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East West Interconnector Cable Remedial Works - Marine Licence Application

Environmental Supporting Information

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Intertek Energy & Water Consultancy Services
Exchange House, Station Road, Liphook, Hampshire GU30 7DW, United Kingdom

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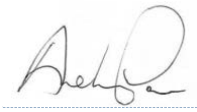
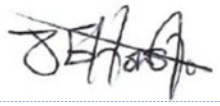
Author/s

Nick Archibald

Project Manager	Authoriser
	
Andy Page	Eric Houston

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GLOSSARY

AIS
Automatic Identification System

BSP
Biosecurity Plan

CIRA
Cable Risk Integrity Assessment

CLV
Cable Lay Vessel

DAERA
Department of Agriculture, Environment and Rural Affairs

DP
Dynamic Positioning

EDR
Effective Deterrent Range

EIA
Environmental Impact Assessment

EMODnet
European Marine Observation and Data Network

EPS
European Protected Species

ESI
Environmental Supporting Information

EUNIS
European Nature Information System

EWIC
East West Interconnector

FCS
Favourable Conservation Status

FLO
Fisheries Liaison Officer

HRA
Habitats Regulations Assessment

HVDC
High Voltage Direct Current

ICES
International Council for the Exploration of the Sea

IMO
International Maritime Organisation

JNCC
Joint Nature Conservation Committee

LAT
Lowest Astronomical Tide

MBES
Multi-Beam Echosounder

MCAA
Marine and Coastal Access Act 2009

MU
Management Unit

NRW
Natural Resources Wales

PTS
Permanent Threshold Shift

RBMP
River Basin Management Plan

ROV
Remote Operated Vehicle

RMS
Root Mean Square

RYA
Royal Yachting Association

SAC
Special Area of Conservation

SEL
Sound Exposure Level

SPA
Special Protection Area

SPL
Sound Pressure Level

SSS
Side Scan Sonar

TTS
Temporary Threshold Shift

WFD
Water Framework Directive

1. INTRODUCTION

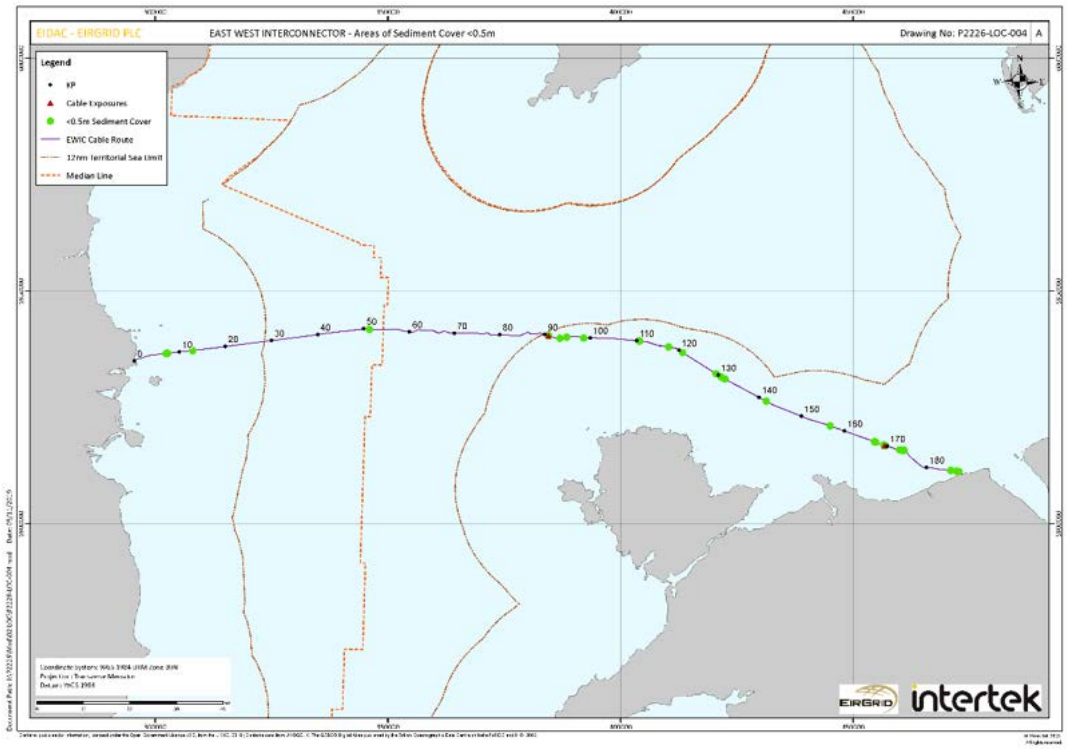
1.1 Purpose of this document

The purpose of this document is to support a Marine Licence application being made under the Marine and Coastal Access Act 2009 by EirGrid Ltd for undertaking remedial works, including placement of cable protection, for the East – West Interconnector (EWIC).

1.2 Overview of the project

EWIC is a 500 MW High Voltage Direct Current (HVDC) electricity interconnector linking the Irish and British electricity markets. Following post-installation inspections, incorporating a marine survey and geophysical condition survey, two cable exposures and several areas of low sediment cover (less than 0.5m) were identified along the EWIC cable route which need remedial works to reinstate the EWIC cable back to a level of acceptable risk. In addition to these areas, Intertek have undertaken a Cable Integrity Risk Assessment (CIRA) of the entire EWIC cable route and have identified the need for remedial works at seven other locations along the EWIC cable route. The remedial works will consist of a combination of reburial of the cