIR Section 42 Response (NRW, October 2021)	Page 69, Table 2 and p. 70, Figure 4: it is difficult to distinguish locations of the crossings. Figure 4 suggests 5A-WX-11 and 12 are the trenchless crossings, whereas Table 2 describes 5A-WX-8 and 9 as the trenchless crossings.	Figure 3 (previously Figure 4) and Table 2 updated based amendments to the locations of crossings.
PEIR Section 42 Response (NRW, October 2021)	<p>Section 5.7, para. 109: Marine Lake Bathing Water has been scoped out, with the statement that it is not connected to the marine environment. However, NRW disagree that Marine Lake should be scoped out from the assessment, as there is a connection to the marine environment during flow reversal. NRW agree that for the majority of the time the lake is only topped up on high tides. However, there are occasions when the lake is drained down by Denbighshire County Council. This has taken place when increased bacti levels are detected or when blue-green algae is present, both of which have occurred fairly recently. The lake is then refilled during the high tide rather than being topped up. Therefore, NRW advise that the Marine Lake should be scoped in to the assessment.</p> <p>There is an ongoing investigation into the recent increased bacti results. One possibility is that the initial topping up of the lake on the high tide is river water that is backed up, before sea water is then pushed through. There is a meter deployed at the moment reading salinity readings of the inflow to the lake. Understanding whether the input of water to the lake is</p>	Marine Lake, Rhyl Bathing Water has been scoped in to the assessment and discussed in Section 7.4.2.

CONSULTATION PHASE/ TYPE	CONSULTATION AND KEY ISSUES RAISED	WHERE THIS COMMENT IS ADDRESSED
	more freshwater from the river or saltwater from the sea could give a good indication of the potential impact on the Bathing Water from the proposed works.	
PEIR Section 42 Response (NRW, October 2021)	Page 96 states that “Both the North Wales and Clwyd waterbodies are classed as heavily modified. However, they are not modified for the purpose of renewable energy and therefore no further consideration of the potential impacts associated with AyM is required.” NRW refer the applicant to previous NRW comments referenced on p.40, Heavily Modified Waterbody (HMWB): “The Applicant is correct in stating that the waterbodies are not Modified for renewable energy, however this means that the potential impacts of the project on the Mitigation Measures or potential Mitigation Measures of the HMWB do not need to be considered, and the project “should be treated as a new modification”.	Text amended in Table 9 and consideration of potential impacts to mitigation measures included in Section 7.1.1.
PEIR Section 42 Response (NRW, October 2021)	Page 99, Water quality: clarification is needed if this discussion includes input of sediment from freshwater sources upstream via Clwyd transitional WB or non-reportable water bodies (land between Afon Gele and Glanfyddion Cut) or if it refers only to marine project activities.	Assessment based on marine project activities only, based on measures in place to avoid sediment entering the freshwater system. Text added to Table 9 to clarify.
PEIR Section 42 Response (NRW, October 2021)	Page 109: the text on the “macrophytes, diatoms and invertebrates” receptor appears to contradict the text on p.108 above for the fish and eels receptor where it is stated “which could in turn harm the habitats of fish, macrophytes and phytobenthos, and invertebrates.”	Text in Table 10 amended.
PEIR Section 42 Response (NRW, October 2021)	Page 142, section 7.5: NRW recognise the WFD compliance assessment seeks to draw from, and signpost to where relevant information is provided within the PEIR and to demonstrate compliance with the WFD, rather than duplicate assessment. There is generally a reasonable balance. However, the Cumulative Effects section would benefit from more information – at the moment the reader has to refer to the signposted sections for any detail about marine or freshwater elements.	Text added to Section 7.5 to support the cumulative effects assessment.
PEIR Section 42 Response (NRW, October 2021)	NRW note that the WFD CA refers to the earlier 2018 version of Operational Guidance Note 72 - Complying with the Water Framework Directive Regulations 2017: how to assess and appraise projects and activities.” Please note that NRW has updated OGN 72 this year so we would be willing send an updated version to the applicant if required.	This is welcomed by the Applicant. The updated OGN 72 (published June 2021) was provided to the Applicant by NRW in January 2022 and used to support this WFD compliance assessment.

## 4 Assessment methodology

### 4.1 Guidance

35 The principal guidance that has informed this WFD compliance assessment is NRW's "OGN 72 - Guidance for assessing activities and projects for compliance with the Water Framework Directive" (hereafter referred to as OGN 72) (NRW, 2021). As discussed as part of the AyM Evidence Plan on 21 September 2020 and 1 October 2020, OGN 72 has been supplemented, where required, by the Environment Agency (2017) 'Clearing the Waters for All' guidance for assessing the potential deterioration of transitional and coastal waterbodies, as recommended by PINS in Advice Note Eighteen: The Water Framework Directive (PINS, 2017). In addition, riverine and groundwater waters have been assessed based on the principles outlined in 'How to assess the risk of your activity' (Environment Agency, 2016b). In addition, the 'Guidance on the Classification of Ecological Potential for Heavily Modified Water Bodies and Artificial Water Bodies' (UKTAG, 2008) has been considered to provide further information regarding the classification of Heavily Modified Water Bodies (HMWBs).

### 4.2 Data sources

36 The following data sources have been collated and used to inform this WFD compliance assessment:

- ▲ Water Watch Wales;
- ▲ River Basin Management Plans (RBMPs) and interim freshwater classifications;
- ▲ Coastal, transitional, rivers and ground water risk assessment excel files;
- ▲ NRW Bathing Water classifications from the Bathing ater explorer data;
- ▲ Lle Geo-portal for Wales;
- ▲ Multi-Agency Geographic Information for the Countryside (MAGIC) interactive mapping tool; and

- ▲ Site-specific data including particle size and contaminant analysis of sediment samples acquired within the offshore ECC as detailed in Volume 2, Chapter 3: Marine Water and Sediment Quality (application ref: 6.2.3) and Volume 4, Annex 5.2: Benthic Ecology Subtidal Characterisation (Offshore ECC) (application ref: 6.4.5.2).

## 4.3 Process

### 4.3.1 Screening

- 37 As defined in OGN 72 (NRW, 2021a), the aim of the WFD screening exercise is to identify the proposed activities which may result in the deterioration of waterbodies from the overall project design. In addition to the consideration of scale, location and nature of activities associated with the proposed development (during construction, operation and maintenance and decommissioning), this has included identifying whether there are any waterbodies or protected areas in the vicinity of the proposed development (see Sections 5.6 and 5.7).
- 38 This screening methodology is also supported by Advice Note Eighteen: The Water Framework Directive (PINS, 2017) which details screening as the stage to detail the extent to which a proposed development is likely to affect waterbodies based on a Zone of Influence (Zol; spatial extent of predicted effects for which an impact may be observed for a specific receptor) (see Section 5.6).

### 4.3.2 Scoping

- 39 As defined in OGN 72 (NRW, 2021a), the aim of the WFD scoping stage is to identify and characterise the WFD elements within waterbodies and protected areas which may be impacted as a result of the activity(ies) associated with the project. Any identified elements, both chemical and ecological, are then taken forwards for a detailed impact assessment (see Section 4.3.3). Where robust justification can be provided, impacts on waterbodies may be scoped out from further consideration.

- 40 In the coastal environment, the Applicant has assessed the potential for deterioration within coastal and transitional water bodies only. Whilst the Applicant acknowledges that waters extending to 12 nm are protected under the Directive, it is difficult to assess a deterioration in chemical status in these waters. This approach is aligned to the Environment Agency's 'Clearing the Waters for All' guidance which focuses on the deterioration in surface water bodies only. The potential for changes in water quality (i.e. the factors affecting chemical status) out to 12 nm (and beyond) are assessed in Volume 2, Chapter 3: Marine Water and Sediment Quality (application ref: 6.2.3). Therefore, the Applicant does not propose to explicitly assess water quality extending to 12 nm in this WFD compliance assessment, but has included it in the EIA for completeness.
- 41 Any protected areas within the AyM ZOI have been scoped in for a detailed impact assessment. For the purposes of this assessment, protected areas are defined as:
- ▲ Bathing Waters;
  - ▲ Shellfish Water Protected Areas;
  - ▲ Sensitive Areas (Urban Waste Water Treatment Directive) and Nitrate Vulnerable Zones (NVZ; Nitrates Directive);
  - ▲ National Site Network (SACs and SPAs) and Ramsar sites; and
  - ▲ Drinking Water Protected Areas (Surface and Ground).
- 42 The scoping stage identifies the receptors that are potentially at risk from the proposed activities and, therefore, may need to be subject to an impact assessment. At the scoping stage, it is necessary to identify all potential risks to each receptor associated with the proposed activity(ies). The receptors are:
- ▲ Marine waterbodies:
    - Hydromorphology;
    - Biology - habitats;
    - Biology - fish;
    - Water quality;
    - Invasive non-Native Species (INNS); and
    - Protected areas.
  - ▲ Fresh waterbodies:

- Hydromorphology;
- Water quality;
- Fish and eels;
- Macrophytes, diatoms and invertebrates;
- INNS; and
- Protected areas.

▲ Ground water:

- Creation of pathways;
- Changes to levels and associated consequences; and
- Water quality.

43 The potential for in-combination and cumulative impacts are also considered in this WFD compliance assessment.

## Marine

44 Hydromorphology in this WFD compliance assessment is defined as the physical characteristics of the waterbody including the size, shape, structure and (for marine bodies) the flow and quantity of water and sediment.

45 Biological habitats (both those designated as higher or lower sensitivity habitats) have been scoped in if the footprint (including sediment plumes and dredging areas) of activities is any of the following:

- ▲ 0.5 km<sup>2</sup> or greater;
- ▲ 1% or more of the waterbody's area;
- ▲ Within 500 m of any higher sensitivity habitat; or
- ▲ 1% or more of any lower sensitivity habitat.

46 Fish should be included in the WFD compliance assessment if the activity could impact on normal fish behaviour like movement, migration, spawning; or species composition and abundance. The presence of type-specific or disturbance-sensitive species and the age structure of fish communities should also be considered. The following impacts on fish have been scoped in<sup>ii</sup> if:

- ▲ The activity is in an estuary and could affect the fish in the estuary;

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<sup>ii</sup> In accordance with the Environment Agency's 'Clearing the Waters for All' Guidance



- ▲ The activity could delay or prevent fish from entering the estuary; or
  - ▲ The activity could affect fish migrating through the estuary to freshwater.
- 47 The impacts resulting from the proposed activities on water quality have been scoped in on the basis of:
  - ▲ Whether it could affect water clarity, temperature, salinity, oxygen levels, nutrients, or microbial patterns;
  - ▲ Whether it is in a waterbody/ waterbodies with a phytoplankton status of moderate, poor or bad;
  - ▲ Whether the waterbody/ waterbodies have a history of harmful algae; and
  - ▲ The water quality assessment has assessed the potential for the release of chemicals (on the EQSD list) and sediment bound contaminants (above Cefas Guideline Action Level 1) as a result of the proposed activities.

## Freshwater

- 48 The receptors which have been considered for fresh waterbodies are:
- ▲ Hydromorphology – the physical characteristics and processes of the waterbody:
    - Physical habitat - the distribution and diversity of habitat including the physical processes that sustain and create new habitat. Physical habitat is essential for fish, macrophytes and invertebrates to live and thrive.
  - ▲ Water quality
    - The scoping stage considers if there is a risk to the alteration of the physio-chemical aspects of water quality, such as levels of dissolved oxygen, phosphorus and ammonia, or the introduction of specific pollutants or chemicals including priority (hazardous) substances.
  - ▲ Fish and eels:
    - The scoping stage considers whether the proposed development could impact on normal fish and eel behaviours, such as movement, migration, spawning, and species composition and abundance.
  - ▲ Macrophytes, diatoms and invertebrates:



- The scoping stage considers these water plants (both visible and not) and invertebrates and whether there is a risk of water quality issues as an impact to these receptors from the proposed development.

## Groundwater

- 49 The scoping stage considers the quantity and quality of the groundwater bodies and the potential for deterioration as a result of AyM.

### 4.3.3 Impact assessment

- 50 Following the scoping stage, if it is determined that the impact assessment stage is required, i.e. a receptor cannot be scoped out, OGN 72 guidance sets out that an impact assessment should be undertaken for each receptor identified as being at risk from the activity (NRW, 2021a). The impact assessment would consider what (if any) pressures the activity may create on the environment and specifically the receptors identified. The key aim of the impact assessment would be to determine whether there is potential for deterioration in the status of the waterbody receptor.
- 51 During the impact assessment, the requirement for additional mitigation measures (i.e., those not inherent to the project's design) and impact monitoring has been considered. All impact assessments inherently consider embedded mitigation (Section 5.4).

- 52 Deterioration is defined as when the status (ecological or chemical) of a quality element reduces by one class, for example, ecological quality elements move from 'good' to 'moderate' status. If a quality element is already at the lowest status (Bad), then any reduction in its condition also counts as deterioration. According to the Environment Agency (2017) guidance, temporary effects due to short-duration activities like construction and maintenance are not considered to cause deterioration if the waterbody would recover in a short time without any restoration measures. However, it is noted that works which are temporary in nature may have longer term effects in aspects such as ecology. Where relevant, mitigation measures have been included to avoid or minimise risks of deterioration. This assessment would be reliant upon identifying those effects that are non-temporary which, for the purposes of this WFD compliance assessment, is defined as 'a period of time that is greater than the recommended monitoring period interval as stated by the WFD (2000/60/EC)'.
- 53 If the activity may cause deterioration or hinder achievement of the waterbody's objective (or potential), either of the quality element or supporting habitat, an explanation must be provided of how this deterioration could occur, including consideration of whether the impact is:
- ▲ Direct and immediate - it will happen at the same time and place as the activity; or
  - ▲ Indirect - it will happen later or further away, including in other linked waterbodies.
- 54 Where the activity may cause deterioration, alternatives should be considered to minimise the impact, including changes to the materials or substances used, the size, scale or timing of the activity or methods of working and/ or how equipment or services are used.

- 55 In addition to assessing the potential for deterioration of the current status of a waterbody, the impact assessment must consider the risk of jeopardising 'Good status'. Every waterbody has a target status that it is expected to achieve, with an expected date by when this should be achieved, as set out in the RBMPs. Where the status of a waterbody or quality element is less than 'Good', the impact assessment should consider whether the activity may jeopardise the waterbody achieving 'Good status' in the future. These may include activities which reduce the effectiveness of improvement activities taking place or prevent improvement activities taking place in the future. Details of these activities or measures are set out in the RBMPs.
- 56 Different monitoring periods are defined for different elements under the Directive. In this assessment, deterioration is measured against the potential to jeopardise the waterbody from attaining the same or better status in the subsequent RBMP (i.e. within six years) and the interim classification (i.e. within three years) (i.e. non-temporary deterioration). The definition of temporary deterioration, as defined in OGN 72 (NRW, 2021a), applied in this assessment is:
- "To qualify as a temporary activity, the water body should recover within a short amount of time and without the need for restoration measures (i) in the water body where the activity is taking place and (ii) in any hydrologically connected water bodies, once the temporary works are removed."*
- 57 The Applicant also notes that even though activities may be temporary in nature, the impacts to ecology may be longer lasting and have been considered accordingly. Therefore, the temporal nature of each potential impact on a receptor is considered within the impact assessment. This includes consideration of impacts to bacteria, specifically in terms of the monitoring which occurs for designated Bathing Waters. Should the monitoring identify elevated bacterial counts, those results are incorporated (and will impact) the Bathing Water classification for four years (see Section 2.5.1).

# 5 Screening

## 5.1 General

58 AyM is a proposed sister project to the operational GyM located off the north coast of Wales (see Figure 1). AyM will comprise up to 50 Wind Turbine Generators (WTGs) and the associated infrastructure required to transmit the power generated by the WTGs to the National Grid network via the grid connection. The offshore export cables will make landfall east of Rhyl, north of Rhyl Golf Club. A grid connection will be made at Bodelwyddan in Denbighshire and as such export cables would be installed (underground) between the landfall and the grid connection (see Figure 1).

## 5.2 Proposed activities offshore

59 This section provides an overview of the proposed activities of relevance to this WFD compliance assessment. Further details are provided in Volume 2, Chapter 1: Offshore Project Description (application ref: 6.2.1).

### 5.2.1 Construction

60 The minimum distance between the AyM array and the coastline is 10.6 km (approximately 7.5 nm). Therefore, the components and activities relevant to this WFD compliance assessment are limited to the offshore export cables which will transfer power from the offshore substations to shore. The array will be sufficiently distanced from the areas (waterbodies) designated under the Directive (1 nm for ecological status) and therefore these activities are not considered in this assessment. Up to two export cables will be installed for AyM, located within the offshore ECC which will make landfall east of Rhyl.

61 The exact location and orientation of the offshore export cables, within the Order Limits, will be determined during an iterative route planning process following the granting of the DCO. For the purposes of this assessment, the offshore ECC (Figure 1) has been used for the relevant activities and components.

- 62 The primary effects associated with the installation of the AyM offshore export cables that are considered to be relevant to the WFD compliance assessment are:
- Preparatory works including boulder clearance and sandwave clearance;
  - Offshore cable pre-sweeping via route clearance (pre-lay grapnel runs and debris/boulder clearance) and/ or, dredging or mass flow excavation;
  - Offshore cable installation via various possible techniques including simultaneous lay and burial via ploughing, cutting or jetting, post-lay burial via cutting, jetting, dredging or mass flow excavation, and installation following pre-installation ploughing or trenching;
  - The installation of the export cables at the cable landfall including Horizontal Directional Drilling (HDD) (or other trenchless technique), with temporary construction of exit pits in the intertidal or shallow subtidal; and
  - Cable rock-berm protection for cable crossings and where cable burial is not achieved.
- 63 As part of the landfall works, it may be necessary to install a cofferdam at the HDD (or other trenchless technique) punch-out location seaward of MHWS. The cofferdam structure will be constructed from sheet piles which may be installed using vibropiling or impact piling. The cofferdam will be situated up to 1,600 m seaward of MHWS. The current expectation is that the cofferdams may be installed either by a piling rig on an excavator (i.e. during low tide) or from a jack-up barge (i.e. either during high or low tide).
- 64 There is no intention to knowingly release any chemicals listed in the EQSD into the environment during construction, operation or decommissioning of AyM. The Applicant has committed that no oil-filled cables will be used.
- 65 During construction, up to 35 construction vessels may be operating within the draft Order Limits at any given time and up to 3,391 vessel round-trips may be required. In the context of this WFD compliance assessment, it should be noted that this includes vessels operating within the array area and, therefore, beyond the extent of coastal WFD waterbodies.

## 5.2.2 O&M

- 66 A number of different vessel types will be required for operation and maintenance (O&M) activities. During the operational phase of the project, there will be no planned maintenance or replacement of the subsea cables, however repairs could be required should the cable fail or be damaged. Periodic surveys will be required to ensure the cables remain buried and, if they do become exposed, then corrective maintenance may be undertaken (such as deployment of cable protection or reburial). Up to 5 km of export cables, the majority of which is beyond 1 nm of the coastline, may require reburial/ remedial works via jetting (or laying additional rock protection) which equates to up to 24,000 m<sup>2</sup> of the seabed may be disturbed due to export cable repairs.
- 67 During O&M, up to 22 O&M vessels may be operating within the Order Limits at any given time and up to 1,207 annual vessel round trips may be required. In the context of this WFD compliance assessment, it should be noted that this includes vessels operating within the array area and, therefore, beyond the extent of coastal WFD waterbodies.

## 5.2.3 Decommissioning

- 68 For the purposes of the WFD compliance assessment, at the end of the operational lifetime of AyM, it is assumed that the decommissioning sequence will generally be in the reverse of construction.
- 69 Closer to the time of decommissioning, it may be decided that removal would lead to a greater environmental impact than leaving some components *in situ*, in which case certain components may be cut off at or below seabed level (e.g., in the case of piled foundations) or left *in situ* (e.g., in the case of subsea cables and scour/ cable protection).

70 A decommissioning plan will be required to be submitted prior to decommissioning in accordance with a requirement in the DCO. Under Section 106 of the Energy Act 2004, this is required to be signed off by the relevant authority prior to commencement of construction. This plan would be updated during the lifetime of AyM to take account of changing best practice and new technologies. A final decommissioning plan would also require approval from the Marine Licensing authority (NRW), prior to the undertaking of decommissioning works. During decommissioning, up to 35 construction vessels may be operating within the draft Order Limits at any given time and up to 3,391 vessel round-trips may be required (i.e., assumed to be the same as the construction phase). In the context of this WFD compliance assessment, it should be noted that this includes vessels operating within the array area and, therefore, beyond the extent of coastal WFD waterbodies.

## 5.3 Proposed activities onshore

71 This section provides an overview of the proposed activities of relevance to this WFD compliance assessment. Further details are provided in Volume 3, Chapter 1: Onshore Project Description (application ref: 6.3.1).

### 5.3.1 Construction

#### Cable circuit installation

72 The onshore cable route construction works are anticipated to take place over an 18-month period.

- 73 Up to two export cable (HVAC) circuits will be installed onshore. The onshore cable corridor will be approximately 12 km in length (from the Transition Joint Bays (TJB) to the existing National Grid substation at Bodelwyddan). The cables will be installed in one trench per circuit (maximum of two trenches for up to two circuits), with each trench 5 m wide at the top and up to 2 m deep (although this depth could increase where cables cross obstacles). Joint pits will be required along the cable route to allow cable pulling and jointing of two sections of cable. A temporary haul road will be established along the onshore ECC to provide safe access for construction vehicles. It could be up to 10 m wide, and wider in places where lay-bys are required, and extend the full length of the onshore ECC.
- 74 The main cable installation method will be through the use of open-cut trenching with High Density Polyethylene (HDPE) ducts installed, the trench backfilled and cables pulled through the pre-laid ducts. The cable circuits will be installed within an onshore ECC generally between 40 to 60 m wide during the construction phase. This corridor includes space to store topsoil, subsoil and a temporary haul road, as well as any equipment required for that section of work during construction and accommodate any Public Rights of Way diversions required during the construction phase. Following the installation of all cables and joint pits in a section, the construction working width will be cleared and reinstated. This reinstatement will include replanting of hedgerows where possible, replacement of fences, removal of temporary land drains and settlement ponds and reinstatement of permanent land drains. HDD (or other trenchless technique) will be used at a number of locations as an alternative methodology to open-cut trenching to cross significant environmental and physical features such as main rivers, major drains, roads and railways.

## Crossings

- 75 Volume 5, Annex 1.1 provides a copy of the Crossing Schedule (application ref: 6.5.1) and comprises a table noting the identified obstacles on the cable route that will be crossed by the onshore ECC.



- 76 Surface water flowing into the trenches during the construction period will be pumped via the appropriate means to remove sediment and potential contaminants, before being discharged into local ditches or drains via temporary interceptor drains. Where gradients on site are significant, where required, cable trenches will include a hydraulic brake (bentonite or natural clay seals) to reduce flow rates along trenches and hence reduce local erosion (Document 8.13.1: Outline Construction Method Statement; application ref: 8.13.1).
- 77 A trenchless technique (e.g., HDD) will be used at a number of locations, used as an alternative crossing methodology to open-cut trenching. Table 2 and Figure 3 present details of the identified watercourse crossings for AyM and the potential engineering solutions. A trenchless technique will be used to cross the Afon Clwyd.

Table 2: Identified watercourse crossings along the onshore ECC.

ID	DETAILS	TRENCHING	TRENCHLESS - HDD OR OTHER	COMMENTS
5A-WX-1	Surface Water Ditch	P	Y	Crossed in same crossing as WX-3.
5A-WX-2	Suspected Culverted Surface Water Ditch - Off Route Haul Road Crossing	N	N	Off route haul road crosses over suspected culverted surface water ditch. Investigation of culvert and possible upgrade/ surface protection may be required.
5A-WX-3	The Cut Watercourse	P	Y	HDD of Watercourse proposed but trenching option retained.
5A-WX-4	The Cut Watercourse - Off Route Haul Road Crossing	N	N	Off route haul road crosses over The Cut watercourse. Existing bridge may be suitable for use for construction traffic however detailed inspection required to confirm suitability. Alternatively new temporary bridge/ culvert required for crossing of watercourse.
5A-WX-5	Surface Water Ditch	Y	P	All options available. Direct trenching currently assumed.

ID	DETAILS	TRENCHING	TRENCHLESS - HDD OR OTHER	COMMENTS
5A-WX-6	Surface Water Ditch	P	Y	Crossed within same crossing as UUX-23 and UUX-24.
5A-WX-7	Surface Water Ditch	Y	P	All options available. Location of crossing of this obstacle would be dependent on final route taken forward in this location. If final route crosses OOX-5 then crossing would be in same crossing as OOX-5.
5A-WX-8	Surface Water Ditch	Y	P	All options available. Direct trenching currently assumed.
5A-WX-9	Afon Ffyddion Watercourse	N	Y	HDD or other trenchless technique required for this crossing. No haul road proposed across obstacle at this location. Haul road crossing further to the west.
5A-WX-10	Surface Water Ditch - Off Route Haul Road Crossing	N	N	Off route haul road crosses surface water ditch.

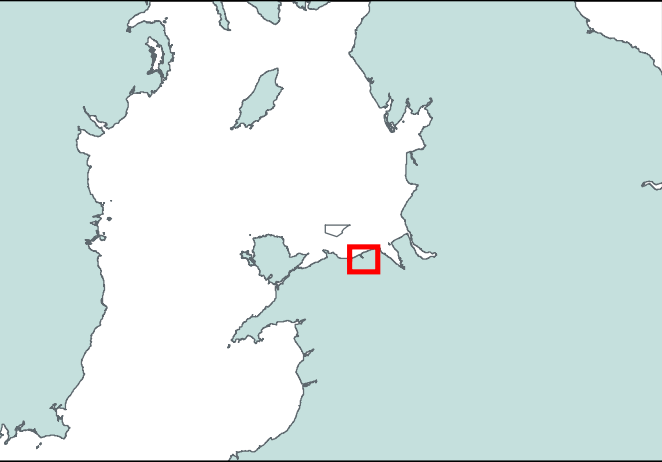
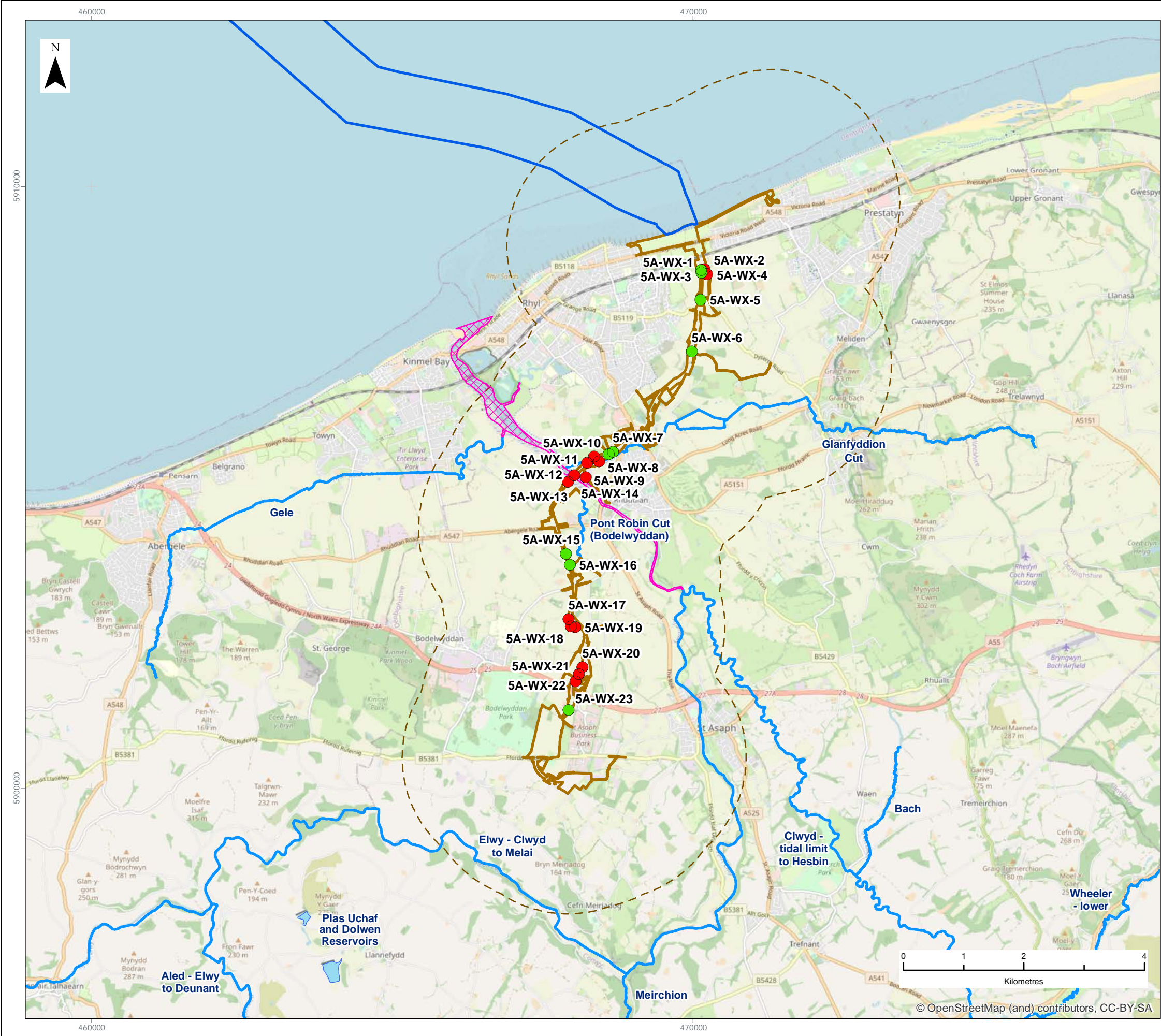
ID	DETAILS	TRENCHING	TRENCHLESS - HDD OR OTHER	COMMENTS
5A-WX-11	Afon Ffyddion Watercourse - Off Route Haul Road Crossing	N	N	Off route haul road crossing of watercourse undertaken where gas mains are not in the immediate area to reduce complexity of temporary bridge/ culvert crossing.
5A-WX-12	River Clwyd	N	Y	HDD or other trenchless technique required for this crossing. No haul road continuity across obstacle.
5A-WX-13	Surface Water Ditch	N	Y	Crossed in same crossing as WX-12.
5A-WX-14	Surface Water Ditch - Off Route Haul Road Crossing	N	N	Off route haul road passes over surface water ditch. Surface water ditch potentially culverted at this location but suitability of culvert to support construction traffic to be confirmed.
5A-WX-15	Surface Water Ditch	Y	P	All options available. Direct trenching currently assumed.
5A-WX-16	Surface Water Ditch	Y	P	All options available. Direct trenching currently assumed.

ID	DETAILS	TRENCHING	TRENCHLESS - HDD OR OTHER	COMMENTS
5A-WX-17	Minor Watercourse / Surface Water Ditch - Off Route Haul Road Crossing	N	N	Off route haul road crosses surface water ditch. Final location of crossing to be confirmed.
5A-WX-18	Minor Watercourse / Surface Water Ditch - Off Route Haul Road Crossing	N	N	Off route haul road crosses surface water ditch. Potential reuse of existing GyM crossing. Final location of crossing to be confirmed.
5A-WX-19	Minor Watercourse / Surface Water Ditch - Off Route Haul Road Crossing	N	N	Off route haul road crosses surface water ditch. Final location of crossing to be confirmed.
5A-WX-20	Surface Water Ditch	N	Y	Crossed in same crossing as EOX-10.

ID	DETAILS	TRENCHING	TRENCHLESS - HDD OR OTHER	COMMENTS
5A-WX-21	Surface Water Ditch	N	N	Diversion of surface water ditch required to accommodate HDD footprint for crossing of EOX-10.
5A-WX-22	Surface Water Ditch - Off Route Haul Road Crossing	N	N	Off route haul road crosses over surface water ditch.
5A-WX-23	Surface Water Ditch	Y	P	All options available. Direct trenching currently assumed.

Y= Yes, P= Potentially and included in the current project design, N= Technique is not proposed





**LEGEND**

- Offshore Export Cable Corridor
- Onshore Export Cable Corridor
- 2km buffer from Onshore Export Cable Corridor
- WFD River Waterbodies
- WFD Lake Waterbodies
- Clwyd Transitional Waterbody
- Watercourse Crossings
  - Trenching or Trenchless
  - Trenchless Only

Data Source:  
Natural Resources Wales (NRW)

PROJECT TITLE:  
*AWEL Y MÔR OFFSHORE WINDFARM*

FIGURE TITLE:  
**Locations of watercourse crossings**

VER	DATE	REMARKS	Drawn	Checked
1	16/09/2021	For Issue for PEIR	BPHB	SM
2	03/03/2022	For Issue For ES	BPHB	DH

FIGURE NUMBER:  
**Figure 3**

SCALE: 1:65,000	PLOT SIZE: A3	DATUM: WGS84	PROJECTION: UTM30N
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Fferm Wynt Alltraeth  
**AWEL Y MÔR**  
Offshore Wind Farm



## Substation

- 78 Onshore substation (OnSS) construction works are anticipated to take place over a 27-month period.
- 79 One OnSS will be required for AyM and will be sited to the west of St Asaph Business Park (SABP) in order to facilitate ease of connection with the National Grid. The substation will contain a number of elements including switchgear, busbars, transformers, capacitors, reactors, reactive power compensation equipment, battery rooms, filters, cooling equipment, control and welfare buildings, lightning protection rods (if required) and internal road access. A security fence will surround the compound. The total land requirement for the HVAC OnSS to the perimeter fence is 50,000 m<sup>2</sup>.
- 80 During construction of the OnSS, a temporary construction area will be established to support the works. The area will be formed of hard standing with appropriate access to allow the delivery and storage of large and heavy materials and assets, such as power transformers. The temporary construction area will be approximately 37,500 m<sup>2</sup> and will accommodate construction management offices, welfare facilities, car parking, workshops and storage areas. Water, sewerage and electricity services will be required at the site and supplied either via mains connection or mobile supplies such as bowzers, septic tanks and generators. This area will also serve for cable installation works.
- 81 The likely sequence of activities at the OnSS are:
- ▲ Site investigation works, pre-construction archaeological and ecological surveys and mitigation;
  - ▲ Site enabling works, including:
    - Site clearance;
    - Site mobilisation, fencing and the establishment of the temporary construction compounds;
    - The construction of temporary and permanent access roads,
    - Ground works including cable ducting and new site drainage; and
    - Ground raising and establishment of the stoned site platform.
  - ▲ Installation of the substation, including;

- Permanent security fencing
  - The GIS building (if required) and other structures such as control and welfare buildings and lightning rods; and
  - Electrical equipment such as switchgear, busbars, capacitors, reactors, reactive power compensation equipment, filters and cooling equipment.
- ▲ Commissioning of the electrical equipment; and
  - ▲ Demobilisation and landscaping.
- 82 The OnSS site will be stripped and graded as required with material being reused on site where possible. Any excess material will be disposed of at a licenced disposal site. Excavations and laying of foundations, trenches and drainage will commence after grading is complete.
- 83 Foundations for the OnSS may require piling, however, confirmation of the type and quantum of piling is dependent on further investigation.
- 84 Volume 3, Chapter 1: Onshore Project Description (application ref: 6.3.1) provides an estimate of the materials and waste used in construction of the Substation.

## Connection to National Grid

- 85 The Onshore ECC will continue southwards and then eastwards from the proposed OnSS to connect to the existing National Grid substation located to the south of St Asaph Business Park. The connection will rely on 'enabling works' that will be undertaken by National Grid. National Grid is responsible for undertaking works at the existing National Grid substation to facilitate the connection of AyM. Therefore, the 'enabling works' are not considered as part of the AyM proposed activities in this assessment.

### 5.3.2 O&M

- 86 For the purposes of assessment, the operational lifetime of the project is assumed to be 25 years. The haul road will not be in place during the operational phase, with access required to each field using existing farms accesses.

- 87 An O&M strategy will be developed further once the technical specification of AyM is finalised. During the operational phase of the project, there will be no planned maintenance or replacement of the buried onshore cables. The joint pits will require separate, smaller cable-testing pits (known as link boxes) to be installed during construction. These will consist of a manhole set in a concrete plinth at ground level and will be accessed during the O&M period to allow fault testing.. The transformers may also require infrequent topping up of oil.
- 88 Unplanned maintenance associated with the Onshore ECC may involve the repair of onshore cable faults. This is extremely rare (indicatively 1-2 events per lifetime). Typically, this involves excavating the two adjacent joint pits, pulling the cable back through the ducting and pulling a new cable through. Alternatively, the area of the fault may be excavated (with an additional up to 40 m in both directions) and two new joints installed within this area. Methods for excavation and reburial will be similar to the original installation as described in the cable installation section.

### 5.3.3 Decommissioning

- 89 At the end of the operational lifetime of AyM, it is assumed that the decommissioning activities will generally be similar to construction.

## 5.4 Mitigation measures

- 90 This section provides an overview of mitigation measures that were identified and adopted as part of the evolution of the project design (embedded into the project design) and that are relevant to the WFD compliance assessment. The mitigation includes embedded measures such as design changes and applied mitigation which is subject to further study or approval of details; these include avoidance measures that will be informed by pre-construction surveys, and necessary additional consents where relevant.

- 91 The composite of embedded and applied mitigation measures apply to all parts of the AyM development works, including pre-construction, construction, O&M and decommissioning. The provision of the identified plans, as detailed below, will be secured in the DCO (or Marine Licence). The subsequent scoping and assessment stages of the WFD compliance assessment (Section 6 onwards) are based on the 'mitigated' design, with any further mitigation added to reduce impacts in the case of potentially significant effects (in this case, potential to result in a deterioration of a WFD waterbody).

### 5.4.1 Offshore

#### Pollution prevention

- 92 A Project Environment Management Plan (PEMP) will be produced post-consent and implemented to cover the construction and O&M phases of AyM. The PEMP will be secured through a Condition in the Marine Licence. The PEMP will include a Marine Pollution Contingency Plan (MPCP) to provide protocols to cover accidental spills and potential contaminant release, and include key emergency contact details (e.g., NRW, Maritime and Coastguard Agency and the project site co-ordinator).
- 93 Typical measures will include:
- ▲ Storage of all chemicals in secure designated areas with impermeable bunding (generally to 110% of the volume); and
  - ▲ Double skinning of pipes and tanks containing hazardous materials.
- 94 The purpose of these measures is to ensure that potential for contaminant release is strictly controlled and provides protection to marine life across all phases of the life of AyM.

#### INNS

- 95 Relevant best practice guidelines will be followed and implemented through the implementation of a Biosecurity Plan to minimise INNS introduction/ spread (the Biosecurity Plan will be secured as a condition in the Marine Licence).

## Cable Specification and Installation Plan

- 96 The Cable Specification and Installation Plan (CSIP) will be developed post-consent and will set out appropriate cable burial depth in accordance with industry good practice, minimising the risk of cable exposure. The CSIP will be secured as a condition in the Marine Licence.

### 5.4.2 Onshore

#### Code of Construction Practice

- 97 An onshore CoCP will set out the environmental measures to be applied on AyM, including details of any mitigation and how it will be managed through the construction phase. An outline CoCP (Document 8.13: Outline Code of Construction Practice; application ref: 8.13) has been provided with the ES and has been assumed to be adopted for the purposes of the assessments in the ES.
- 98 All construction work will be undertaken in accordance with the outline CoCP (Document 8.13: Outline Code of Construction Practice; application ref: 8.13), and good practice guidance including, but not limited to:
- ▲ Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors CIRIA (C532) (CIRIA, 2001);
  - ▲ CIRIA – The SuDS Manual (C753) (CIRIA, 2015);
  - ▲ No discharge to main river watercourses will occur without permission from NRW (SuDS Manual);
  - ▲ Wheel washers and dust suppression measures to be used as appropriate to prevent the migration of pollutants (SuDS Manual);
  - ▲ Regular cleaning of roads of any construction waste and dirt to be carried out (SuDS Manual); and
  - ▲ A construction method statement to be submitted for approval by the responsible authority (SuDS Manual).
- 99 The Final CoCP will be submitted to Denbighshire County Council (DCC) for approval, as relevant planning authority, under a requirement of the DCO.

## Permits

- 100 Consent would be required for the works (e.g., drilling, crossing, culverting, discharging to, passing under and/ or through) affecting the sea defence structures, main rivers, non-main and ordinary watercourses in accordance with Environmental Permitting (England and Wales) Regulations 2016 and the requirements of NRW/ DCC. The conditions of the consents would be specified to ensure that construction does not result in significant alteration to the hydrological regime or an increase in fluvial or tidal flood risk.

## Soil management

- 101 The Pollution Prevention and Emergency Incident Response Plan (PPEIRP), an outline version of which is provided in Document 8.13.6Annex 3.1, Appendix 6 (application ref: 8.13.6), includes measures to control runoff from the construction works. The soil will be carefully maintained during the storage process. This could include, for example, sediment fences when working in proximity to open watercourses, containment of storage areas and treatment of any runoff from work areas or water from dewatering of trenches. Such measures would prevent the potential reduction in water quality associated with increased sediment loading affecting nearby tidal waters, fluvial watercourses or drainage ditches during cable route construction works, especially during excavations or earthwork activities.
- 102 Further details are provided in Document 8.13.4: Outline Soil Management Plan (application ref: 8.13.4).

## Drainage and dewatering

- 103 A pre-construction drainage scheme, secured as part of the CoCP (Document 8.13: Outline CoCP; application ref: 8.13) which forms a requirement of the DCO, will be developed and implemented to minimise water within the trench and ensure ongoing drainage of surrounding land. Where water enters the trenches during installation, this will be pumped via the appropriate means to remove sediment and potential contaminants, before being discharged into local ditches or drains via temporary interceptor drains.

## Pollution prevention

- 104 All construction work will be undertaken in accordance with a PPEIRP, secured as part of Document 8.13: Outline CoCP (application ref: 8.13) which forms a requirement of the DCO. An outline version of the PPEIRP is provided as Appendix 6 of the CoCP (Document 8.13.6; application ref: 8.13.6). The outline PPEIRP sets out the principles to be followed when the final PPEIRP is finalised as part of the DCO that will include the following measures.
- 105 Areas at risk of spillage, such as vehicle maintenance areas and hazardous substance stores (including fuel, oils, drilling fluids and chemicals) will be bunded and carefully sited to minimise the risk of hazardous substances entering drainage systems or local watercourses. Additionally, the bunded areas will have impermeable bases to limit the potential for migration of contaminants into groundwater following any leakage/ spillage. Bunds used to store fuel, oil etc. will have a 110% capacity. Furthermore, spill procedures and use of spill kits will be implemented (if required). These measures together with appropriate drainage systems and containment will minimise the potential for any reduction in water quality associated with spills or leaks of stored oils/ fuels/ chemicals or other polluting substances migrating into nearby water bodies. It is envisaged these measures will be secured as a part of the PPEIRP.



## 5.5 Zone of Influence

106 The Zol for the AyM WFD compliance assessment has been defined by the project-specific sediment modelling<sup>iii</sup> from the proposed offshore works and 2 km from the onshore draft Order Limits (see Figure 1). This distance aligns with the Environment Agency's 'Clearing the Waters for All' guidance. Sections 5.6 and 5.7 provide details of the WFD waterbodies and protected areas within the AyM Zol, respectively. However, it should be noted that Report 5.2: RIAA (application ref: 5.2) has been prepared to accompany the ES which details consideration of all relevant National Site Network (and Ramsar) sites which may be potentially affected by the proposed development.

107 The Zol for groundwaters has been defined as where the onshore draft Order Limits overlaps these sites.

## 5.6 Waterbodies screening

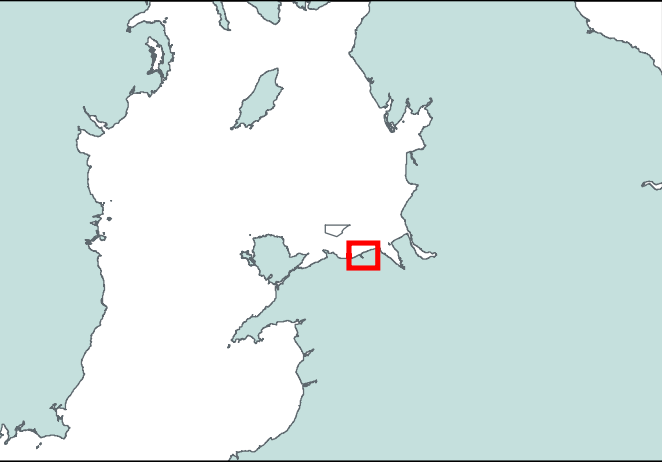
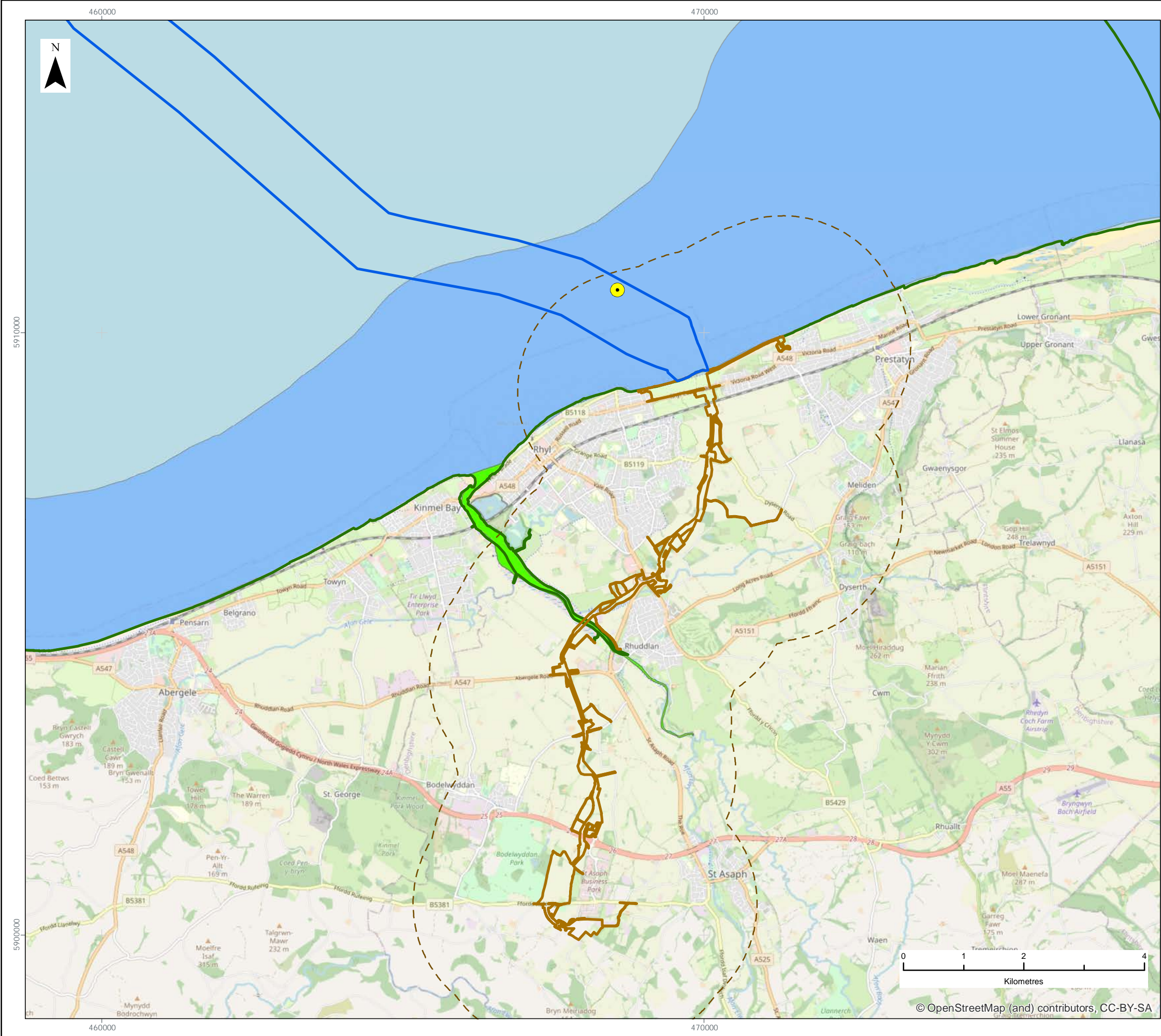
108 The Zol has been considered alongside the location of waterbodies along the North Wales coast and in conjunction with the relevant project activities, as presented above. This enables a determination of those waterbodies that are likely to be impacted to be identified, as presented in Table 3. Further detail on these waterbodies are presented in Section 6 of this document.

Table 3: Waterbodies screened into the WFD compliance assessment.

NAME	QUALIFYING REASON FOR INCLUSION IN SCREENING
Clwyd transitional waterbody	Onshore ECC overlaps with the waterbody and within the Zol of sediment plumes associated with the proposed activities (Figure 4).
North Wales coastal waterbody	Offshore ECC overlaps with the waterbody and within the Zol of sediment plumes associated with the proposed activities (Figure 4).

<sup>iii</sup> Volume 4, Annex 2.3: Physical Processes Modelling Results (application ref: 6.4.2.3) and Volume 2, Chapter 3: Marine Water and Sediment Quality (application ref: 6.2.3).

NAME	QUALIFYING REASON FOR INCLUSION IN SCREENING
Clwyd - tidal limit to Hesbin river waterbody	This waterbody is within 2 km of the proposed development (Figure 5).
Pont Robin Cut (Bodelwyddan) river waterbody	Onshore ECC overlaps with the waterbody (Figure 5).
Gele river waterbody	This waterbody is within 2 km of the Onshore ECC (Figure 5).
Glanfyddion Cut river waterbody	Onshore ECC overlaps with the waterbody (Figure 5).
Elwy - Clwyd to Melai river waterbody	This waterbody is within 2 km of the Onshore ECC (Figure 5).
Clwyd Permo-Triassic Sandstone groundwater waterbody	Onshore ECC overlaps with the waterbody (Figure 6).



**LEGEND**

- Offshore Export Cable Corridor
- Onshore Export Cable Corridor
- Zone of Influence
- 2km buffer from Onshore Export Cable Corridor
- Benthic Survey Station (E\_ST16)
- North Wales Coastal Waterbody
- Clywd Transitional Waterbody

Data Source:  
Natural Resources Wales (NRW)

PROJECT TITLE:  
*AWEL Y MÔR OFFSHORE WINDFARM*

FIGURE TITLE:  
**Coastal and transitional WFD waterbodies of relevance to AyM**

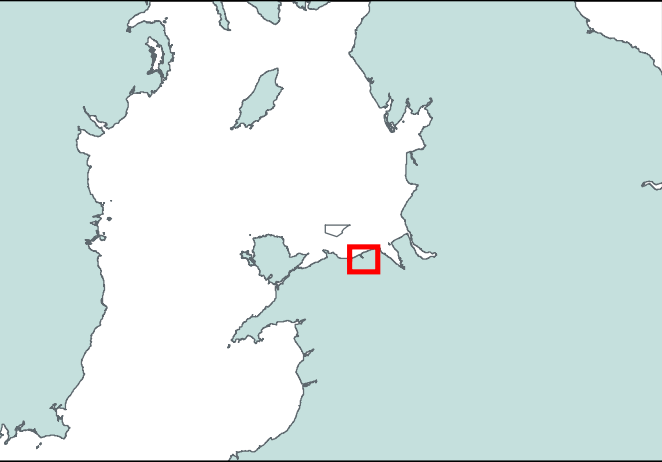
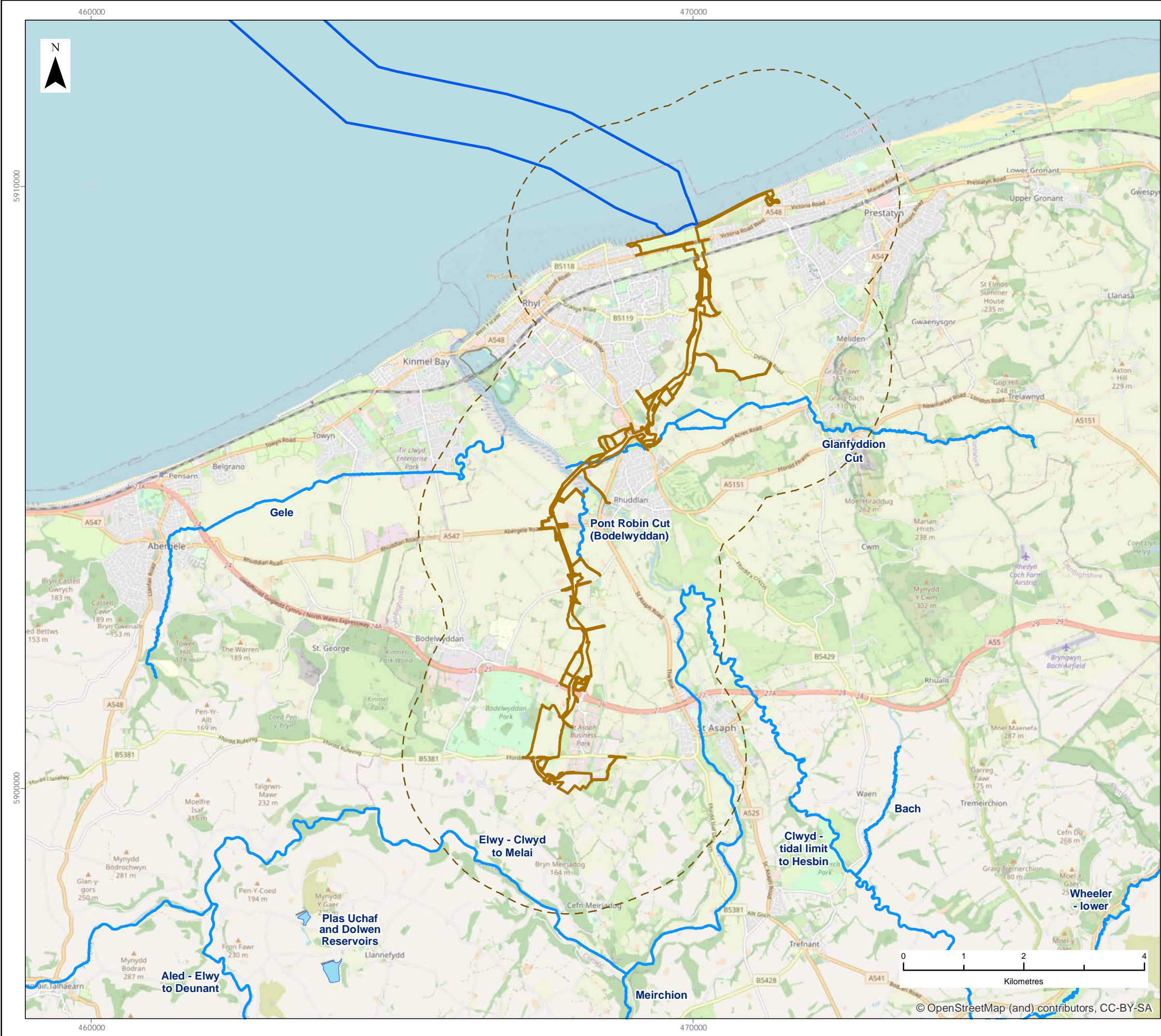
VER	DATE	REMARKS	Drawn	Checked
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2	03/03/2022	For Issue For ES	BPHB	DH

FIGURE NUMBER:  
**Figure 4**

SCALE: 1:65,000	PLOT SIZE: A3	DATUM: WGS84	PROJECTION: UTM30N
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**LEGEND**

- Offshore Export Cable Corridor
- Onshore Export Cable Corridor
- 2km buffer from Onshore Export Cable Corridor
- WFD River Waterbodies
- WFD Lake Waterbodies

Data Source:  
Natural Resources Wales (NRW)

PROJECT TITLE:  
*AWEL Y MÔR OFFSHORE WINDFARM*

FIGURE TITLE:  
**Geographical overview of freshwater WFD waterbodies of relevance to AyM**

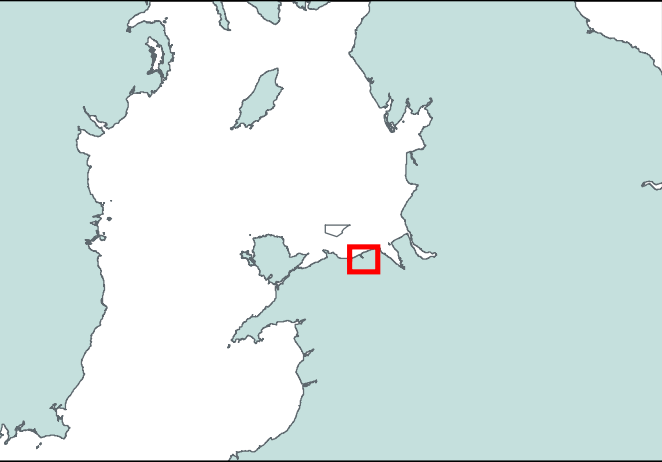
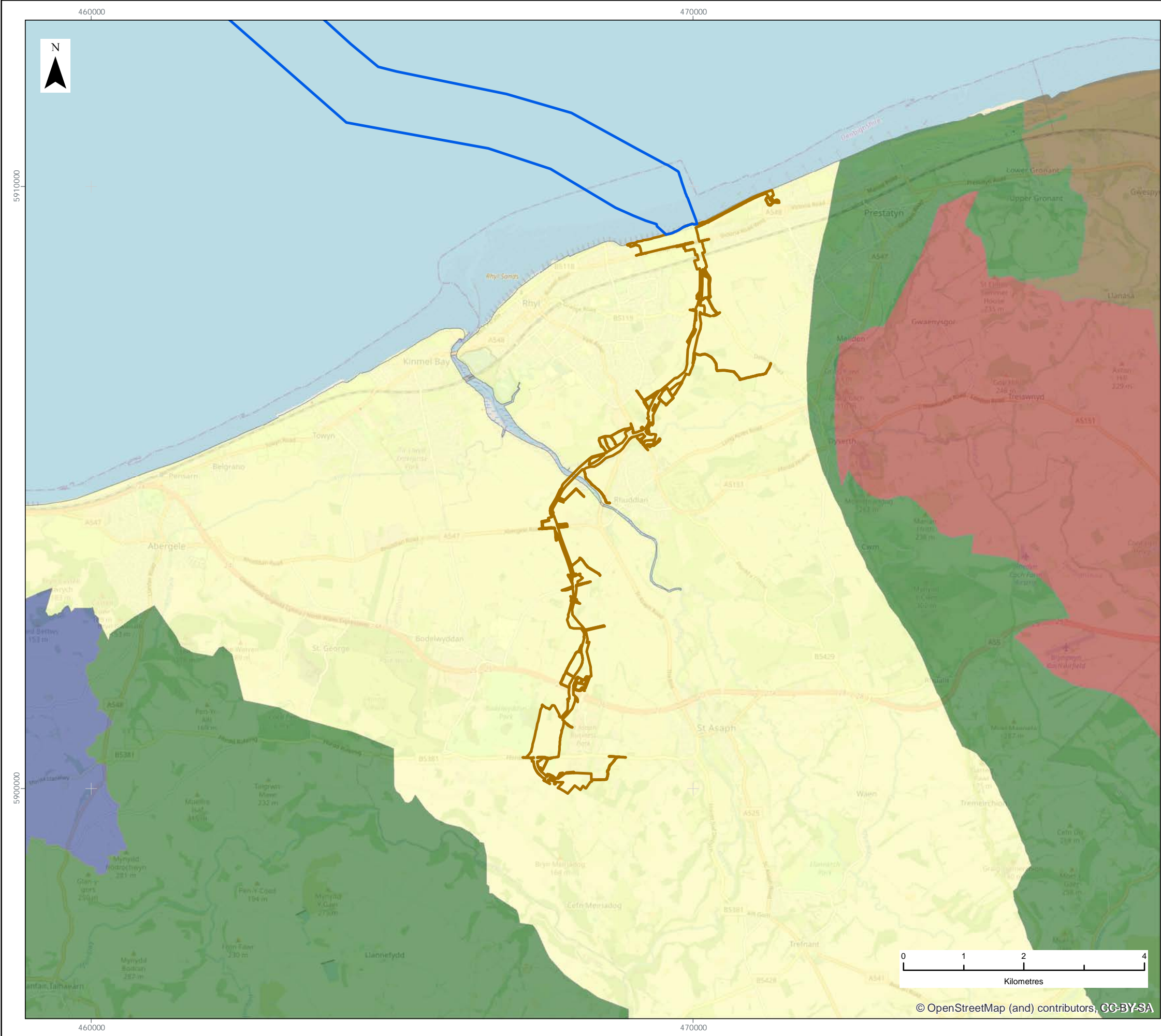
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2	03/03/2022	For Issue For ES	BPHB	DH

FIGURE NUMBER:  
**Figure 5**

SCALE: 1:65,000	PLOT SIZE: A3	DATUM: WGS84	PROJECTION: UTM30N
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Fferm Wynt Alltraeth  
**AWEL Y MÔR**  
Offshore Wind Farm





**LEGEND**

- Offshore Export Cable Corridor
- Onshore Export Cable Corridor
- WFD Groundwaterbodies
  - Clwyd Carboniferous Limestone
  - Clwyd Permo-Triassic Sandstone
  - Clwyd Silurian
  - Conwy
  - Dee Carboniferous Coal Measures

Data Source:  
Natural Resources Wales (NRW)

PROJECT TITLE:  
*AWEL Y MÔR OFFSHORE WINDFARM*

FIGURE TITLE:  
**Geographical overview of groundwater WFD waterbodies**

VER	DATE	REMARKS	Drawn	Checked
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2	03/03/2022	For Issue For ES	BPHB	DH

FIGURE NUMBER:  
**Figure 6**

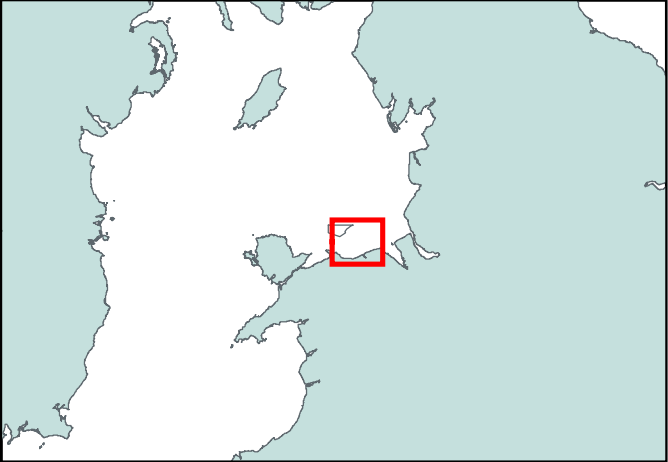
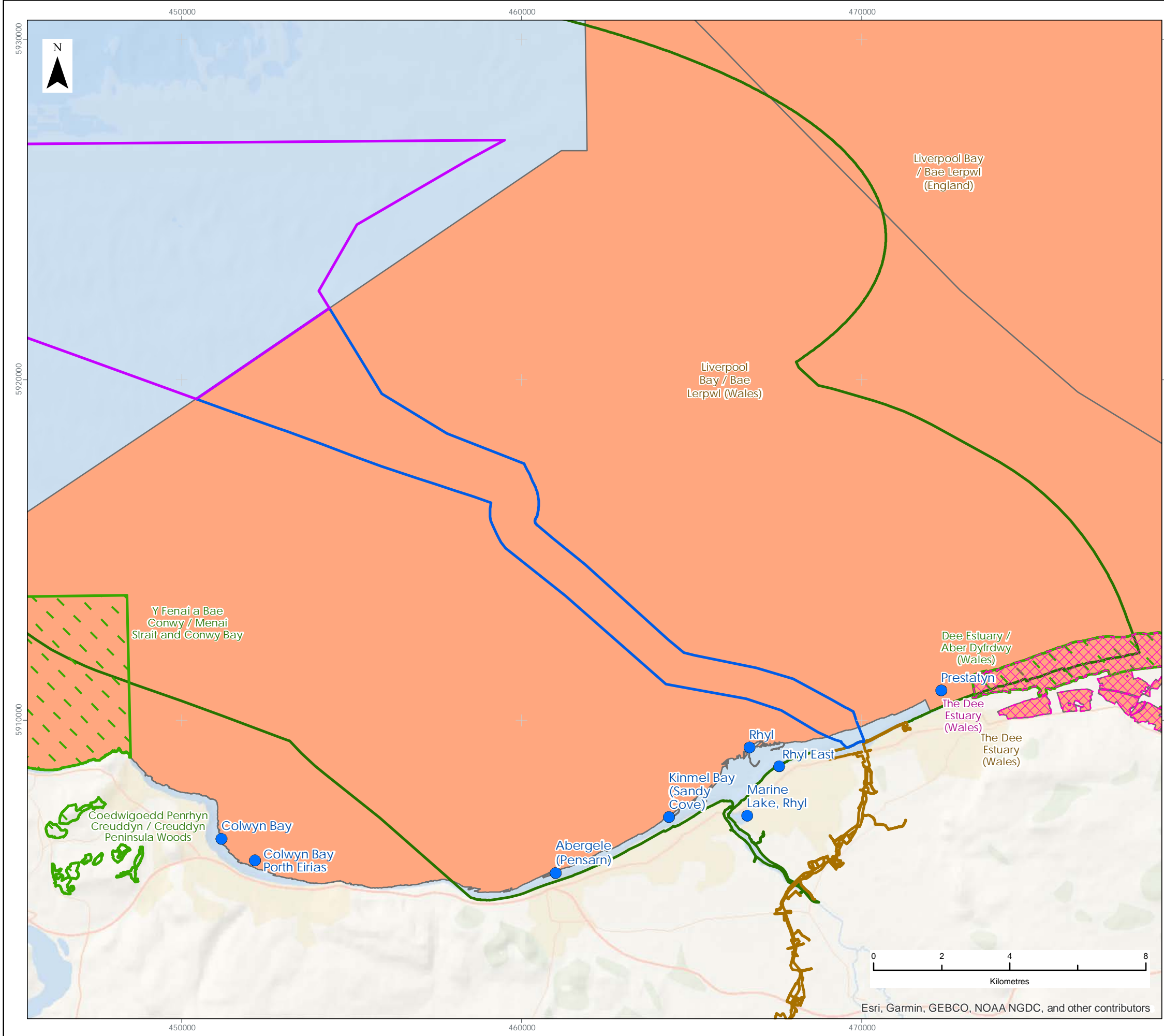
SCALE: 1:65,000	PLOT SIZE: A3	DATUM: WGS84	PROJECTION: UTM30N
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Fferm Wynt Alltraeth  
**AWEL Y MÔR**  
Offshore Wind Farm

## 5.7 Protected areas screening

109 As required under OGN 72 (NRW, 2021a), the following WFD protected areas have been identified within the Zol of the proposed development (Figure 7 and Figure 8):

- ▲ Bathing Waters:
  - Abergele (Pensarn);
  - Kinmel Bay (Sandy Cove);
  - Rhyl East;
  - Rhyl;
  - Marine Lake, Rhyl; and
  - Prestatyn.
- ▲ Shellfish Water Protected Areas:
  - There are no Shellfish Water Protected Areas within the AyM Zol. The closest are Dee (West) and Rhos-on-Sea to the east and west of the offshore ECC, respectively.
- ▲ Sensitive Areas:
  - The Rhyl Bathing Water Sensitive Area is within the AyM Zol, directly overlapping the offshore ECC.
- ▲ NVZs:
  - Existing groundwater NVZ; and
  - Existing surface water NVZ.
- ▲ National Site Network sites and Ramsar sites:
  - Dee Estuary/ Aber Dyfrdwy SAC;
  - Menai Strait and Conwy Bay SAC;
  - Coedwigoedd Dyffryn Elwy / Elwy Valley Woods SAC; and
  - Liverpool Bay / Bae Lerpwl (Wales) SPA.
  - There are no Ramsar sites within the defined AyM Zol.
- ▲ Drinking Water Protected Areas (Surface and Ground):
  - There are no Drinking Water Protected Areas within the AyM Zol. The closest is approximately 4 km from the onshore ECC.



LEGEND

- Array Area
- Offshore Export Cable Corridor
- Onshore Export Cable Corridor
- Zone of Influence
- Bathing Water Designated Beaches
- Ramsar sites
- Special Areas of Conservation
- Special Protection Areas

Data Source:  
Natural Resources Wales (NRW)

PROJECT TITLE:

*AWEL Y MÔR OFFSHORE WINDFARM*

FIGURE TITLE:

Geographical overview of marine  
protected areas WFD waterbodies

VER	DATE	REMARKS	Drawn	Checked
1	16/09/2021	For Issue for PEIR	BPHB	SM
2	03/03/2022	For Issue For ES	BPHB	DH

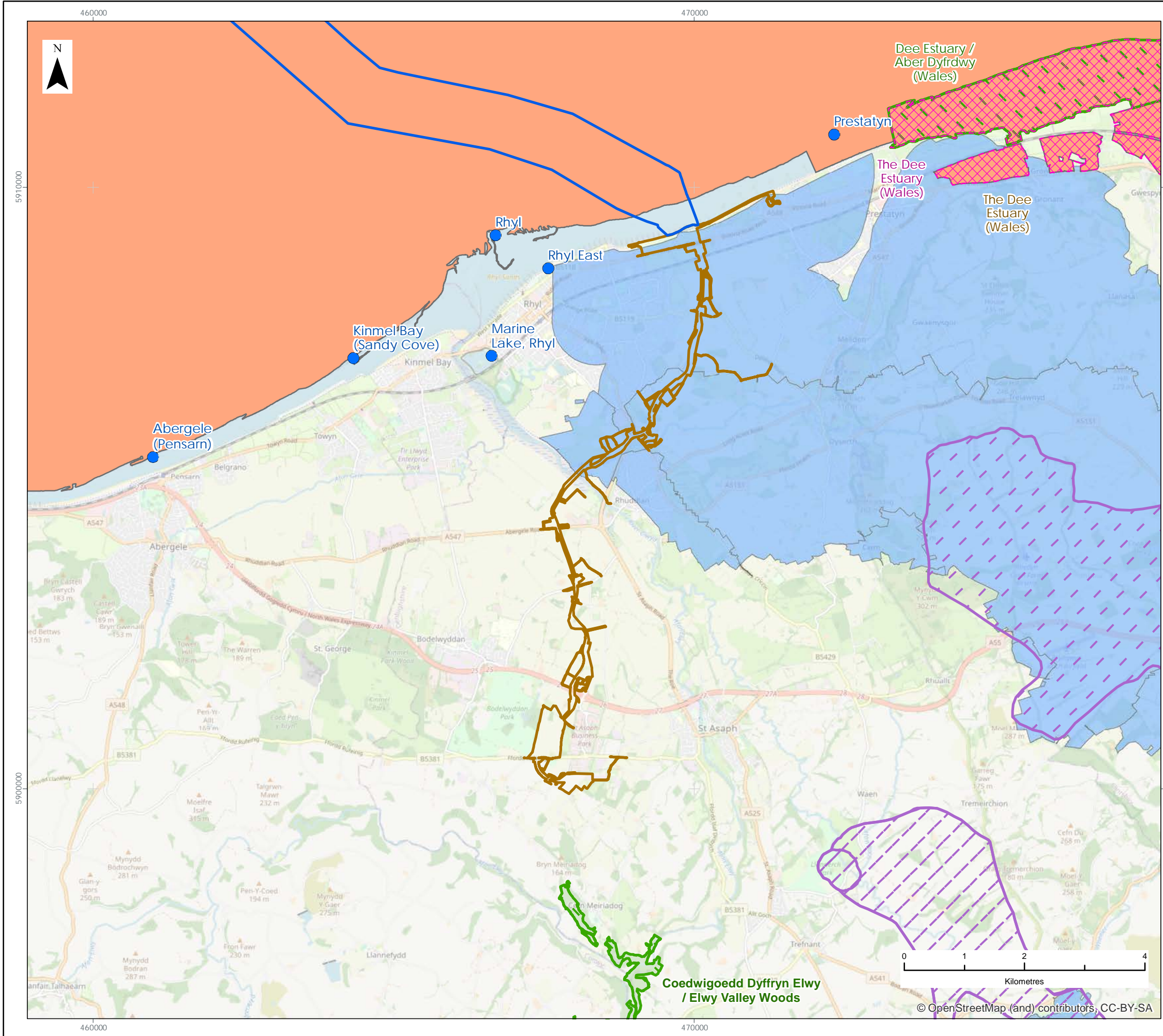
FIGURE NUMBER:

Figure 7

SCALE: 1:115,000	PLOT SIZE: A3	DATUM: WGS84	PROJECTION: UTM30N
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Fferm Wynt Alltraeth  
**AWEL Y MÔR**  
Offshore Wind Farm





LEGEND

- Offshore Export Cable Corridor
- Onshore Export Cable Corridor
- Bathing Water Designated Beaches
- Ramsar sites
- Special Areas of Conservation
- Special Protection Areas
- Drinking Water Protected Areas (Surface and Ground)
- Nitrate Vulnerable Zones

Data Source:  
Natural Resources Wales (NRW)

PROJECT TITLE:

*AWEL Y MÔR OFFSHORE WINDFARM*

FIGURE TITLE:

Geographical overview of terrestrial protected areas WFD waterbodies

VER	DATE	REMARKS	Drawn	Checked
1	16/09/2021	For Issue for PEIR	BPHB	SM
2	03/03/2022	For Issue For ES	BPHB	DH

FIGURE NUMBER:

Figure 8

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:65,000	A3	WGS84	UTM30N

Fferm Wynt Alltraeth  
**AWEL Y MÔR**  
Offshore Wind Farm

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## 6 Scoping

### 6.1 Relevant waterbodies status

#### 6.1.1 Relevant coastal and transitional waterbodies status

110 A detailed characterisation of the marine water quality baseline is provided in Volume 2, Chapter 3: Marine Water and Sediment Quality (application ref: 6.2.3).

111 The AyM offshore ECC crosses the North Wales waterbody (ID: GB641011650000) (Figure 4). There are no other coastal or transitional waterbodies within the Zol of the offshore ECC. However, the onshore ECC crosses the Clwyd transitional waterbody (ID: GB541006608000) and has been screened-in as a relevant waterbody which may be affected by the proposed development. The current status of the screened-in coastal and transitional WFD waterbodies, as per the latest Cycle 3 classifications published in December 2021, are presented in Table 4.

Table 4: Current status of scoped in coastal and transitional waterbodies (source: Cycle 3 Classifications (NRW, 2021b)).

NAME	North Wales	Clwyd
ID	GB641011650000	GB541006608000
TYPE	Coastal	Transitional
DISTANCE FROM AYM (KM)	0 (the offshore ECC overlaps with the waterbody)	0 (the onshore ECC overlaps with the waterbody)
WATERBODY AREA (HA)*	14,627.8	64.4
OVERALL CURRENT POTENTIAL STATUS	Moderate	Moderate
CURRENT STATUS (ECOLOGICAL)	Moderate	Moderate

<b>CURRENT STATUS (CHEMICAL)</b>	Moderate (Fail)	High
<b>TARGET**</b>	Good by 2033	Moderate by 2027
<b>DRIVING ECOLOGICAL QUALITY ELEMENT</b>	Phytoplankton blooms; Mercury and its Compounds	Dissolved Inorganic Nitrogen; Mitigation Measures Assessment
<b>IS THE WATERBODY HEAVILY MODIFIED (HMWB)?</b>	Yes	Yes
<b>PHYTOPLANKTON CLASSIFICATION</b>	Moderate	Not recorded
<b>ANNEX 8 CHEMICALS</b>	High	Not Assessed
<b>DISSOLVED INORGANIC NITROGEN</b>	Good	Moderate
<b>HYDROMORPHOLOGY</b>	Not Assessed	Not High (Hydrological Regime)

(\*) Calculated from GIS analysis.

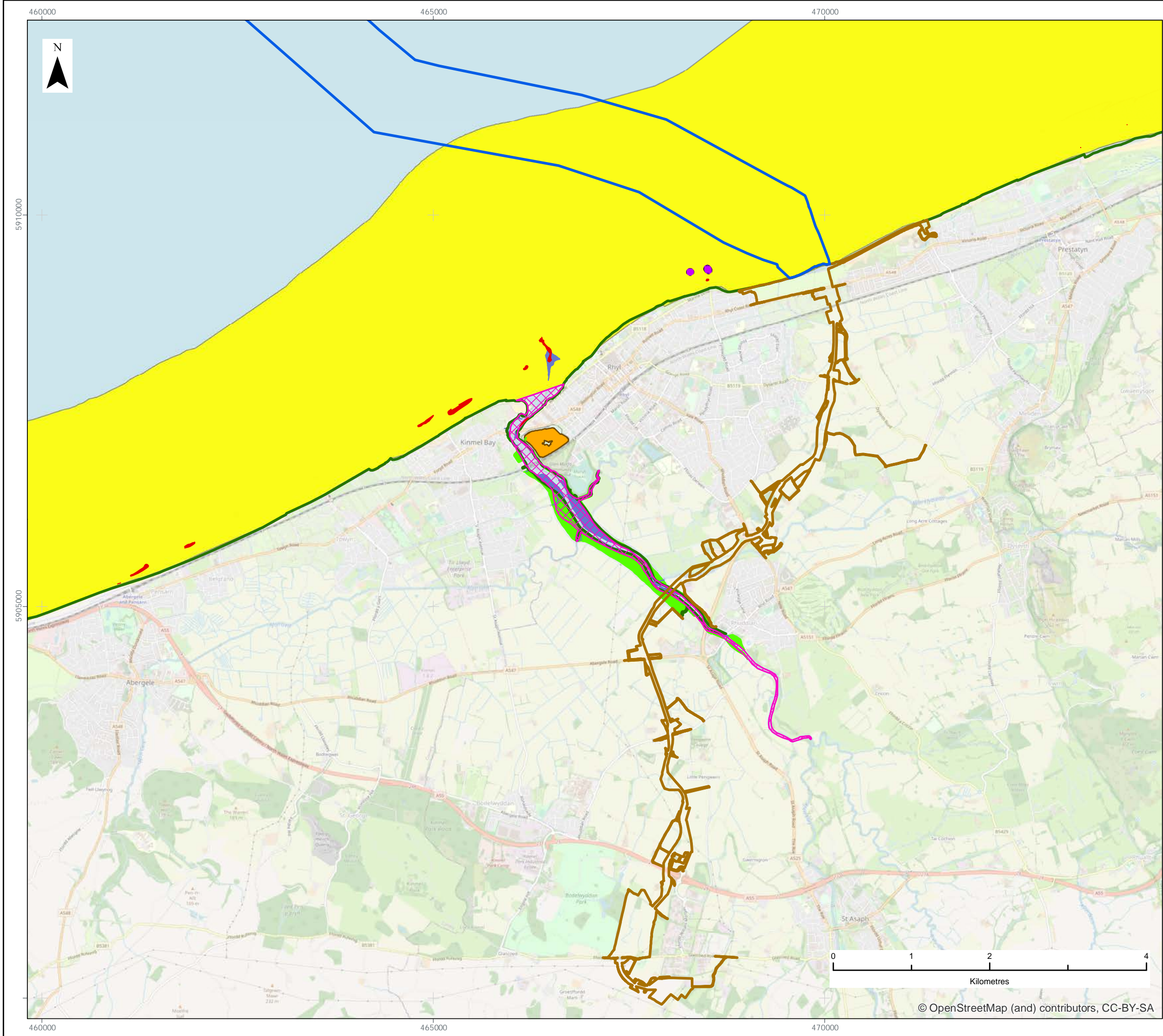
(\*\*) As defined in Draft RBMP Consultation Data (NRW,2020).

## Biological habitats

112 The proposed activities include the potential for sandwave clearance in the offshore ECC and, therefore, within the North Wales coastal waterbody. The maximum footprint of sandwave clearance within the North Wales coastal waterbody is estimated to be 0.19 km<sup>2</sup> (~19.4 ha) (1 nm x 70 m sandwave clearance disturbance corridor x 1.5 multiplier for dredging activities). This is approximately 0.13% of the North Wales coastal body's total area (see Table 4). No dredging is proposed in the Clwyd transitional waterbody.

113 Within the proximity of the offshore ECC, there are Mussel beds, *Sabellaria alveolata* (distance to offshore ECC approximately 400 m) and Saltmarsh to the East (distance to ECC approximately 4.8 km). Saltmarsh in the Clwyd Estuary (distance to ECC approximately 3.5 km) is directly overlapped by the onshore ECC (see Figure 9). However, it should be noted that there will be no direct interaction with habitats in the Clwyd transitional water body due to the trenchless techniques proposed to cross the river.





**LEGEND**

- Offshore Export Cable Corridor
- Onshore Export Cable Corridor
- Zone of Influence
- Clywd Transitional Waterbody
- Transitional Waterbodies
- North Wales Coastal Waterbody
- Sabellaria
- Mussel beds
- Saltmarsh
- Intertidal Mudflats
- Potential Saline Lagoon

Data Source:  
Datasets from Lle

PROJECT TITLE:  
*AWEL Y MÔR OFFSHORE WINDFARM*

FIGURE TITLE:  
**Benthic habitats  
(source: Lle)**

VER	DATE	REMARKS	Drawn	Checked
1	16/09/2021	For Issue for PEIR	BPHB	SM
2	03/03/2022	For Issue For ES	BPHB	DH

FIGURE NUMBER:  
**Figure 9**

SCALE: 1:50,000	PLOT SIZE: A3	DATUM: WGS84	PROJECTION: UTM30N
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Fferm Wynt Alltraeth  
**AWEL Y MÔR**  
Offshore Wind Farm

## 6.1.2 Relevant river waterbodies status

- 114 A detailed characterisation of the hydrological baseline is provided in Volume 3, Chapter 7: Hydrology, Hydrogeology and Flood Risk (application ref: 6.3.7).
- 115 Within the Zol surrounding the AyM onshore ECC, there are five designated WFD river waterbodies (Figure 5):
- ▲ Clw-d - tidal limit to Hesbin (ID: GB110066059960);
  - ▲ Pont Robin Cut (Bodelwyddan) (ID: GB110066059970);
  - ▲ Gele (ID: GB110066059980);
  - ▲ Glanfyddion Cut (ID: GB110066059990); and
  - ▲ El-y - Clwyd to Melai (ID: GB110066060020).
- 116 The onshore ECC crosses or is in the immediate vicinity of the Pont Robin Cut and Glanfyddion Cut river waterbodies, with the other three river waterbodies are within 2 km of the onshore ECC.
- 117 The current status of these screened in rivers, as per the latest Cycle 3 classifications published in December 2021, is provided in Table 5. No other riverine waterbodies, canals or lakes are within 2 km of the onshore ECC. For all non-reportable watercourses, in the area of land between the coast and the Gele and Glandfyddion waterbody catchments, these have been assumed as Good status for the purposes of this assessment. This is considered a precautionary approach as part of the WFD compliance assessment given the overarching objective to avoid deterioration in status (i.e., it would not be suitable for a non-reportable watercourse to be less than good).
- 118 The Plas Uchaf and Dolwen Reservoirs, designated as WFD Lake waterbodies, are approximately 4.4 km from the onshore ECC.

Table 5: Current status of scoped in river waterbodies (source: Cycle 3 Classifications (NRW, 2021b)).

WATERBODY ID	GB110066059960	GB110066059970	GB110066059980	GB110066059990	GB110066060020
WATERBODY NAME	Clw-d - tidal limit to Hesbin	Pont Robin Cut (Bodelwyddan)	Gele	Glanfyddion Cut	El-y - Clwyd to Melai
WATERBODY TYPE	River	River	River	River	River
IS THE WATERBODY HEAVILY MODIFIED (HMWB)?	Heavily Modified	Not Designated (Natural)	Heavily Modified	Not Designated (Natural)	Not Designated (Natural)
OVERALL WATERBODY STATUS	Moderate	Poor	Moderate	Moderate	Good
ECOLOGICAL STATUS	Moderate	Poor	Moderate	Moderate	Good
CHEMICAL STATUS	High	High	High	High	High
DRIVING ECOLOGICAL QUALITY ELEMENT	Phosphate; Mitigation Measures Assessment	Invertebrates	Dissolved Oxygen; Phosphate; Mitigation Measures Assessment	Fish	Phosphate; Hydrological Regime
FISH	Moderate	Not recorded	Not recorded	Moderate	High



<b>INVERTEBRATES</b>	High	Poor	High	Not recorded	High
<b>MACROPHYTE AND PHYTOBENTHOS</b>	Good	High	High	Not recorded	Not recorded
<b>AMMONIA</b>	High	Good	High	High	High
<b>DISSOLVED OXYGEN</b>	High	Bad	Poor	High	High
<b>PHOSPHATE</b>	Moderate	Moderate	Poor	Good	Good
<b>HYDROLOGICAL REGIME</b>	Not High	Not High	Not High	Not High	Not High
<b>ANNEX 8 CHEMICALS</b>	High	Not Assessed	Not Assessed	Not Assessed	High
<b>PRIORITY HAZADOUS SUBSTANCES</b>	High	Not Assessed	Not Assessed	Not Assessed	High

### 6.1.3 Relevant groundwater bodies status

119 A detailed characterisation of the hydrogeological baseline and known ground conditions and sources of contamination are provided in Volume 3, Chapter 7: Hydrology, Hydrogeology and Flood Risk (application ref: 6.3.7) and Volume 3, Chapter 6: Ground Conditions and Land Use (application ref: 6.3.6).

120 The AyM onshore ECC is within the Clwyd Permo-Triassic Sandstone groundwater (ID: GB41001G202100) (Figure 6). The current status of the Clwyd Permo-Triassic Sandstone WFD groundwater waterbody, as per the latest Cycle 3 classifications published in December 2021 is presented in Table 6. No other WFD groundwater waterbodies are intersected by the onshore (or offshore) ECC. The NRW groundwater risk assessment concluded that the Clwyd Permo-Triassic Sandstone was “probably at risk” from impacts on the water balance and terrestrial ecosystems (wetlands). Therefore, the groundwater is “probably at risk” when all quantitative pressures are combined.

Table 6: Current status of scoped in groundwater waterbodies (source: Cycle 3 Classifications (NRW, 2021b)).

ID	GB41001G202100
NAME	Clwyd Permo-Triassic Sandstone
WATERBODY TYPE	Groundwater
OVERALL WATERBODY STATUS	Good
GROUNDWATER QUANTITATIVE STATUS	Good
GROUNDWATER CHEMICAL STATUS	Good
OBJECTIVE	Good by 2027

## 6.2 Status of relevant protected areas

- 121 The current status of all the scoped-in Bathing Waters, as well as the distance between the respective Bathing Water monitoring points and the offshore ECC, is presented in Table 7. It is also noted that the offshore ECC overlaps the Rhyl Bathing Water Sensitive Area as designated under the Urban Waste Water Treatment Directive (see Figure 8). Table 8 presents the designated features of the screened-in SACs and SPAs (note, no Ramsar sites have been screened in to the WFD compliance assessment). The relevant SACs and SPAs (in addition to other screened-in sites) are subject to a Habitats Regulation Assessment which is presented in Report 5.2: RIAA (application ref: 5.2). The WFD compliance assessment provides signposting to the key findings of Report 5.2: RIAA (application ref: 5.2) rather than duplicating.
- 122 Large areas of Rhyl and Prestatyn, within which the onshore ECC is situated, are designated as Groundwater NVZs. There are no Shellfish Water Protected Areas within the AyM Zol, with the nearest sites being Dee (West) and Rhos-on-Sea to the east and west of the offshore ECC, respectively.

Table 7: Bathing Water classification and distances.

NAME	CLASSIFICATION					DISTANCE TO OFFSHORE ECC
	2021	2020	2019	2018	2017	
Abergele (Pensarn)	Sufficient	Sufficient	Sufficient	Good	Good	9.3 km
Kimmel Bay (Sandy Cove)	Good	Sufficient	Good	Good	Good	5.6 km
Rhyl	Sufficient	Good	Sufficient	Sufficient	Sufficient	2.8 km
Rhyl East	Good	Good	Good	Good	Good	2.0 km
Marine Lake, Rhyl	Sufficient	Sufficient	Sufficient	Good	Good	3.5 km
Prestatyn	Excellent	Excellent	Excellent	Excellent	Excellent	2.7 km

Table 8: Designated feature(s) of the identified SACs and SPAs.

SITE	DESIGNATED FEATURE(S)
Dee Estuary / Aber Dyfrdwy SAC	<ul style="list-style-type: none"> <li>▲ Estuaries;</li> <li>▲ Mudflats and sandflats not covered by seawater at low tide;</li> </ul>

SITE	DESIGNATED FEATURE(S)
	<ul style="list-style-type: none"> <li>➤ Annual vegetation of drift lines;</li> <li>➤ Vegetated sea cliffs of the Atlantic and Baltic Coasts;</li> <li>➤ <i>Salicornia</i> and other annuals colonizing mud and sand;</li> <li>➤ Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>);</li> <li>➤ Embryonic shifting dunes;</li> <li>➤ Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ("white dunes");</li> <li>➤ Fixed coastal dunes with herbaceous vegetation ("grey dunes");</li> <li>➤ Humid dune slacks;</li> <li>➤ River lamprey (<i>Lampetra fluviatilis</i>);</li> <li>➤ Sea lamprey (<i>Petromyzon marinus</i>).</li> <li>➤ Petalwort (<i>Petalophyllum ralfsii</i>).</li> </ul>
Y Fenai a Bae Conwy / Menai Strait and Conwy Bay SAC	<ul style="list-style-type: none"> <li>➤ Sandbanks which are slightly covered by sea water all the time;</li> <li>➤ Mudflats and sandflats not covered by seawater at low tide;</li> <li>➤ Reefs;</li> <li>➤ Large shallow inlets and bays; and</li> <li>➤ Submerged or partially submerged sea caves.</li> </ul>
Coedwigoedd Dyffryn Elwy / Elwy Valley Woods SAC	<ul style="list-style-type: none"> <li>➤ <i>Tilio-Acerion</i> forests of slopes, scree and ravines.</li> </ul>

SITE	DESIGNATED FEATURE(S)
Liverpool Bay / Bae Lerpwl SPA	<p>🌿 Breeding:</p> <ul style="list-style-type: none"> <li>▪ Little tern; and</li> <li>▪ Common tern.</li> </ul> <p>🌿 Non-breeding:</p> <ul style="list-style-type: none"> <li>▪ Red-throated diver;</li> <li>▪ Little gull; and</li> <li>▪ Common scoter.</li> </ul> <p>🌿 Waterbird assemblage.</p>

## 6.3 Marine waterbodies scoping

123 Table 9 details the scoping assessment for the identified coastal and transitional WFD waterbodies, whilst Table 12 provides a summary of the results of scoping for consideration in the impact assessment. The scoping assessment has been undertaken on the basis of no additional measures (i.e., excluding those which are inherent or embedded into the project) being applied.



Table 9: Scoping assessment of marine (coastal and transitional) WFD waterbodies.

CONSIDERATION OF THE ACTIVITIES	KEY RISK ISSUES AND JUSTIFICATION	SCOPED INTO ASSESSMENT?
Hydromorphology		
Could impact on the Hydromorphology (for example morphology or tidal patterns) of a waterbody at high status	The proposed activities will not impact the hydromorphology of a High status waterbody. The North Wales coastal waterbody has not been assessed in the latest (2021) classifications and the Clwyd transitional waterbody is currently (2021) 'not high' for hydromorphology (Hydrological Regime).	No – Impact assessment not required
Could significantly impact the Hydromorphology of any waterbody	Physical structures associated with the AyM project that have the potential to influence the hydromorphology of the North Wales coastal waterbody include rock berms and mattresses. These structures may be deployed to provide additional protection to the export cable beyond that afforded by its burial alone.  No pathway to alter the hydromorphology of the Clwyd transitional waterbody has been identified due to proposed project design (i.e., trenchless cable installation).	Yes
Waterbody is heavily modified for the same	Both the North Wales coastal and Clwyd transitional waterbodies are classed as heavily modified for 'coast protection use'. Based on the proposed project design (i.e., trenchless cable installation), the	Yes

CONSIDERATION OF THE ACTIVITIES	KEY RISK ISSUES AND JUSTIFICATION	SCOPED INTO ASSESSMENT?
use as the proposed activity	hydromorphological designation of the Clwyd transitional water body will not be altered. However, the proposed development activities should be considered as a new modification to the North Wales coastal water body as these are not covered by the existing hydromorphological designation (i.e., for coast protection use). Mitigation measures for the North Wales coastal water body need to be taken into account to ensure that the project does not compromise the improvement of the waterbody.	
Biology - habitats		
0.5 km <sup>2</sup> or greater	<p>The footprint of the works within the North Wales coastal waterbody, including a factor of 1.5 times the footprint in terms of dredging is, approximately, 0.19 km<sup>2</sup> and is therefore below the 0.5 km<sup>2</sup> threshold.</p> <p>No direct interaction with the biological habitats in the Clwyd transitional waterbody will occur due to the trenchless techniques proposed by the Applicant.</p>	No – Impact assessment not required
1% or more of the waterbody's area	The footprint of the works, including a factor of 1.5 times the footprint of the dredged area, totals, approximately, 0.13% of the North Wales coastal waterbody area and therefore falls below the 1% threshold.	No – Impact assessment not required

CONSIDERATION OF THE ACTIVITIES	KEY RISK ISSUES AND JUSTIFICATION	SCOPED INTO ASSESSMENT?
	No direct interaction with the biological habitats in the Clwyd transitional waterbody will occur due to the trenchless techniques proposed by the Applicant.	
Within 500 m of any higher sensitivity habitat	Based on available data from MAGIC interactive map, the proposed development (offshore ECC) is not within 500 m of any Higher Sensitivity habitats for the North Wales coastal body. However, it is noted that subtidal surveys of the offshore ECC observed the honeycomb reef worm <i>Sabellaria alveolata</i> (polychaete reef) encrusting an upper shore boulder, as well as between the boulders at the base of an outflow pipe. In addition, mussel beds were observed in the vicinity of the offshore ECC. The proposed development (onshore ECC) is also within 500 m of saltmarsh habitats in the Clwyd transitional waterbody (see Figure 9).	Yes
1% or more of any lower sensitivity habitat	The footprint of the works within the North Wales coastal waterbody, including a factor of 1.5 times the footprint in terms of dredging is, approximately, 0.19 km <sup>2</sup> , while no direct interaction with the biological habitats in the Clwyd transitional waterbody will occur due to the trenchless techniques proposed by the Applicant. However, a consideration of lower sensitivity habitats is proposed to be included in the impact assessment due to proximity to intertidal and subtidal soft sediment (mudflats).	Yes

CONSIDERATION OF THE ACTIVITIES	KEY RISK ISSUES AND JUSTIFICATION	SCOPED INTO ASSESSMENT?
Biology – fish and eels		
Is in an estuary and could affect fish in the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary	The Clwyd is an estuary and could affect fish through the generation of noise associated with trenchless techniques.	Yes
Could impact on sensitive species and normal fish behaviour and movement/ migration/ spawning or impact on species composition/ abundance/ population age structure	<p>The generation of noise and vibration has the potential to impact on fish receptors in the Clwyd transitional waterbody.</p> <p>The proposed activities for AyM will not cause a physical barrier to prevent fish from entering the estuaries or their migration patterns.</p> <p>The presence of the export cable buried in the seabed will not affect current speeds and will, as a worst-case, result in a minor reduction in terms of total water depth at cable crossings if required in the North Wales coastal waterbody. Therefore, changes to water depth and changes in currents (both tidal and non-tidal) are not considered to impact on normal fish behaviour, such as, movement, migration or spawning.</p>	Yes – noise for trenchless crossings only

CONSIDERATION OF THE ACTIVITIES	KEY RISK ISSUES AND JUSTIFICATION	SCOPED INTO ASSESSMENT?
	<p>There will not be any outfalls or discharges associated with AyM and so the proposed activities are not expected to cause a reduction in the dissolved oxygen in the water column. Therefore, the potential for chemical changes and its implication on fish species will not be taken forward as a consideration of the impact assessment.</p> <p>The resuspension of sediments into the water column would result in a short-term increase in suspended sediment concentration (SSC) as a result of construction activities, such as sandwave clearance and export cable installation within the North Wales coastal waterbody. However, this is unlikely to result in impacts to normal fish behaviour and movement, with any reduction in dissolved oxygen concentrations being small scale, highly localised and transient (short-term, temporary).</p>	
Could cause entrainment or impingement of fish, resulting in injury or death	No entrainment or impingement will occur as a result of AyM.	No – Impact assessment not required
Water quality		

CONSIDERATION OF THE ACTIVITIES	KEY RISK ISSUES AND JUSTIFICATION	SCOPED INTO ASSESSMENT?
<p>Could affect water clarity, temperature, salinity, oxygen levels nutrients or microbial patterns</p>	<p>It is not anticipated that temperature or salinity would be affected as a result of export cable installation activities and, therefore, these parameters have not been taken forward to the impact assessment.</p> <p>The resuspension of sediments into the water column would result in a short-term increase in SSC as a result of construction activities, such as sandwave clearance and cable installation. The methods used for installation would affect the amount of sediment displaced, but it is considered that the impacts will be localised, short lived and high levels of SSC would not disperse to a significant level outside the footprint of the activities. However, given that the landfall is within the North Wales coastal waterbody and transects Rhyl Bathing Water Sensitive Area, the potential for decreased clarity and changes in microbial patterns are proposed to be scoped in for further consideration. This includes the potential release of bentonite, used to support HDD (or other trenchless technique) activities, which can also contribute to reduced water clarity.</p> <p>No pathway to alter the water quality of the Clwyd transitional waterbody has been identified due to proposed project design (i.e., trenchless cable installation). Similarly, based on embedded mitigation measures and best practice method proposed for use along the onshore ECC for the onshore cable installation, it is</p>	<p>Yes – clarity &amp; microbiological patterns (North Wales coastal waterbody only)</p>

CONSIDERATION OF THE ACTIVITIES	KEY RISK ISSUES AND JUSTIFICATION	SCOPED INTO ASSESSMENT?
	considered unlikely that sediment/contaminants from the Clwyd transitional waterbody, WFD riverine waterbodies or non-reportable watercourses will be transported downstream towards the North Wales coastal waterbody. Therefore, the only considerations included as part of the water quality assessment relate to the offshore ECC (marine activities).	
Is in a waterbody with a phytoplankton status of moderate, poor or bad	The North Wales coastal waterbody is currently (2021) classified as being of moderate phytoplankton status and, therefore, will be taken forward for the impact assessment. Phytoplankton status is not recorded for the Clwyd transitional waterbody.	Yes – North Wales coastal waterbody only
Release or use of chemicals which are on the EQSD list	The proposed activities do not include the direct discharge of any chemicals listed under the EQSD list. The only substance which may be released into the environment from AyM would be bentonite from HDD (or other trenchless technique) at the landfall export cable installation. Bentonite is a non-toxic, inert, natural clay mineral (<63 µm particle diameter) and is not included on the EQSD list. It is included in the List of Notified Chemicals approved for use and discharge into the marine environment and is classified as a group E substance under the Offshore Chemical Notification Scheme (OCNS). Substances in group E are defined as the group least likely to cause environmental harm and are “readily biodegradable and	Yes – Accident spills and pollution events only



CONSIDERATION OF THE ACTIVITIES	KEY RISK ISSUES AND JUSTIFICATION	SCOPED INTO ASSESSMENT?
	<p>is non-bioaccumulative". This is further supported by bentonite being included on the OSPAR List of Substances Used and Discharged Offshore which Are Considered to Pose Little or No Risk to the Environment (PLONOR) (OSPAR Commission, 2021). Therefore, no deterioration of the status of any sites designated under the Directive is anticipated from the release of bentonite.</p> <p>While bentonite is the only substance which may be released as part of planned works for AyM, there is the potential for accidental spills and pollution events of other substances (e.g., fuel oil). Therefore, in line with the NRW Scoping Opinion, the Applicant agrees to scope in the potential for accident spills and pollution events for further assessment.</p>	
Disturbance of sediment with contaminants above Cefas Action Level 1	<p>The project specific surveys confirmed that the composition and grain size present within the offshore ECC, within the North Wales coastal waterbody, is predominantly sand with limited gravel fractions. Based on the project specific surveys, all metals were below Cefas Guideline Action Level 1 within the sampling station in the North Wales coastal waterbody (and all other stations sampled in the offshore ECC). In addition, all the 2 to 6 ring polycyclic aromatic hydrocarbon (PAH) concentrations were below their respective effects range low (ERL) values. Therefore, it is considered</p>	No – Impact assessment not required

CONSIDERATION OF THE ACTIVITIES	KEY RISK ISSUES AND JUSTIFICATION	SCOPED INTO ASSESSMENT?
	<p>unlikely that any sediments disturbed in the North Wales coastal waterbody would have contamination levels greater than Cefas Guideline Action Level 1.</p> <p>Based on the proposed project design (i.e., trenchless cable installation), no sediments are proposed to be disturbed in the Clwyd transitional waterbody.</p>	
If your activity has a mixing zone (like a discharge pipeline or outfall) consider if the chemicals released are on the EQSD list.	The proposed development does not have a discharge pipe or outfall, nor does the project intend to release substances on the EQSD list. Therefore, the project will not have a mixing zone for these chemicals.	Not applicable
WFD Protected Areas		
Any WFD protected area within the Zol?	<p>The following WFD protected areas have been identified within the offshore Zol:</p> <ul style="list-style-type: none"> <li>▲ National Site Network sites: <ul style="list-style-type: none"> <li>▪ Dee Estuary/ Aber Dyfrdwy SAC;</li> <li>▪ Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC; and</li> </ul> </li> </ul>	Yes

CONSIDERATION OF THE ACTIVITIES	KEY RISK ISSUES AND JUSTIFICATION	SCOPED INTO ASSESSMENT?
	<ul style="list-style-type: none"> <li>▪ Liverpool Bay / Bae Lerpwl (Wales) SPA.</li> <li>▲ Bathing Waters: <ul style="list-style-type: none"> <li>▪ Abergele (Pensarn);</li> <li>▪ Kinmel Bay (Sandy Cove);</li> <li>▪ Rhyl;</li> <li>▪ Rhyl East;</li> <li>▪ Marine Lake, Rhyl; and</li> <li>▪ Prestatyn</li> </ul> </li> <li>▲ Sensitive Areas (under the Urban Waste Water Treatment Directive): <ul style="list-style-type: none"> <li>▪ Rhyl Bathing Water.</li> </ul> </li> </ul>	
INNS		
Potential to introduce or spread INNS	<p>For the INNS considered in the North Wales coastal water body, it was concluded for all species assessed to either be “Not at risk” or “Probably not at risk”. However, further consideration of the potential INNS present and a risk within the Irish Sea will be provided in the detailed impact assessment.</p> <p>It is likely that any man-made structures placed on the seabed will be colonised by a range of marine species. These structures have the potential to act as artificial reefs and may also facilitate the</p>	Yes – North Wales coastal waterbody only

CONSIDERATION OF THE ACTIVITIES	KEY RISK ISSUES AND JUSTIFICATION	SCOPED INTO ASSESSMENT?
	<p>spread of non-native species if these species are already present (i.e. they will not act as a vector for INNS in and of themselves). The vast majority of these structures will be located within the AyM Array and so are not relevant to this WFD compliance assessment. However, cable protection may be installed within the North Wales coastal waterbody. If required, it is likely to be limited to small areas of the offshore ECC.</p> <p>Both construction and O&amp;M vessels have the potential to introduce or spread INNS through the discharge of ballast water within the North Wales coastal waterbody. This potential impact will be mitigated through measures such as a marine biosecurity plan, as well as vessels complying with International Maritime Organisation (IMO) ballast water management guidelines, ensuring that risks associated with INNS are minimised. In addition, the materials and vessels are highly likely to be from within European and/ or UK waters. There is currently little evidence from other UK offshore wind developments to suggest adverse effects on key species and habitats from INNS.</p> <p>No pathway to introduce or spread INNS within the Clwyd transitional waterbody has been identified due to proposed project design (i.e., trenchless cable installation).</p>	

## 6.4 Freshwater waterbodies scoping

124 Table 10 details the scoping assessment for the identified freshwater (riverine) WFD waterbodies and non-reportable watercourses, whilst Table 12 provides a summary of the results of scoping for consideration for the water environment in the impact assessment. The scoping assessment has been undertaken on the basis of no additional measures (i.e., excluding those which are inherent or embedded into the project) being applied.

Table 10: Scoping assessment of freshwater (riverine) WFD waterbodies and non-reportable watercourses.

RECEPTOR	RISK ISSUE(S)	SCOPED IN FOR IMPACT ASSESSMENT?
Physical habitat	<p>No alteration to the morphology or the hydromorphology of any of the rivers is anticipated due to the proposed activities. It is proposed that major watercourse crossings will be undertaken using trenchless techniques – see Table 2.</p> <p>The onshore ECC crosses main rivers, ordinary watercourses and drainage ditches along its route. At any watercourse crossing there will be potential for the construction works associated with the crossing to increase fluvial flood risk through altering the existing hydrological regime.</p>	Yes – for non-trenchless crossings of watercourses only
Water quality	<p>There is no intention to knowingly release any chemicals listed in the EQSD into the environment during construction, operation or decommissioning of AyM. Therefore, no source-receptor-pathway has been identified for the deterioration in chemical status from the introduction of Annex 8 or priority (hazardous) substances in WFD riverine water bodies or non-reportable watercourses. However, in line with the NRW Scoping Opinion, the Applicant agrees to scope in the potential for accident spills and pollution events for further assessment.</p> <p>The Applicant has also considered impacts on water quality associated potentially contaminated sediment entering nearby fluvial watercourses or drainage ditches during works.</p>	Yes – accidental spills and pollution events and contaminated sediments

RECEPTOR	RISK ISSUE(S)	SCOPED IN FOR IMPACT ASSESSMENT?
	<p>As detailed in Section 5.4 and Volume 3, Chapter 7: Hydrology and Flood Risk (application ref: 6.3.7), appropriate embedded measures are proposed to store soil to prevent it being leached into watercourses which could result in turbid run-off into the rivers. The outline CoCP (Document 8.13: Outline Code of Construction Practice; application ref: 8.13) also includes measures to control runoff from the construction works. This could include, for example, sediment fences when working in proximity to open watercourses, containment of storage areas and treatment of any runoff from work areas or water from dewatering of trenches. Such measures would prevent the potential reduction in water quality associated with increased sediment loading affecting nearby tidal waters, fluvial watercourses or drainage ditches during cable route construction works, especially during excavations or earthwork activities. Stockpiling of materials (including top soil) during earthworks would be temporary and would only be permitted in designated areas. All designated stockpile areas would be a minimum of 10 m from any open watercourse features. The potential for contaminants contained within the stockpiled materials to be leached into water bodies, resulting in a reduction in the quality of the receiving waters, would be reduced through the implementation of mitigation measures.</p> <p>The outline CoCP includes a flood response plan to ensure that procedures are in place in the event of flooding during the construction phase. Through measures such as the ceasing of works, relocation or securing of materials and evacuation</p>	



RECEPTOR	RISK ISSUE(S)	SCOPED IN FOR IMPACT ASSESSMENT?
	<p>of workforce personnel, the outline CoCP will reduce the likelihood of construction activities resulting in incidents detrimental to water quality occurring in the event of flooding and reduce the magnitude of the impact of any such incidents.</p> <p>No source-receptor-pathways, as a result of the proposed activities, have been identified which would result in a change to the nutrient (or dissolved oxygen levels) in WFD riverine waterbodies or non-reportable watercourses.</p>	
Fish and eels	<p>Trenchless crossings – During the crossing of watercourses using trenchless methods, during the laying of the onshore cables, there is the potential the drilling noise to create a temporary barrier effect.</p> <p>Trenched crossings – For trenched crossings, the potential effect on fish (and other biota) is the potential alteration of habitat associated with changes in hydromorphology and/ or water quality.</p> <p>The main potential effect habitats from water quality would be specifically related to the mobilisation of sediments from cable crossings and short-term soil stockpiling adjacent to the watercourses. This could result in a short-term pulse of sediments downstream, which could in turn harm the habitats of fish, macrophytes and phytobenthos, and invertebrates. As noted above, there are sufficient controls details within the outline CoCP (Document 8.13: Outline Code of Construction Practice; application ref: 8.13) control runoff of sediments from the construction works. As detailed in Document 8.13.1: Outline Construction Method Statement</p>	Yes – noise associated with trenchless crossings only

RECEPTOR	RISK ISSUE(S)	SCOPED IN FOR IMPACT ASSESSMENT?
	(application ref: 8.13.1), mitigation and controls are proposed to minimise erosion of the bed of the watercourses. Therefore, the potential for this effect has been suitably mitigated to ensure that fish (and their habitats) would not be affected by a trenching crossing solution.	
Macrophytes, diatoms and invertebrates	<p>Trenchless crossings – During the crossing of watercourses using trenchless methods, during the laying of the onshore cables, no deterioration in water clarity, dissolved oxygen or nutrients are anticipated as a result of the proposed activities. Therefore, no source-receptor-pathway has been identified which would result in a deterioration of plant life within the rivers.</p> <p>Trenched crossings – For trenched crossings, the potential effect on macrophytes, diatoms and invertebrates is the potential changes in water quality due to mobilisation of sediments from cable crossings and short-term soil stockpiling adjacent to the watercourses. However, as noted above, no deterioration in water clarity, dissolved oxygen or nutrients are anticipated as a result of the proposed activities through the implementation of suitable controls. Details of mitigation are provided within the outline CoCP (Document 8.13: Outline Code of Construction Practice; application ref: 8.13) to control runoff of sediments from the construction works. Therefore, no source-receptor-pathway has been identified which would result in a deterioration of plant life within the rivers.</p>	No – Impact assessment not required

RECEPTOR	RISK ISSUE(S)	SCOPED IN FOR IMPACT ASSESSMENT?
	Consideration of indirect impacts on macrophytes, diatoms and invertebrates as a result of changes in hydromorphology and water quality are provided in Sections 7.2.1 and 7.2.2 respectively.	
Any WFD protected areas within the Zol?	<p>The following WFD protected areas have been identified within the onshore Zol:</p> <ul style="list-style-type: none"> <li>▲ National Site Network sites: <ul style="list-style-type: none"> <li>▪ Coedwigoedd Dyffryn Elwy / Elwy Valley Woods SAC.</li> </ul> </li> <li>▲ NVZs: <ul style="list-style-type: none"> <li>▪ Existing groundwater NVZ; and</li> <li>▪ Existing surface water NVZ.</li> </ul> </li> </ul>	Yes
INNS	<p>During all phases of AyM, there is the potential for the introduction and spread of INNS. However, as presented in Volume 3, Chapter 5: Onshore Biodiversity and Nature Conservation (application ref: 6.3.5), due to the time that will have elapsed since the last project specific surveys and the possibility that INNS could have changed in the intervening period, the results of the pre-construction surveys would inform the need for any mitigation measures. The pre-construction survey would be secured as part of Document 8.3.12: INNS Management Plan (application ref 8.3.12).</p> <p>Stands of INNS, whether existing or identified during pre-construction surveys, will be avoided wherever possible. If avoidance is not possible, a detailed mitigation</p>	No – Impact assessment not required

RECEPTOR	RISK ISSUE(S)	SCOPED IN FOR IMPACT ASSESSMENT?
	<p>plan will be produced and agreed as part of the CEMP to ensure compliance with the relevant legislation. Further mitigation includes the production and adherence to a Biosecurity Plan as discussed in Volume 2, Chapter 5: Benthic Subtidal and Intertidal Ecology (application ref: 6.2.5). Therefore, no significant effects are predicted in respect of invasive non-native species. The introduction and/or spread of INNS is not expected to pose a risk of deterioration of the WFD riverine waterbodies or non-reportable watercourses.</p>	

## 6.5 Groundwater scoping

125 Table 11 details the scoping assessment for the identified groundwater WFD waterbodies, whilst Table 12 provides a summary of the results of scoping for consideration in the impact assessment. The scoping assessment has been undertaken on the basis of no additional measures (i.e., excluding those which are inherent or embedded into the project) being applied.

Table 11: Scoping assessment of groundwater WFD waterbodies.

RECEPTOR	RISK ISSUE(S)	SCOPED IN FOR IMPACT ASSESSMENT?
Will the activities lead to the creation of pathways for ingress of contaminants?	During the construction phase of the project, techniques for cable laying have the potential to create pathways for ingress of contaminants into the Clwyd Permo-Triassic Sandstone groundwater waterbody through cross contamination between shallow and deep aquifers, as well as exposure to pollutants in construction materials. No proposed activities during O&M or the decommissioning phases have been identified which could result in ingress of contaminants.	Yes – construction activities only
Will the activity change groundwater levels, affecting Groundwater Dependent Terrestrial Ecosystems (s) or dependent surface water features?	The small-scale nature of the construction works in relation to the overall size of the Clwyd Permo-Triassic Sandstone groundwater waterbody means there is little potential for impact on groundwater levels. In addition, as noted in Volume 3, Chapter 7: Hydrology, Hydrogeology and Flood Risk (application ref: 6.3.7), there are no hydrologically designated sites within the hydrology, hydrogeology and flood risk study area. Watercourses designated for their ecological interest are identified in Volume 3, Chapter 5: Onshore Biodiversity and Nature Conservation (application ref: 6.3.5).	No – Impact assessment not required

RECEPTOR	RISK ISSUE(S)	SCOPED IN FOR IMPACT ASSESSMENT?
Will the activity lead to saline intrusion?	There is the potential for the use of HDD (or other trenchless technique) at landfall to result in saline intrusion within the Clwyd Permo-Triassic Sandstone groundwater waterbody. However, based on the geology (as presented in Volume 3, Chapter 6: Hydrology, Hydrogeology and Flood Risk; application ref: 6.3.6), the likelihood of a material potential impact is considered to be <i>de minimis</i> as a result of the generally shallow profile of HDD (or other trenchless technique) to be adopted and the risk being localised and small scale.	No – Impact assessment not required
Will the level of proposed groundwater abstraction (dewatering) exceed recharge at a water body scale?	The only extraction will be dewatering from the export cable trench, which is likely to be re-infiltrated to groundwater. Therefore, no impacts on groundwater quantity will occur.	No – Impact assessment not required
Will the activity lead to an additional surface water body that will	No additional surface waterbodies will be created as a result of AyM.	Not applicable



RECEPTOR	RISK ISSUE(S)	SCOPED IN FOR IMPACT ASSESSMENT?
become non-compliant and lead to failure of the Dependent Surface Water test?		
Will the activity result in additional abstraction that will exceed any groundwater body scale headroom between the fully licensed quantity and the limit imposed by the total recharge?	The only abstraction likely to occur will be dewatering from the cable trench, which is likely to be re-infiltrated to the groundwater. Therefore, no impacts on groundwater quantity will occur.	No – Impact assessment not required

## 6.6 Cumulative effects

126 All projects and plans within the AyM ZOI have been assessed for cumulative effects where a source-receptor-pathway can be established. The identified shortlisted projects and plans are presented in Volume 1, Annex 3.1: Cumulative Effects Assessment (application ref: 6.1.3.1) but tailored as part of this WFD compliance assessment to consider cumulative effects at the waterbody scale.

## 6.7 Scoping conclusions

127 The conclusions from the AyM WFD scoping stage are presented in Table 12.

Table 12: WFD scoping conclusions.

WATERBODY/ PROTECTED AREA	RECEPTOR	POTENTIAL RISK TO RECEPTORS?	POTENTIAL IMPACT SCOPED IN
Protected areas			
Bathing Waters: ▲ Abergele (Pensarn); ▲ Kinmel Bay (Sandy Cove); ▲ Rhyl; ▲ Rhyl East; ▲ Marine Lake, Rhyl; and ▲ Prestatyn. Sensitive Areas: ▲ Rhyl Bathing Water. NVZs: ▲ Existing groundwater NVZ; and ▲ Existing surface water NVZ. National Site Network sites: ▲ Dee Estuary/ Aber Dyfrdwy SAC; ▲ Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC;		N/A	Yes

WATERBODY/ PROTECTED AREA	RECEPTOR	POTENTIAL RISK TO RECEPTORS?	POTENTIAL IMPACT SCOPED IN
<ul style="list-style-type: none"> <li>Coedwigoedd Dyffryn Elwy / Elwy Valley Woods SAC; and</li> <li>Liverpool Bay/ Bae Lerpwl (Wales) SPA.</li> </ul>			
Marine			
<ul style="list-style-type: none"> <li>North Wales (coastal); and</li> <li>Clwyd (transitional)</li> </ul>	Hydromorphology	Yes – considered in Table 9	Yes
	Biology – habitats	Yes – considered in Table 9	Yes
	Biology – fish	Yes – considered in Table 9	Yes – noise impacts only
	Water quality	Yes – considered in Table 9	Yes
	INNS	Yes – considered in Table 9	Yes - North Wales coastal waterbody only
Freshwater			
<ul style="list-style-type: none"> <li>Clwyd - tidal limit to Hesbin (river)</li> <li>Pont Robin Cut (Bodelwyddan) (river)</li> <li>Gele (river)</li> <li>Glanfyddion Cut (river)</li> </ul>	Physical habitat	Yes – considered in Table 10	Yes – watercourse crossings only
	Water quality	Yes – considered in Table 10	Yes – accidental spills and

WATERBODY/ PROTECTED AREA	RECEPTOR	POTENTIAL RISK TO RECEPTORS?	POTENTIAL IMPACT SCOPED IN
▲ Elwy - Clwyd to Melai (river)			pollution only
	Fish and eels	Yes – considered in Table 10	Yes – noise for trenchless crossings only
	Macrophytes, diatoms and invertebrates	Yes – considered in Table 10	No
	INNS	Yes – considered in Table 10	No
Groundwater			
▲ Clwyd Permo-Triassic Sandstone (groundwater)	Creation of pathways	Yes – considered in Table 11	Yes – construction activities only
	Groundwater Dependent Terrestrial Ecosystems (s) or dependent surface water features	No – considered in Table 11	No
	Saline intrusion	Yes – considered in Table 11	No

WATERBODY/ PROTECTED AREA	RECEPTOR	POTENTIAL RISK TO RECEPTORS?	POTENTIAL IMPACT SCOPED IN
	Groundwater abstraction (dewatering) exceed recharge	No – considered in Table 11	No
	Non-compliant and lead to failure of the Dependent Surface Water test	No – considered in Table 11	No

# 7 Impact Assessment

## 7.1 Marine elements

### 7.1.1 Hydromorphology

- 128 The AyM offshore ECC transects the North Wales coastal waterbody, whilst the Clwyd transitional waterbody is located further than 2 km from the marine component of the ECC, as illustrated in Figure 4. There are no current intentions to install structures which may alter the hydromorphology of the Clwyd transitional waterbody.
- 129 Physical structures associated with the AyM project that have the potential to influence the hydromorphology of the North Wales coastal waterbody include rock berms and mattresses. These structures may be deployed to provide additional protection to the export cable beyond that afforded by its burial alone. Further detail is provided in Section 5.2 (and Volume 2, Chapter 1: Offshore Project Description; application ref: 6.2.1).
- 130 The installation of any cable protection measures will have the potential to result in a localised blockage of waves, tides and sediment transport. Theoretically, cable protection in shallow water could behave in a similar way to a submerged offshore breakwater, affecting wave transformation processes closer to shore. In turn, this could potentially alter the wave approach to the shore, resulting in wave focussing on coastal areas not presently eroding causing beach lowering. The structures themselves could also locally intercept sediment being transported by wave and tidal driven currents. However, whilst it can reasonably be expected to be the case that there will be some localised change to waves and hydrodynamics immediately within the vicinity of the rock berms/mattresses, the potential for wider morphological change to the beach at the landfall is considered to be limited.
- 131 Specifically, the protection measures for the two export cables which may influence the existing hydromorphology within the North Wales coastal waterbody includes:

- ▲ Buried mattressing at landfall; indicative width of 3 m, length of 6 m and height of 0.3 m;
- ▲ Rock berm within the nearshore: height of 1.4 m, total width of 15.2 m. Rock protection has the highest profile relative to the seabed and therefore has the greatest potential to influence the behaviour of waves, tides and sediment transport in nearshore areas. It should be noted that the Applicant has committed to not using rock berm protection within a distance of 1,000 m from the existing sea defence (the toe of which is approximately at the MHWS mark).

132 An assessment of the potential impacts upon the hydromorphology resulting from the presence of these physical structures is provided in Volume 2, Chapter 2: Marine Geology, Oceanography and Physical Processes (application ref: 6.2.2). Here it was considered that the maximum dimensions of morphological change (seabed lowering) that might result from the maximum temporary reduction in sediment supply are proportionally limited (e.g., a maximum of 0.1 m bed lowering might occur in an area up to 24.3 m downstream of the protection, or up to 0.5 m up to 4.86 m downstream, or 0.05 m up to 48.6 m downstream, etc) and is therefore unlikely to measurably affect the form and function of the seabed locally or regionally.

133 The assessment demonstrated that, for all areas where cable protection is to be used (including where sandwaves are present), it is unlikely that the presence of the cable protection structures will continuously affect the hydromorphology. An initial period of (limited) sediment accumulation is expected around the structures following installation, with associated seabed morphology changes anticipated to be very small. The extent of the cable protection measures does not constitute or cause a continuous blockage along the offshore ECC.



- 134 The exact location of the rock berms and orientation relative to the beach is presently unknown. However, given the route of the offshore ECC, it is probable that the long axis of the rock berms will be orientated generally across the main tidal current axis, but broadly aligned with the direction of waves as they approach the coast. Two berms may theoretically be installed, one for each export cable. whilst it can reasonably be expected to be the case that there will be some localised change to waves and hydrodynamics immediately within the vicinity of the rock berms, the potential for wider morphological change to the beach at the landfall is considered to be limited.
- 135 The (probable) shore-normal orientation of the rock berms could, in theory, temporarily intercept the longshore movement of sediment. However, regular re-working by waves at lower states of the tide is likely to mean that this material would be rapidly re-distributed and could easily pass over the obstacle in suspension. Accordingly, the degree to which the rock berms will physically block the movement of sediment is expected to be very limited.
- 136 The EIA assessment concluded that there would be minor adverse effects upon the hydromorphology resulting from the installation, for export cable protection, of both mattresses at landfall and rock berm in the nearshore (Volume 2, Chapter 2: Marine Geology, Oceanography and Physical Processes; application ref: 6.2.2). In accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 and the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended), this is defined as insignificant. No changes to hydromorphology are anticipated during the O&M phase.

137 The North Wales coastal and Clwyd transitional waterbodies are both designated as HMWBs in relation to coast protection use. Based on the proposed project design (i.e., trenchless cable installation), the hydromorphological designation of the Clwyd transitional water body will not be altered. However, the proposed development activities should be considered as a new modification to the North Wales coastal waterbody as these are not covered by the existing HMWB designation (i.e., for coast protection use). Therefore, existing mitigation measures reported by NRW for the North Wales coastal waterbody need to be taken into account to ensure that the project does not compromise the improvement of the waterbody.

138 Table 13 presents the hydromorphological designation (HMWB) mitigation measures currently in place for the North Wales coastal waterbody and their existing status (it is noted that these mitigation measures are currently under review and status may have change since the latest update in 2019; available from Water Watch Wales). Based on these existing measures, it is considered unlikely that the proposed development would prevent or compromise any of these improvements being achieved. Furthermore, all existing measures are deemed to be 'not currently applicable' and 'not required in this waterbody'. Therefore, there is currently no pathway for the proposed development to impact mitigation measures associated with the HMWB hydromorphological designation of the North Wales coastal waterbody.

Table 13: Existing mitigation measures for the North Wales coastal waterbody.

HEAVILY MODIFIED USE	MEASURE TIER 1	MEASURE TIER 2	MEASURE STATUS
Coast protection use	Habitat creation	48. Indirect mitigation	Not currently applicable - not required in this waterbody
Coast protection use	Operations and maintenance	21. Avoid the need to dredge	Not currently applicable - not required in this waterbody

HEAVILY MODIFIED USE	MEASURE TIER 1	MEASURE TIER 2	MEASURE STATUS
Coast protection use	Operations and maintenance	22. Dredging disposal strategy	Not currently applicable - not required in this waterbody
Coast protection use	Operations and maintenance	23. Reduce impact of dredging	Not currently applicable - not required in this waterbody
Coast protection use	Operations and maintenance	24. Reduce sediment resuspension	Not currently applicable - not required in this waterbody
Coast protection use	Operations and maintenance	25. Retime dredging or disposal	Not currently applicable - not required in this waterbody
Coast protection use	Operations and maintenance	26. Sediment management	Not currently applicable - not required in this waterbody
Coast protection use	Operations and maintenance	27. Dredge disposal site selection	Not currently applicable - not required in this waterbody
Coast protection use	Operations and maintenance	28. Manage disturbance	Not currently applicable - not required in this waterbody
Coast protection use	Operations and maintenance	37. Retain habitats	Not currently applicable - not required in this waterbody
Coast protection use	Structural modification	16. Fish passes	Not currently applicable - not required in this waterbody

HEAVILY MODIFIED USE	MEASURE TIER 1	MEASURE TIER 2	MEASURE STATUS
Coast protection use	Structural modification	19. Enhance ecology	Not currently applicable - not required in this waterbody
Coast protection use	Structural modification	20. Changes to locks etc	Not currently applicable - not required in this waterbody
Coast protection use	Working with physical form and function	13. Realign flood defence	Not currently applicable - not required in this waterbody
Coast protection use	Working with physical form and function	2. Remove obsolete structure	Not currently applicable - not required in this waterbody
Coast protection use	Working with physical form and function	4. Remove or soften hard bank	Not currently applicable - not required in this waterbody
Coast protection use	Working with physical form and function	5. Preserve or restore habitats	Not currently applicable - not required in this waterbody
Coast protection use	Working with physical form and function	6. In-channel morph diversity	Not currently applicable - not required in this waterbody
Coast protection use	Working with physical form and function	7. Bank rehabilitation	Not currently applicable - not required in this waterbody

139 Given the scale and nature of proposed works, it is considered unlikely that O&M activities will result in significant impacts to hydromorphology within the North Wales coastal waterbody. While the scale of potential decommissioning activities is currently unknown, impacts are likely to be no greater than those predicted for construction works (if not less).

- 140 Decommissioning activities may involve the removal of rock protection from shallow sub-tidal areas. If this were to occur, it is not anticipated to result in widespread morphological changes. This is because the presence of the rock is not expected to result in widespread change to the beach in the first instance (assuming cable protection is required), for the reasons set out as part of the construction stage assessment (see above). Similarly, should the export cable system (including scour/ cable protection) require removal at the end of its operational life, it is unlikely to result in significant impacts to hydromorphology. It is anticipated that the working areas for removal will be restricted to the area used for installation; accordingly, any change would be no greater in magnitude than for the construction phase (also see Volume 2, Chapter 2: Marine Geology, Oceanography and Physical Processes; application ref: 6.2.2).
- 141 As such, there is not predicted to be a deterioration in the hydromorphology status of the North Wales coastal waterbody. The proposed development is therefore considered to be compliant with the Directive's requirements and therefore would not result in a deterioration of the current status of the North Wales coastal waterbody.

### 7.1.2 Biological habitats

- 142 The AyM offshore ECC transects the North Wales coastal waterbody, while the Clwyd transitional waterbody is greater than 2 km from the marine component of the ECC (Figure 4). As identified in Figure 9, there are three Higher Sensitivity habitats within the North Wales coastal and Clwyd transitional waterbodies (Mussel beds, polychaete reef (*Sabellaria alveolata*) and Saltmarsh). Project activities are currently planned for greater than 500 m for the Mussel beds. For discrete locations of *Sabellaria alveolata* (as recorded during offshore ECC project surveys) and Saltmarsh, activities are planned within less than 500 m from these habitats in the North Wales coastal and Clwyd transitional waterbodies, respectively. The Lower Sensitivity habitats include Intertidal soft sediment, Subtidal soft sediments and Rocky shore within the North Wales coastal waterbody. Whilst the Clwyd transitional waterbody features the Intertidal soft sediment habitat, there is no direct interaction currently planned between project activities and this feature or the higher sensitivity saltmarsh habitat (due to planned trenchless techniques for this section of the onshore ECC; Figure 9).

- 143 The Clwyd transitional waterbody is currently (2021) at good status for the biological quality element 'Angiosperm', with the saltmarsh sub-feature classified as good; however, this ecological parameter is not reported for the North Wales coastal waterbody.
- 144 Works associated with export cable installation within the North Wales coastal waterbody includes seabed preparation (sandwave clearance), cable installation into the seabed and the use of HDD (or other trenchless technique) at the landfall. O&M activities may also occur and allow for the re-burial of 1 km of subsea cable every five years. Further details are provided in Section 5 (and Volume 2, Chapter 1: Offshore Project Description; application ref: 6.2.1). Potential impacts to biological habitats include direct disturbance, damage or loss, as well as indirect effects from the increase in SSCs (e.g., smothering).
- 145 As identified in Section 6, the activities associated with export cable installation may result in the temporary habitat loss/ disturbance of up to 0.19 km<sup>2</sup> within the North Wales coastal waterbody during the construction phase. This is equivalent to 0.13% of the total area of the North Wales coastal waterbody. With respect to activities within the operation phase, 0.518 km<sup>2</sup> of temporary habitat disturbance is predicted to arise over AyM's 25-year design life (Volume 2, Chapter 5: Benthic Subtidal and Intertidal Ecology; application ref: 6.2.5). Though unlikely, should the entirety of these activities occur within the North Wales coastal waterbody boundaries, this would equate to 0.35% of the total area of the North Wales coastal waterbody.
- 146 A characterisation of the benthic and subtidal habitats which may be directly or indirectly impacted by AyM is provided in Volume 2, Chapter 5: Benthic Subtidal and Intertidal Ecology (application ref: 6.2.5). With respect to installation activities, given the limited spatial and temporal extent of the works, it has been concluded that both faunal and floral population re-colonisation and recovery will occur from recovering and/ or un-impacted communities in adjacent habitats.
- 147 The EIA assessment concluded that there would be no adverse significant effects on benthic receptors from habitat disturbance due to activities associated with the proposed development.

- 148 The subtidal benthic habitats identified within the AyM red line boundary and wider region, thus including the North Wales coastal and Clwyd transitional waterbodies, have been demonstrated to be both common and widespread (Volume 2, Chapter 5: Benthic Subtidal and Intertidal Ecology; application ref: 6.2.5). With respect to the higher sensitivity habitats mussel beds and polychaete reef (*Sabellaria alveolata*), the discrete areas present, including those identified during the project offshore ECC surveys, are considered sufficiently spatially remote from AyM activities to remain undisturbed and complete. Further, their exposure to naturally high sediment movement, for example during storms, infers an adaption to increased SSC, turbidity and deposition events of a level comparable to those experienced during cable installation works.
- 149 The sensitivity of all biotopes that are known to characterise the study area and that have been assessed within the EIA have been assessed according to the detailed MarESA sensitivity assessments (Volume 2, Chapter 5: Benthic Subtidal and Intertidal Ecology; application ref: 6.2.5). This assessment determined that all biotopes have a low to medium/moderate sensitivity to a disturbance likely to result from the AyM installation/ decommissioning and O&M activities. None of the biotopes are considered geographically restricted. As detailed within the baseline characterisation, comparable habitats are distributed within the wider region and Irish Sea. Therefore, given the relatively small spatial scales for the total temporary habitat disturbance outlined above, this loss is not expected to undermine regional ecosystem functions or diminish biodiversity.
- 150 The impact upon benthic habitats is predicted to be of local spatial extent (i.e., restricted to discrete areas within AyM), short temporal duration (as it is limited to the period of construction, O&M and decommissioning activities), intermittent and with high reversibility.
- 151 As such, there is not predicted to be a deterioration in the ecological status of the North Wales coastal or Clwyd transitional waterbodies. The proposed development is therefore considered to be compliant with the Directive's requirements and therefore would not result in a deterioration of the current status of the North Wales coastal and Clwyd transitional waterbodies.



### 7.1.3 Fish ecology

- 152 Fish receptors within the North Wales coastal and Clwyd transitional waterbodies have the potential to be affected by the generation of noise and vibration resulting from AyM project activities. The presence of different fish and eel receptors are presented within Volume 2, Chapter 6: Fish and Shellfish Ecology (application ref: 6.2.6).
- 153 Project activities which are likely to generate underwater noise are those associated with general seabed clearance, installation and vessel operations, foundation installation, cofferdam installation, HDD (or other trenchless technique) operations and UXO specific seabed clearance. A full and detailed assessment of these activities upon fish receptors is provided in Volume 2, Chapter 6: Fish and Shellfish Ecology (application ref: 6.2.6).
- 154 For the majority of fish species (excluding migratory species) identified as at risk from impacts from AyM in the area, the nearshore area which will be ensonified as a result of piling from the cofferdam installation is of limited importance. Significant alternative habitat is available within the study area for spawning and or nursery and feeding (see Volume 2, Chapter 6: Fish and Shellfish Ecology for further details; application ref: 6.2.6). Therefore, displacement from this area will be extremely small scale and short-term (i.e., maximum of eight hours of piling within a 24-hour period and installation occurring over a short period of time (days)).
- 155 For migratory species, only salmon use the inshore region around the cofferdam location as part of the migration route, with the other species (sea lamprey (*Petromyzon marinus*) and sea trout (*Salmo trutta*)) having a more oceanic migration route (as detailed within Volume 4, Annex 6.1: Fish and Shellfish Technical Baseline; application ref: 6.4.6.1). Of note is that river lamprey tend not to leave the estuary mouth for their natal river and so are unlikely to be in the vicinity of the works. The offshore ECC is greater than 2.5 km from any river mouth and any behavioural effects from the relatively quiet, rapidly attenuating sound source (due to the shallow waters) and short-term installation period are unlikely to result in any significant behavioural reactions at this distance.

156 Atlantic Salmon (*Salmo salar*) on migration are thought to generally follow the coast and are therefore likely to occur within coastal waters rather than passing directly through the AyM site. Whilst the cofferdam works could be along the migration route for the salmon following the coast from the west of the Dee Estuary, the associated piling will be short-term (days) and intermittent during the eight-hour (maximum) installation period. As such, a few days of noise within a localised area, which a highly mobile species such as Atlantic salmon is capable of swimming around or may even continue to migrate through due to the strength of the biological driver to migrate overriding any avoidance reaction (see Volume 2, Chapter 6: Fish and Shellfish Ecology for further details; application ref: 6.2.6).

157 The EIA assessment (Volume 2, Chapter 6: Fish and Shellfish Ecology; application ref: 6.2.6) included an investigation into whether the proposed project activities could impact upon the following aspects:

- ▲ normal fish behaviour, including movement, migration and spawning;
- ▲ species composition and abundance;
- ▲ sensitive species;
- ▲ population dynamics, specifically age and population structure; and
- ▲ occurrence of mechanical injury and/ or death.

158 The sensitivity of the fish receptors to noise producing activities have been classified in accordance with the associated hearing categories. Fish receptors of relevance to AyM include Group 1 (least sensitive), Group 2 and Group 3 (most sensitive). Those fish receptors of relevance to AyM are provided in Table 14.

Table 14: Hearing categories of fish receptors.

CATEGORY	FISH RECEPTORS RELEVANT TO AYM
Group 1 (least sensitive)	Sandeel, sole, dab, plaice, mackerel, elasmobranchs, river and sea lamprey
Group 2	Atlantic salmon, sea trout

CATEGORY	FISH RECEPTORS RELEVANT TO AYM
Group 3 (most sensitive)	Herring, sprat, cod, ling*, hake*, whiting, European eel*, allis and twaite shad, smelt*

\* denotes uncertainty or lack of current knowledge with regard to the potential role of the swim bladder in hearing.

159 The EIA assessment concluded that there would be no adverse significant effects upon fish receptors within the study area throughout the construction, O&M and decommissioning phases of the project. Given the scale and nature of proposed works, it is considered unlikely that O&M activities will result in significant impacts to fish within the North Wales coastal waterbody. While the scale of potential decommissioning activities is currently unknown, impacts are likely to be no greater than those predicted for construction works (if not less).

160 There is not predicted to be a deterioration in the ecological status of the Clwyd transitional waterbody with respect to fish species (the biological parameter 'fish' is not reported for coastal waterbodies under the Directive; i.e., the North Wales coastal waterbody). The proposed development is therefore considered to be compliant with the Directive's requirements and would not result in a deterioration of the current status of the Clwyd transitional waterbody (it is noted that the biological parameter 'fish' has not been assessed/ reported for the Clwyd transitional waterbody as part of the latest WFD classifications in 2021).

#### 7.1.4 Water Quality

161 The AyM offshore ECC intersects the North Wales coastal waterbody (Figure 4) and, therefore, a requirement exists to consider the potential for a deterioration in water quality (though an increase in suspended sediments, nutrients, oxygen or bacterial concentrations) within this waterbody. Specifically, this includes the potential to detrimentally effect the North Wales coastal waterbody moderate status for phytoplankton.

162 Additionally, a consideration is also afforded for a reduction in water quality at the following Bathing Waters within in the AyM Zol:

- ▲ Abergele (Pensarn);
- ▲ Kinmel Bay (Sandy Cove);

- ▲ Rhyl;
- ▲ Rhyl East;
- ▲ Marine Lake, Rhyl; and
- ▲ Prestatyn.

- 163 Classification details for these Bathing Waters are provided in Table 7, while an assessment of potential impacts to Bathing Waters is provided in Section 7.4.2 (as WFD protected areas).
- 164 Project activities which introduce the potential for a reduction in water quality are typically those which involve seabed disturbance and/ or an increase in SSC (including the potential release of small quantities of bentonite to support HDD, or other trenchless technique). Seabed disturbance may also result in the release of sediment bound contaminants into the water column. Examples of such activities include drilling works and export cable installation, including associated landfill works.
- 165 As described in Volume 2, Chapter 3: Marine Water and Sediment Quality (application ref: 6.2.3), the levels of contamination in sediment samples at AyM is considered to be very low, both within the array and offshore ECC areas. The release of contaminants such as metals and PAHs is likely to be rapidly dispersed with the tidal currents; and increased bioavailability resulting in adverse eco-toxicological effects is not expected. Moreover, given the short-term nature of the works and presence of the sediment plumes, any small uplift in concentrations of EQS substances would be anticipated to return to background levels very quickly. Therefore, it is considered unlikely that the proposed works would contribute to a deterioration in any chemical parameters for the North Wales coastal waterbody.
- 166 An increase in suspended sediments (including bentonite) may consequently result in an increase in bacterial counts within the water column. Bacterial mortality, including of *E. coli* and intestinal enterococci, is strongly influenced by the amount of UV light penetrating the water column. Under reduced UV scenarios, as occurs when SSCs are high, the mortality of bacterium is lower.

- 167 The biological quality element 'Dissolved oxygen' is currently (2021) at high status. Dissolved oxygen levels can also decrease as a reaction to nutrient inputs. When nutrient loading is too high, phytoplankton can bloom and then die. Bacteria and other decomposer organisms then use oxygen to break down the available organic matter. However, no nutrients are anticipated to be released in significant concentrations from the seabed, beyond typical storm conditions. There are no outfalls or discharges associated with the project and so the proposed activities are not expected to cause a reduction in dissolved oxygen in the water column.
- 168 The introduction of nutrients (mainly inorganic nitrogen) to the marine environment can result in phytoplankton blooms under the right conditions. These blooms can produce extremely toxic compounds that have harmful effects on fish, shellfish, mammals, birds and, potentially, humans. While it is predicted that sediments will be mobilised due to activities associated with the proposed development (e.g., sandwave clearance, cable installation, HDD at landfill), it is unlikely that this will result in significant nutrient uplift in the surrounding waters. Such inputs are typically associated with, for example, agricultural use of fertilisers and surface water runoff. The proposed works will largely be completed in open waters (high potential for dispersal/dilution), effects will be temporary and do not involve the planned release of nutrients. Therefore, it is considered unlikely that activities in the marine environment will result in phytoplankton blooms within the North Wales coastal waterbody (or any other connected waterbody).
- 169 It is noted that the biological parameter 'Phytoplankton' is currently (2021) at moderate status for the North Wales coastal waterbody. This suggests that algal biomass is substantially outside of the range associated with type-specific reference conditions and that persistent blooms may occur in summer months. Nevertheless, as noted above, it is considered unlikely that the proposed development will contribute to a significant change in phytoplankton composition and abundance, nor prevent this parameter from meeting future WFD objectives (i.e., to achieve good status).

- 170 There is also the potential for accidental events to result in water quality deterioration, for example through the unplanned release of chemicals and/ or materials during planned project activities. An example of an occurrence of such an event would be the accidental release of grease and oils during maintenance work and from vessels associated with AyM.
- 171 A full assessment of the potential impacts of the proposed project and its activities upon water quality is presented within Volume 2, Chapter 3: Marine Water and Sediment Quality (application ref: 6.2.3), with detail also provided within Volume 2, Chapter 2: Marine Geology, Oceanography and Physical Processes (application ref: 6.2.2). Both assessments conclude that effects are either negligible or minor adverse. As such, the EIA assessment concluded that there would be no adverse significant effects upon marine water and sediment quality, including the phytoplankton status from activities associated with the proposed development.
- 172 Given the scale and nature of proposed works, it is considered unlikely that O&M activities will result in significant impacts to water quality within the North Wales coastal waterbody. While the scale of potential decommissioning activities is currently unknown, impacts are likely to be no greater than those predicted for construction works (if not less).
- 173 There is not predicted to be a deterioration in the water quality of either the North Wales coastal waterbody (nor the six Bathing Waters previously identified within the AyM Zol; see Section 7.4.2). Neither is there an expectation that the moderate phytoplankton status of the North Wales coastal waterbody will be compromised. The proposed development is therefore considered to be compliant with the Directive's requirements and would not result in a deterioration of the current status of these features.

### 7.1.5 Marine Invasive Non-Native Species

- 174 The AyM offshore ECC transects the North Wales coastal waterbody, as shown in Figure 4. Consequently, there exists the potential for the introduction/ spread of marine INNS through the presence of subsea infrastructures and vessel movement in relation to the AyM development.

- 175 The placement of any man-made structures within the North Wales coastal waterbody, such as cable protection, provides an opportunity for colonisation by a range of marine species, some of which may not already be present within the ecosystem. The maximum area of hard substrate which has been considered within the EIA with respect to marine INNS is 1.476 km<sup>2</sup> introduced into the benthic subtidal ecology study area, which equates to 1% of the North Wales coastal waterbody total area.
- 176 Vessel movement throughout the North Wales coastal waterbody also provides the potential for the introduction of marine INNS. For the purposes of the EIA, there is anticipated to be a total of up to 3,391 and 1,207 vessel return trips per annum associated with the AyM development, during construction (assumed the same for decommissioning) and O&M, respectively. While the scale of potential decommissioning activities is currently unknown, impacts are likely to be no greater than those predicted for construction works (if not less).
- 177 The project will follow and adopt relevant best practice guidelines at all stages of the project (construction, O&M and decommissioning) through the implementation of a Biosecurity Plan to minimise the introduction/spread of INNS. Any vessels used for the delivery of materials to site will adhere to industry legislation, codes of conduct and/or best practice to reduce the risk of introduction or spread of invasive non-native species.
- 178 A characterisation of the benthic ecology and biodiversity which may be directly or indirectly impacted by AyM is provided in Volume 2, Chapter 5: Benthic Subtidal and Intertidal Ecology (application ref: 6.2.5). The EIA assessment concluded that there would be no adverse significant effects on benthic receptors from activities associated with the proposed development.
- 179 Considering the existing status of the North Wales coastal waterbody alongside the proposed management of marine INNS, there is not predicted to be a deterioration in the ecological status of this waterbody, with respect to benthic ecology and biodiversity. The proposed development is therefore considered to be compliant with the Directive's requirements and would not result in a deterioration of the current status of the North Wales coastal waterbody.



## 7.2 Freshwater elements

### 7.2.1 Physical habitat

- 180 This section has summarised the information presented in the ES, with further information provided in Volume 3, Chapter 7: Hydrology, Hydrogeology and Flood Risk (application ref: 6.3.7).
- 181 In accordance with Environmental Permitting (England and Wales) Regulations 2016, consent must be sought from NRW to undertake works crossing, or works within 8 m of main rivers or within 16 m if it is a tidal main river. Ordinary watercourse consent will be required from DCC for works crossing any other watercourse. Construction activities would be undertaken in accordance with the conditions of any consent which would be specified to ensure that construction does not result in a non-temporary change in flow rate or water level (i.e., will not result in a deterioration to hydromorphology). The consent could include mitigation measures such as emergency and contingency plans for flooding incidents which may affect the works. The consent could also include the need for a minimum cover depth between the cable and hard bed level of the watercourse being crossed. This WFD compliance assessment and associated ES chapters concludes that at this stage there is no impediment to the relevant permits being secured against the final design.
- 182 During the decommissioning phase, it is considered that the impacts on hydromorphology will be no greater than those assessed for the construction phase. A decommissioning plan (as secured under the DCO) will be agreed which will cover aspects such as best working practices. No impacts are predicted during the O&M phase of the development.

183 Overall, it is predicted that the impact on hydromorphology from construction (and decommissioning) of the onshore ECC (including crossing of watercourses) would be direct and of an intermittent nature and of short duration. The significance of the potential change would, therefore, not result in a deterioration of the current status of hydromorphology for any WFD waterbodies or non-reportable watercourses. As noted in Table 10, no potential indirect impacts on ecological receptors, such as macrophytes, diatoms, invertebrates or fish, have been identified as a result of watercourse crossings.

## 7.2.2 Water quality

184 This section has summarised the information presented in the ES, with further information provided in Volume 3, Chapter 7: Hydrology and Flood Risk (application ref: 6.3.7).

185 As confirmed in Volume 3, Chapter 6: Ground Conditions and Land Use (application ref: 6.3.6), there are no known sources of contamination within the onshore ECC study area, however, on a precautionary basis, there is the potential for limited contamination to exist as a result of previous land uses. Any contamination is likely to be localised in its extent given the sources of contaminants and the characteristics of the underlying geology.

## Construction

### Water quality mitigation measures

186 The mitigation measures discussed in Section 5.4.2 includes the implementation of spill procedures and use of spill kits, as part of Document 8.13: Outline CoCP (application ref: 8.13). These measures together with appropriate drainage systems and containment will minimise the potential for any reduction in water quality associated with spills or leaks of stored oils/ fuels/ chemicals or other polluting substances migrating into nearby waterbodies. Together these measures will reduce the likelihood of construction activities resulting in incidents detrimental to water quality occurring and reduce the magnitude of the impact of any such incidents.

- 187 The implementation of the Document 8.13.6: PPEIRP (application ref: 8.13.6) as part of Document 8.13: Outline CoCP (application ref: 8.13) would control the storage and use of fuels and chemicals within the compound and therefore, reduce the likelihood of contamination occurring.
- 188 Controls will be in place (as detailed in the outline CoCP) to prevent the potential reduction in water quality associated with increased sediment loading (including potentially contaminated sediment) entering nearby fluvial and tidal waters during excavation works or HDD (or other trenchless technique) activities.

### Landfall activities

- 189 The onshore cable would be installed by HDD (or other trenchless technique) under the sea defences and dunes. A temporary construction compound would be established at the HDD working area, which is likely to incorporate a storage area for fuels and chemicals. As a result, there is the potential for contaminants to be released as a result of accidental spillage or inappropriate storage. The mitigation measures discussed at Section 5.4 includes the implementation of spill procedures and use of spill kits. These measures will minimise the potential for any reduction in water quality associated with spills or leaks migrating into fluvial or tidal waters.
- 190 Overall, it is predicted that the any potential impact on water quality from use of HDD (or other trenchless technique) at landfall would be unlikely, direct and of an intermittent nature and of short duration with the identified mitigation measures in place. The significance of the potential change would, therefore, not result in a deterioration of the current status of any WFD waterbodies or non-reportable watercourses. No potential indirect impacts on ecological receptors have been identified as a result of the use of HDD (or other trenchless technique) at the landfall location.

## Trenchless crossings

- 191 Export cables will be installed by HDD (or other trenchless technique), passing beneath the coastal flood defences, A548 Rhyl Coast Road and North Wales Main Line railway. For the HDD crossing which includes the railway, potentially contaminated materials may have been used in the construction of the railway line and from management operations (Volume 3, Chapter 6: Ground Conditions and Land Use; application ref: 6.3.6); however, the potential contaminants are likely to be localised to the railway corridor and therefore, are unlikely to be mobilised as a result of the HDD which will be required to pass a safe distance from the railway to avoid slumping.
- 192 In addition, trenchless crossings will be undertaken beneath Afon Clwyd (Clwyd transitional water body) and a surface water ditch (see Table 2 and Figure 3). For other crossings where HDD (or other trenchless technique) may be used, land use has primarily been agricultural, and no land uses with potential sources of contamination in the vicinity of the works have been identified. Notwithstanding this the potential for localised contaminants as a result of run-off from the adjacent road or work areas should be considered.
- 193 Measures in Document 8.13.6: PPEIRP (application ref: 8.13.6) provided as part of Document 8.13: Outline CoCP (application ref 8.13) will be implemented to avoid accidental spillages and run-off from the HDD (or other trenchless technique) works. The proposed measures would include controls to prevent the potential reduction in water quality associated with spills or leaks of oils, fuels or drilling fluids used during the HDD (or other trenchless technique) works migrating into nearby fluvial watercourses or drainage ditches during construction works.
- 194 Overall, it is predicted that any potential impact on water quality from spills or mobilisation of contaminants from use of trenchless crossings would be direct and of an intermittent nature and of short duration with the identified mitigation measures in place. The significance of the potential change would, therefore, not result in a deterioration of the current status of any WFD waterbodies or non-reportable watercourses. No potential indirect impacts on ecological receptors have been identified as a result of the use of trenchless crossings.

## Trenching of onshore cables

- 195 Where trenching techniques will be used to cross onshore watercourses (see Table 2), it is predicted that the impact on water quality from the onshore ECC trenching works would be localised and of an intermittent nature and of short duration. The magnitude of impact is deemed to be low given the mitigation measures in place (see Section 5.4.2) and that any direct pollution from spills would be small. The significance of the potential change would, therefore, not result in a deterioration of the current chemical status of any WFD waterbodies or non-reportable watercourses. No potential indirect impacts on ecological receptors, such as macrophytes, diatoms invertebrates or fish, have been identified as a result of watercourse crossings.

## Construction of the onshore substation

- 196 The proposed substation site is currently agricultural land. DCC has no record of any potentially contaminative land use on the site (Volume 3, Chapter 6: Ground Conditions and Land Use; application ref: 6.3.6) and therefore, the probability of contamination is considered to be low. NRW has no data to suggest that the substation site has been affected by migration of potential contaminants from the adjacent St Asaph Business Park.
- 197 The magnitude of impact is deemed to be low given the mitigation measures in place (see Section 5.4.2) and that any direct pollution from spills would be small. The significance of the potential change would, therefore, not result in a deterioration of the current chemical status of any WFD waterbodies or non-reportable watercourses. No potential indirect impacts on ecological receptors, such as macrophytes, diatoms invertebrates or fish, have been identified as a result of watercourse crossings.

## O&M

- 198 The OnSS would contain potential pollutants which could include cooling oils, lubricants, fuels, greases, etc. The design, maintenance and operation of the facility would include routine inspection to prevent or contain leaks of any pollutants from the substation, thereby mitigating against the potential for these contaminants to migrate into the local drainage ditch network and/or groundwater and cause a reduction in water quality.
- 199 The HDD drilling (or other trenchless technique) for the onshore ECC would require working areas at either side of each crossing. Following construction, these areas would be restored, with the former land use retained. The only permanent features on the surface of the onshore ECC would be the jointing bays, which would be buried. Therefore, the only risk in terms of water quality would be any access routes required for inspection and maintenance of the joint bays. No additional pathways for accidental spills or pollution from onshore infrastructure during the O&M phase of AyM have been identified.
- 200 Overall, it is predicted that the impact on water quality would be localised and of a temporary nature. The magnitude of impact is deemed to be low given the mitigation measures in place (see Section 5.4.2) and that any direct pollution from spills would be small. The significance of the potential change would, therefore, not result in a deterioration of the current chemical status of any WFD waterbodies or non-reportable watercourses. No potential indirect impacts on ecological receptors, such as macrophytes, diatoms invertebrates or fish, have been identified as a result of O&M at AyM.

## Decommissioning

- 201 For the purposes of the WFD compliance assessment, at the end of the operational lifetime of AyM, it is assumed that the decommissioning sequence will generally be in the reverse of construction. During the decommissioning phase, the potential impacts on water quality are likely to be no greater (if not less) than those assessed for the construction phase.

### 7.2.3 Fish and eels

#### Trenchless crossings

- 202 Measurements of a generic HDD operation have been taken (Parvin *et al.*, 2007) in shallow riverine conditions while drilling was being undertaken directly below the riverbed. Measurements of the HDD operations gave maximum unweighted  $SPL_{RMS}$  of 129.5 dB re 1  $\mu Pa$  on the riverbed due to the minimal transfer of sound between the two mediums. There are a few limitations in using these riverine values, for example, the shallow water conditions result in a more rapid attenuation of sound, however, these measurements were taken directly above the underground drilling with no shipping noise present.
- 203 The sound levels emitted into the water from HDD works are of a low intensity, with all values below those considered within Popper *et al.* (2014) sufficient to result in injurious effects to fish (from continuous noise sources). The shallow water will lead to very rapid attenuation, with sound levels reducing away from the substrate. The intermittent, short-term and temporary nature of the drilling works ensures that there will be no barrier impacts to fish from the HDD works under the river.
- 204 There is not predicted to be a deterioration in the ecological status of any WFD waterbodies or non-reportable watercourses, with respect to fish species. The proposed development is therefore considered to be compliant with the Directive's requirements.

## 7.3 Groundwater elements

### 7.3.1 Creation of pathways

- 205 This section has summarised the information presented in the ES, with further information provided in Volume 3, Chapter 7: Hydrology, Hydrogeology and Flood Risk (application ref: 6.3.7).

#### Landfall

- 206 No potential sources of contamination have been identified from former land uses at landfall and, therefore, the probability of mobilising existing contaminants in the vicinity is considered unlikely.



- 207 The onshore cable is proposed to be installed by HDD (or other trenchless technique) under the sea defences and dunes. A temporary construction compound would be established at the HDD (or other trenchless technique) working area, which is likely to incorporate a storage area for fuels and chemicals. As a result, there is the potential for contaminants to be released as a result of accidental spillage or inappropriate storage and, therefore, potentially affect the underlying groundwater.
- 208 Where groundwater is encountered, it will be sensitive to accidental spillages and runoff from the trenchless crossings works. Measures in Document 8.13.6: PPEIRP (application ref 8.13.6) provided as part of Document 8.13: Outline CoCP (application ref: 8.13) will be implemented to avoid accidental spillages and run-off from the HDD (or other trenchless technique) works. The proposed measures would include controls to prevent the potential reduction in water quality associated with spills or leaks of oils, fuels or drilling fluids used during the HDD (or other trenchless technique) works migrating into nearby fluvial watercourses or drainage ditches during construction works. These measures would limit the magnitude of impact.
- 209 Overall, it is predicted that any potential impact on water quality from the ingress of pollutants from the use of HDD (or other trenchless technique) for the landfall would be unlikely, direct and of an intermittent nature and of short duration with the identified mitigation measures in place. The significance of the potential change would, therefore, not result in a deterioration of the current status of the Clwyd Permo-Triassic Sandstone groundwater waterbody.

## Trenchless crossings

- 210 For the HDD (or other trenchless technique) crossing which includes the railway, potentially contaminated materials may have been used in the construction of the railway line and from management operations. However, the potential contaminants are likely to be localised to the railway corridor and, therefore, are unlikely to be mobilised as a result of the HDD (or other trenchless technique). For other crossings where HDD (or other trenchless technique) may be used, land use has primarily been agricultural, and no land uses with potential contamination sources in the vicinity of the works have been identified. However, the potential for localised contaminants as a result of run-off from the adjacent road or work areas should be considered.
- 211 The superficial deposits are classified as a Secondary Undifferentiated Aquifer of low sensitivity and are up to 25 m thick. Given the depth and heterogeneous nature of these deposits, the major groundwater resource within the Kinnerton Sandstone is unlikely to be directly affected. Shallow perched groundwater may be encountered during HDD (or other trenchless technique) works. Whilst there is the potential for the construction of the cable trench to introduce a pathway for contaminants the permeability of the underlying strata is likely to limit the migration of potential contaminants.
- 212 Where groundwater is encountered, it will be sensitive to accidental spillages and runoff from the trenchless crossings works. Measures in Document 8.13.6: PPEIRP (application ref: 8.13.6) provided as part of Document 8.13: Outline CoCP (application ref: 8.13) will be implemented to avoid accidental spillages and run-off from the trenchless crossings work works (see above). These measures would limit the magnitude of impact.
- 213 Overall, it is predicted that the any potential impact on water quality from the ingress of pollutants from use of trenchless crossings would be unlikely, direct and of an intermittent nature and of short duration with the identified mitigation measures in place. The significance of the potential change would, therefore, not result in a deterioration of the current status of the Clwyd Permo-Triassic Sandstone groundwater waterbody.

## Trenching and substation construction

- 214 Across some areas of the onshore ECC, the underlying superficial deposits are unlikely to contain significant quantities of groundwater, particularly near the surface. As a result, groundwater is unlikely to be encountered during the construction of the cable trenches given their shallow depth (up to 2 m). Similarly, groundwater is not anticipated to be encountered during the construction of the OnSS.
- 215 Any groundwater seepage is likely to be minor and it would be managed in accordance with procedures set out in Document 8.13: Outline CoCP (application ref: 8.13). Given the depth of the superficial deposits, groundwater in the bedrock is unlikely to be affected. Therefore, it is predicted that the any potential impact on water quality from ingress of pollutants from use of trenching will not result in a deterioration of the current status of the Clwyd Permo-Triassic Sandstone groundwater waterbody.

## 7.4 Protected areas

### 7.4.1 National Site Network sites

- 216 This section has summarised the information presented in the ES and HRA process, with further information is provided in Report 5.2: RIAA (application ref: 5.2).
- 217 The identified protected areas have been subjected to the HRA process. Report 5.2: RIAA (application ref: 5.2) applies the conclusions on the potential for a Likely Significant Effect (LSE), as drawn in the Screening Report, with respect to the conservation objectives of the screened in European sites, to determine the potential for an Adverse Effect on Integrity (AEol) for the project alone or in-combination.
- 218 No potential for AEol has been identified within Report 5.2: RIAA (application ref: 5.2) for the National Site Network sites, alone or in-combination, of relevance to this WFD compliance assessment (summarised in Table 15).

219 As presented in Report 5.2: RIAA (application ref: 5.2), Coedwigoedd Dyffryn Elwy/ Elwy Valley Woods SAC (1.8 km distant from the onshore ECC) was screened out for a potential LSE as it was beyond the relevant screening range (0.5 km).

Table 15: Summary of the potential for Adverse Effect from AyM Alone and In-combination for National Site Network.

DESIGNATED SITE	FEATURE(S) ASSESSED	EFFECTS ASSESSED			POTENTIAL FOR ADVERSE EFFECT ALONE AND IN-COMBINATION
		CONSTRUCTION	O&M	DECOMMISSIONING	
Dee Estuary/ Aber Dyfrdwy SAC	<ul style="list-style-type: none"><li>➤ Mudflats and sandflats not covered by seawater at low tide</li><li>➤ <i>Salicornia</i> and other annuals colonizing mud and sand</li><li>➤ Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>)</li><li>➤ Estuaries</li></ul>	<ul style="list-style-type: none"><li>➤ Suspended sediment/ deposition</li><li>➤ Pollution</li><li>➤ Marine INNS</li></ul>	<ul style="list-style-type: none"><li>➤ Suspended sediment/ deposition</li><li>➤ Pollution</li><li>➤ Marine INNS</li><li>➤ EMF</li><li>➤ Changes to physical processes</li></ul>	<ul style="list-style-type: none"><li>➤ Suspended sediment/ deposition</li><li>➤ Pollution</li><li>➤ Marine INNS</li></ul>	No AEol
	<ul style="list-style-type: none"><li>➤ Sea lamprey</li><li>➤ River lamprey</li></ul>	<ul style="list-style-type: none"><li>➤ Underwater noise</li><li>➤ Suspended sediment and deposition</li><li>➤ Pollution</li></ul>	<ul style="list-style-type: none"><li>➤ Pollution</li><li>➤ EMF</li></ul>	<ul style="list-style-type: none"><li>➤ Underwater noise</li><li>➤ Suspended sediment and deposition</li><li>➤ Pollution</li></ul>	No AEol
Y Fenai a Bae Conwy / Menai Strait and Conwy Bay SAC	<ul style="list-style-type: none"><li>➤ Sandbanks which are slightly covered by sea water all the time</li><li>➤ Reefs</li><li>➤ Large shallow inlets and bays</li><li>➤ Submerged or partially submerged sea caves</li></ul>	<ul style="list-style-type: none"><li>➤ Physical habitat loss/ disturbance</li><li>➤ Suspended sediment and deposition</li><li>➤ Pollution</li><li>➤ Marine INNS</li><li>➤ Changes to physical processes</li></ul>	<ul style="list-style-type: none"><li>➤ Physical habitat loss/ disturbance</li><li>➤ Suspended sediment and deposition</li><li>➤ Pollution</li><li>➤ Marine INNS</li><li>➤ EMF</li><li>➤ Changes to physical processes</li></ul>	<ul style="list-style-type: none"><li>➤ Physical habitat loss/ disturbance</li><li>➤ Suspended sediment and deposition</li><li>➤ Pollution</li><li>➤ Marine INNS</li><li>➤ Changes to physical processes</li></ul>	No AEol
	<ul style="list-style-type: none"><li>➤ Mudflats and sandflats not covered by seawater at low tide</li></ul>	<ul style="list-style-type: none"><li>➤ Suspended sediment and deposition</li><li>➤ Pollution</li><li>➤ Marine INNS</li><li>➤ Changes to physical processes</li></ul>	<ul style="list-style-type: none"><li>➤ Suspended sediment and deposition</li><li>➤ Pollution</li><li>➤ Marine INNS</li><li>➤ Changes to physical processes</li></ul>	<ul style="list-style-type: none"><li>➤ Suspended sediment and deposition</li><li>➤ Pollution</li><li>➤ Marine INNS</li><li>➤ Changes to physical processes</li></ul>	No AEol
Liverpool Bay/ Bae Lerpwl SPA	➤ The potential for effect is considered in the context of the designated features, taking account of the role of supporting habitat.				No AEol
	➤ Common scoter (non-breeding)	➤ Direct disturbance and displacement	<ul style="list-style-type: none"><li>➤ Direct disturbance and displacement</li><li>➤ Barrier effect</li></ul>	➤ Direct disturbance and displacement	No AEol

DESIGNATED SITE	FEATURE(S) ASSESSED	EFFECTS ASSESSED			POTENTIAL FOR ADVERSE EFFECT ALONE AND IN-COMBINATION
		CONSTRUCTION	O&M	DECOMMISSIONING	
	⬆ Red-throated diver (non-breeding)				
	⬆ Red-breasted merganser (non-breeding)				
	⬆ Little gull (non-breeding)	⬆ N/A	⬆ Risk of collision	⬆ N/A	No AEol

## 7.4.2 Bathing Waters

220 The following six designated Bathing Waters have been identified within in the AyM Zol:

- ▲ Abergele (Pensarn);
- ▲ Kinmel Bay (Sandy Cove);
- ▲ Rhyl;
- ▲ Rhyl East;
- ▲ Marine Lake, Rhyl; and
- ▲ Prestatyn

221 In addition, the offshore ECC directly overlaps the Rhyl Bathing Water Sensitive Area (designated under the Urban Waste Water Treatment Directive) and, therefore, has been included as part of this assessment.

222 Project activities which introduce the potential for a reduction in water quality at Bathing Waters within the AyM Zol are typically those which involve seabed disturbance and/ or an increase in SSC. Examples of such activities include drilling works and export cable installation, including associated landfall works.

223 Table 7 provides an indication of the distance between these types of works (i.e., landfall, cable installation within the offshore ECC) and the respective monitoring points. The Rhyl (2.8 km) and Rhyl East (2.0 km) Bathing Waters are the nearest to the west of ECC, while Prestatyn (2.7 km) is the only Bathing Water to the east within the AyM Zol. The Rhyl Bathing Water Sensitive Area directly overlaps the offshore EEC.

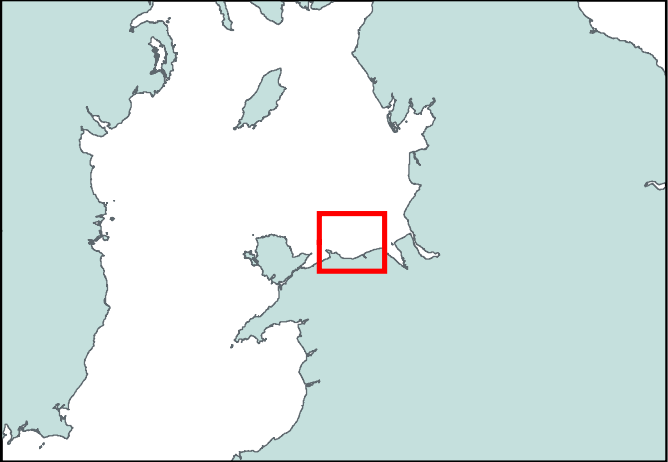
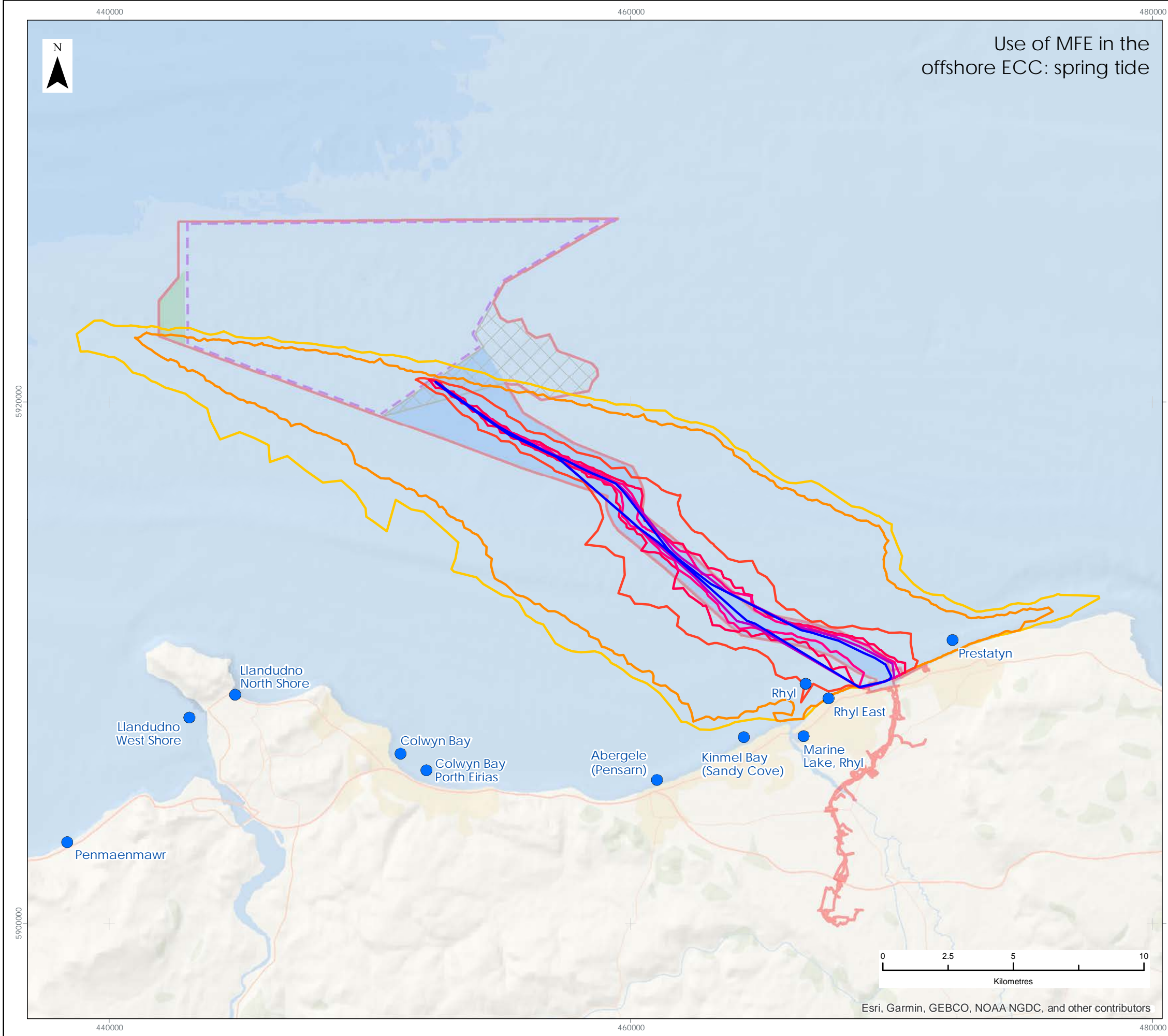


- 224 An increase in suspended sediments may consequently result in an increase in bacterial counts within the water column. Bacterial mortality, including of *E. coli* and intestinal enterococci (used in the classification of Bathing Waters), is strongly influenced by the amount of UV light penetrating the water column. Under reduced UV scenarios, as occurs when SSCs are high, the mortality of bacterium is lower. Therefore, should the bacterium levels be elevated as a result of increased SSCs during the Bathing Water monitoring season (and picked up in water samples), this could influence the reported Bathing Water classification. It is important to recognise that Bathing Water classifications are based on monitoring data from the previous four bathing seasons; therefore, any increases in bacterial abundance, which could arise from increases in SSCs due to activities which disturb seabed sediments (even if relatively short-term), could have a long-term impact on Bathing Water classification well beyond the reported event.
- 225 Figure 10 and Figure 11 present the maximum SSC plume extents anticipated to arise through the use of Mass Flow Excavation (MFE) within the offshore ECC during spring and neap tides, respectively. This activity is considered to present the worst case in terms of potential uplift in SSC. It should be noted that the plume extents shown are not simultaneous (i.e., they do not capture a specific moment in time), and instead present the maximum spatial extent that could be covered by the movement of the plume during typical conditions of a spring or neap tidal cycle. The plume will be expected to move back and forth and disperse with the prevailing tidal currents.
- 226 Monitoring points for the six designated Bathing Water identified within the AyM Zol are also shown in Figure 10 and Figure 11. Increased SSCs due to the use of MFE may be observed at the monitoring points of the nearest Bathing Waters to the offshore ECC, namely Rhyl, Rhyl East and Prestatyn (separate consideration of Marine Lake, Rhyl provided below).

- 227 During spring tides, SSCs could be in the range of 50 to 100 mg/l at Rhyl Bathing Water, while concentrations at Rhyl East and Prestatyn Bathing Waters could be in the range of 5 to 50 mg/l. The maximum spatial extent of SSC plumes during neap tides are likely to be much reduced, with concentrations at Rhyl and Prestatyn Bathing Waters in the range of 1 to 5 mg/l (plume unlikely to reach Rhyl East Bathing Water). Increased SSCs are unlikely to be detectable at the monitoring points for Abergele (Pensarn) and Kinmel Bay (Sandy Cove) Bathing Waters during spring or neap tides. Within the Rhyl Bathing Water Sensitive Area, SSCs could be in the range of 250 to 500 mg/l; however, it is important to note these elevated concentrations would be highly localised to the site of works/ seabed disturbance and short lived as sediments readily disperse.
- 228 While elevated SSCs are predicted at the monitoring points of Rhyl, Rhyl East and Prestatyn Bathing Waters, these changes to water quality will be short-lived, localised and highly transient. The timing of the proposed works is currently unknown and, therefore, could overlap the bathing season during which monitoring is conducted (15<sup>th</sup> May to 30<sup>th</sup> September in Wales). The majority of the plume will be advected in the direction of the ambient tidal currents, which are broadly aligned to the coast. The direction of transport (either to the northeast or southwest) will depend on the state of the tide (flood or ebb) at the time of the release. It is expected that the plume would be dispersed to relatively low concentrations within hours of release and to background concentrations within a few tidal cycles.
- 229 The limited width/ footprint of the plume feature means that specific locations (e.g., a Bathing Water monitoring point) will only be affected by an increase in SSC for the limited duration it takes for the plume to be advected past by the tide. It is recognised that increases in SSC have the potential to result in localised changes to bacterial abundance. However, the SSC plume will be highly transient and, therefore, the potential for changes in bacterial abundance (and thus impacts to Bathing Water classifications) is considered negligible. In addition, the predicted increases in SSC at the monitoring points are relatively modest and likely to be within natural variation, or conditions experienced during storms events.

- 230 Marine Lake, Rhyl Bathing Water is situated adjacent to the Afon Clwyd. The Bathing Water is not directly linked to the sea, but can be topped up during high tide through a sluice connected to the Afon Clwyd. As shown in Figure 10 and Figure 11, elevated SSCs are unlikely to be observed within the Afon Clwyd on either spring or neap tides; therefore, there is limited potential for suspended sediments associated with AyM activities to enter Marine Lake. Any increased SSCs are likely to be less than 5 mg/l (if observed at all) and unlikely to result in material changes to bacterial abundance. Furthermore, the site is topped up (sluice opened) at high water, at which point the plume would be transported downstream (away from the Bathing Water) with the ebb tide.
- 231 Separate to potential changes in bacterial abundance, and thus classifications, 'abnormal situations' can also lead to the closure of designated Bathing Waters (for as long as it takes to clean up the beach from a pollution event). There is the potential for accident spills to result in water quality deterioration, for example through the unplanned release of chemicals and/ or materials during planned project activities. An example of an occurrence of such an event would be the accidental release of grease and oils during maintenance work and from vessels associated with AyM. Bathing Water Sensitive Areas are also identified based on risks of nutrient inputs which could result in adverse conditions (e.g., eutrophication).
- 232 A Project Environment Management Plan (PEMP) will be produced post-consent and implemented to cover the construction and O&M phases of AyM. The PEMP will be secured through a Condition in the Marine Licence. The PEMP will include a Marine Pollution Contingency Plan (MPCP) to provide protocols to cover accidental spills and potential contaminant release, and include key emergency contact details (e.g., NRW, Maritime and Coastguard Agency and the project site co-ordinator). While it is predicted that sediments will be mobilised due to activities associated with the proposed development (e.g., sandwave clearance, cable installation, HDD at landfill), it is unlikely that this will result in significant nutrient uplift in the surrounding waters. Therefore, it is considered unlikely that water quality at nearby Bathing Waters or the Rhyl Bathing Water Sensitive Area will be significantly impacted by the proposed development.

233 Overall, there is not predicted to be a deterioration in the water quality at the six designated Bathing Waters identified within the AyM Zol or Rhyl Bathing Water Sensitive Area. The proposed development is therefore considered to be compliant with the Directive's requirements and would not result in a deterioration of the current status of these protected areas.



LEGEND

- Order Limits
  - Array Area
  - Offshore Export Cable Corridor
  - Other Wind Farm Infrastructure Zone
  - GyM Interlink Zone
  - Bathing Water Designated Beaches
- Suspended Sediment Concentration
- 1 mg/l
  - 5 mg/l
  - 50 mg/l
  - 100 mg/l
  - 150 mg/l
  - 250 mg/l
  - 500 mg/l

Data Source:  
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PROJECT TITLE:

*AWEL Y MÔR OFFSHORE WINDFARM*

FIGURE TITLE: **Modelled SSC plume for use of MFE in relation to designated bathing water beaches**

VER	DATE	REMARKS	Drawn	Checked
1	03/03/2022	For Issue For ES	BPHB	DH

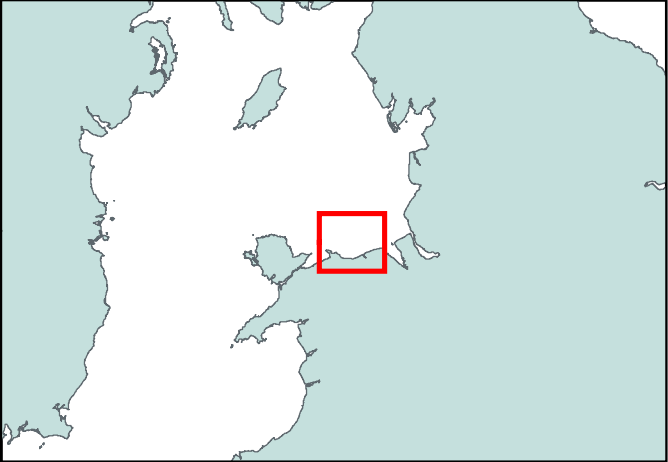
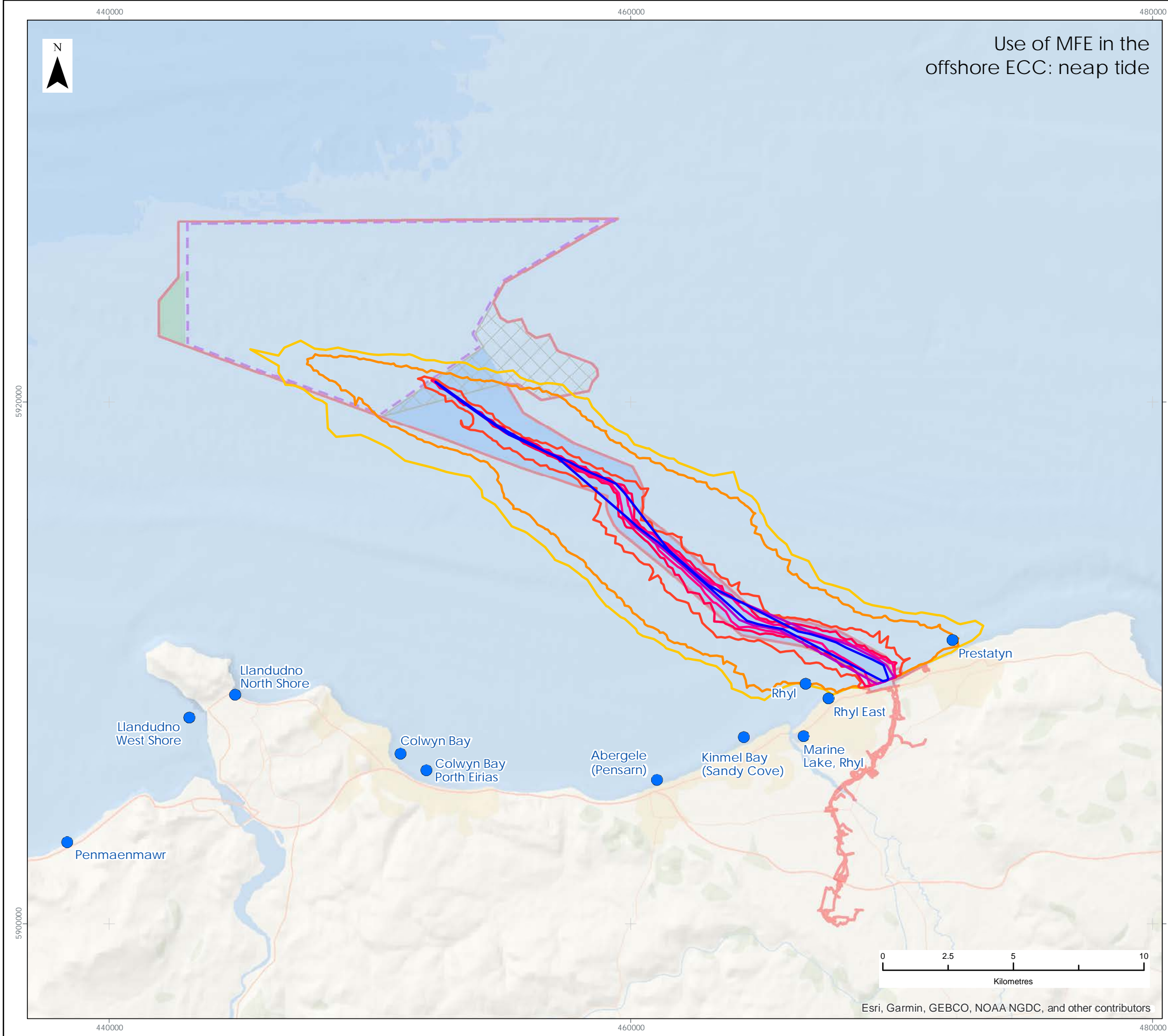
FIGURE NUMBER:

**Figure 10**

SCALE: 1:150,000	PLOT SIZE: A3	DATUM: WGS84	PROJECTION: UTM30N
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Fferm Wynt Alltraeth  
**AWEL Y MÔR**  
Offshore Wind Farm





LEGEND

- Order Limits
- Array Area
- Offshore Export Cable Corridor
- Other Wind Farm Infrastructure Zone
- GyM Interlink Zone
- Bathing Water Designated Beaches
- Suspended Sediment Concentration
  - 1 mg/l
  - 5 mg/l
  - 50 mg/l
  - 100 mg/l
  - 150 mg/l
  - 250 mg/l
  - 500 mg/l

Data Source:  
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PROJECT TITLE:

*AWEL Y MÔR OFFSHORE WINDFARM*

FIGURE TITLE: **Modelled SSC plume for use of MFE in relation to designated bathing water beaches**

VER	DATE	REMARKS	Drawn	Checked
1	03/03/2022	For Issue For ES	BPHB	DH

FIGURE NUMBER:

**Figure 11**

SCALE: 1:150,000	PLOT SIZE: A3	DATUM: WGS84	PROJECTION: UTM30N
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Fferm Wynt Alltraeth  
**AWEL Y MÔR**  
Offshore Wind Farm

### 7.4.3 Nitrate Vulnerable Zones

234 Consideration of the NVZs is provided in in Volume 3, Chapter 7: Hydrology, Hydrogeology and Flood Risk (application ref: 6.3.7) and has been used to inform the sensitivity of the waters. As the proposed development is not introducing additional nitrogen sources into the water environment, no pathway has been identified with could affect NVZs. The proposed development is therefore considered to be compliant with the Directive's requirements and would not result in a deterioration of the current status of these protected areas.

## 7.5 Cumulative effects

235 For each of the scoped in WFD aspects presented within this assessment, cumulative aspects have been considered in alignment with the cumulative effects assessment methodology and long list as described in Volume 1, Annex 3.1: Cumulative Effects Assessment (application ref: 6.1.3.1).

236 It is important to note that the EIA has identified potential projects, plans and activities over large distances from the Array area, offshore ECC, onshore ECC and OnSS. This is to ensure that the potential wider impacts of the proposed development on sensitive receptors are captured, whether at a local, regional, national or international scale. However, this WFD compliance assessment has focussed on potential cumulative effects at the waterbody scale, specifically assessing the same coastal, transitional, riverine and groundwater WFD waterbodies and non-reportable watercourses which have been screened in for AyM alone.

237 The following projects, plans and activities have been identified as relevant to WFD waterbodies screened in to for AyM alone:

- ▲ GyM – O&M activities for offshore export cables;
- ▲ Rhyl Flats offshore wind farm – O&M activities for offshore export cables;
- ▲ North Hoyle offshore wind farm – O&M activities for offshore export cables;
- ▲ Burbo Bank Extension offshore wind farm – O&M activities for offshore export cables;
- ▲ Outfalls along North Wales coastline; and



- ▲ Onshore planning applications.

### 7.5.1 Marine elements

238 Consideration is supported by the following chapters for the potential for cumulative impacts upon the following, scoped in, WFD aspects:

- ▲ Hydromorphology - Volume 2, Chapter 2: Marine Geology, Oceanography and Physical Processes (application ref: 6.2.2);
- ▲ Benthic ecology, including higher/lower sensitivity habitats and marine INNS - Volume 2, Chapter 5: Benthic Subtidal and Intertidal Ecology (application ref: 6.2.5);
- ▲ Fish ecology - Volume 2, Chapter 6: Fish and Shellfish Ecology (application ref: 6.2.6); and
- ▲ Water quality - Volume 2, Chapter 3: Marine Water and Sediment Quality (application ref: 6.2.3).

239 The scale of potential change to hydromorphology within the North Wales coastal and Clwyd transitional waterbodies as a result of AyM is small and localised to areas where cable protection is required. The potential for significant cumulative effects from the proposed development at AyM with other projects, plans and activities, specifically the existing export cables for offshore wind farms in the area, is considered unlikely to result in a deterioration in status of the North Wales coastal or Clwyd transitional waterbodies.

240 Impacts to benthic habitats as a result of the offshore export cable installation for AyM will be localised to the ECC and temporary, except for areas of cable protection. It is noted that trenchless techniques will be used to cross the Clwyd transitional waterbody along the onshore ECC, thus avoiding nearby saltmarsh habitat. The potential for significant cumulative effects from the proposed development at AyM with other projects, plans and activities is considered unlikely to result in a deterioration in status of biological quality elements (such as saltmarsh), or significant impacts to other higher sensitivity habitats (Mussel beds, *Sabellaria alveolata*), in the North Wales coastal or Clwyd transitional waterbodies.

- 241 There is a potential for the introduction and/ or spread of marine INNS as a result of activities associated with the development of AyM. This includes the placement of cable protection, providing new habitat for marine INNS to colonise, and the movement of vessel transporting INNS via ballast water and attached to hulls/equipment. Relevant best practice guidelines will be followed and implemented through the implementation of a Biosecurity Plan (secured as a condition in the Marine Licence) to minimise introduction/ spread of INNS. Any activity in the marine environment could pose a risk in terms of INNS, but it is anticipated that other projects, plans and activities identified above will also adopt similar Biosecurity Plans; therefore, the risk of cumulative effects to the North Wales coastal and Clwyd transitional waterbodies with regards to INNS is considered minimal and unlikely to result in a deterioration in status.
- 242 The biological parameter 'fish' is not reported for coastal waterbodies under the Directive (e.g., the North Wales coastal waterbody). Therefore, potential impacts on fish from the proposed development at AyM are limited to the Clwyd transitional waterbody (albeit, this parameter was also not assessed as part of the latest WFD classifications published in December 2021). No pathway to impact fish within the Clwyd transitional waterbody has been identified due to proposed project design (i.e., trenchless cable installation). Therefore, the potential for significant cumulative effects from the proposed development at AyM with other projects, plans and activities is considered unlikely to result in a deterioration in status of the North Wales coastal or Clwyd transitional waterbodies.

- 243 Project activities which introduce the potential for a reduction in water quality are typically those which involve seabed disturbance and/ or an increase in SSC. The impacts to water quality from the installation of the offshore export cable at AyM will be temporary. This will also be the case for O&M activities associated with other offshore wind farms in the wider area for which existing export cable made landfall along the same stretch of North Wales coastline. This could involve, for example, the requirement to undertake cable repairs and re-burial; however, this is likely to be infrequent and impacts would be much reduced compared to construction. There is also the potential for accidents to occur, releasing chemicals/substances into the marine environment. It is anticipated that other projects, plans and activities identified above will also adopt similar pollution prevention measures to minimise the risk of such impacts. Therefore, the potential for significant cumulative effects to water quality, including physico-chemical, specific pollutant and chemical parameters, from the proposed development at AyM with other projects, plans and activities is considered unlikely to result in the deterioration in status of the North Wales coastal or Clwyd transitional waterbodies.
- 244 The cumulative assessments undertaken for each of the specialisms concluded that potential effects are either negligible, negligible adverse or minor adverse. These effects are considered not significant in EIA terms; however, this WFD compliance assessment has also considered potential impacts at the waterbody scale. The proposed development is considered to be compliant with the Directive's requirements and would not result in a deterioration of the current status of the North Wales coastal waterbody, Clwyd transitional waterbody and WFD protected areas.

## 7.5.2 Freshwater elements

- 245 Volume 3, Chapter 6: Hydrology, Hydrogeology and Flood Risk (application ref: 6.3.6) assesses the potential for cumulative impacts of AyM on hydrology, hydrogeology and flood risk receptors in the onshore study area. Further details of the methodology of this assessment are provided in Volume 1, Annex 3.1: Cumulative Effects Assessment (application ref: 6.1.3.1).

- 246 It is anticipated that other projects of significance along the onshore ECC and in the vicinity of the OnSS would be constructed in accordance with a CoCP and would require an assessment of flood risk. Surface water drainage for any development proposals would also require approval from the sustainable drainage systems Approval Bodies. Given the requirements to control potential detrimental effects of any development on flood risk or water quality, appropriate mitigation would be in place for these schemes to secure approval. Therefore, no significant cumulative hydrology or hydrogeology effects arising during the construction phase of the proposed new developments are likely. Furthermore, it is not expected that AyM would have an impact on any of the measures that other developments within the vicinity of the onshore works would need to incorporate during the construction phase to prevent detrimental hydrology or flood risk effects elsewhere.
- 247 Overall, it is considered that the proposed development is compliant with the Directive's requirements and would not result in a deterioration of the current status of any riverine WFD waterbodies or non-reportable watercourses screened in for AyM alone, or cumulatively with other projects, plans or activities.

## 8 Summary

- 248 This document has been prepared to present the findings of the WFD compliance assessment for the potential impacts of AyM. The purpose of this WFD compliance assessment is to ensure that the proposed activities associated with AyM do not result in a deterioration in a designated water body (or protected area) and do not jeopardise the attainment of good status (or the potential to achieve good ecological and chemical status).
- 249 Table 16 presents the conclusions of this WFD compliance assessment. It has been informed and presents a summary of the information presented in the EIA and HRA assessments presented within the ES. Further information is provided in the related chapters and annexes of the ES.
- 250 Overall, the proposed development at AyM is considered to be compliant with the objectives of the Directive and will not result in the deterioration in status of relevant WFD waterbodies, or associated protected areas, both alone and in-combination with other projects, plans and activities.

Table 16: WFD compliance assessment conclusions.

WATERBODY/ PROTECTED AREA	RECEPTOR	CONCLUSION
<p>Bathing Waters:</p> <ul style="list-style-type: none"> <li>▲ Abergele (Pensarn);</li> <li>▲ Kinmel Bay (Sandy Cove);</li> <li>▲ Rhyl;</li> <li>▲ Rhyl East;</li> <li>▲ Marine Lake, Rhyl; and</li> <li>▲ Prestatyn.</li> </ul>		<p>No deterioration of in the status of the Bathing Waters is predicted.</p>
<p>NVZs:</p> <ul style="list-style-type: none"> <li>▲ Existing groundwater NVZ; and</li> <li>▲ Existing surface water NVZ.</li> </ul>		<p>No deterioration of in the status of the NVZs is predicted.</p>
<p>Sensitive Areas:</p> <ul style="list-style-type: none"> <li>▲ Rhyl Bathing Water.</li> </ul>		<p>No deterioration of in the status of the Bathing Water Sensitive Area is predicted.</p>
<p>National Site Network sites:</p> <ul style="list-style-type: none"> <li>▲ Dee Estuary/ Aber Dyfrdwy SAC;</li> <li>▲ Coedwigoedd Dyffryn Elwy / Elwy Valley Woods SAC;</li> <li>▲ Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC; and</li> <li>▲ Liverpool Bay / Bae Lerpwl SPA.</li> </ul>		<p>No AEoI is predicted from the proposed activities.</p>

WATERBODY/ PROTECTED AREA	RECEPTOR	CONCLUSION
<p>▲ North Wales (coastal); and</p> <p>▲ Clwyd (transitional).</p>	Hydromorphology	No deterioration in the status of the water body element; the proposed activities will not jeopardise the attainment of good status.
	Biology – habitats	No deterioration in the status of the water body element; the proposed activities will not jeopardise the attainment of good status.
	Biology – fish	No deterioration in the status of the water body element; the proposed activities will not jeopardise the attainment of good status.
	Water quality	No deterioration in the status of the water body element; the proposed activities will not jeopardise the attainment of good status.
	INNS	No deterioration in the status of the water body element; the proposed activities will not jeopardise the attainment of good status.



WATERBODY/ PROTECTED AREA	RECEPTOR	CONCLUSION
<ul style="list-style-type: none"> <li>▲ Clwyd - tidal limit to Hesbin (river);</li> <li>▲ Pont Robin Cut (Bodelwyddan) (river);</li> <li>▲ Gele (river);</li> <li>▲ Glanfyddion Cut (river);</li> <li>▲ Elwy - Clwyd to Melai (river); and</li> <li>▲ Non-reportable WFD watercourses.</li> </ul>	Physical habitat	No deterioration in the status of the water body element; the proposed activities will not jeopardise the attainment of good status.
	Water quality	No deterioration in the status of the water body element; the proposed activities will not jeopardise the attainment of good status.
	Fish and eels	No deterioration in the status of the water body element; the proposed activities will not jeopardise the attainment of good status.
	Macrophytes, diatoms and invertebrates	No deterioration in the status of the water body element; the proposed activities will not jeopardise the attainment of good status.
	INNS	No deterioration in the status of the water body element; the proposed activities will not jeopardise the attainment of good status.

WATERBODY/ PROTECTED AREA	RECEPTOR	CONCLUSION
Clwyd Permo-Triassic Sandstone (groundwater)	Creation of pathways	No deterioration in the status of the water body element; the proposed activities will not jeopardise the attainment of good status.
	Groundwater Dependent Terrestrial Ecosystems (s) or dependent surface water features	No deterioration in the status of the water body element; the proposed activities will not jeopardise the attainment of good status.
	Saline intrusion	No deterioration in the status of the water body element; the proposed activities will not jeopardise the attainment of good status.
	Groundwater abstraction (dewatering) exceeding recharge rate	No deterioration in the status of the water body element; the proposed activities will not jeopardise the attainment of good status.

WATERBODY/ PROTECTED AREA	RECEPTOR	CONCLUSION
	Non-compliant and lead to failure of the Dependent Surface Water test	No deterioration in the status of the water body element; the proposed activities will not jeopardise the attainment of good status.

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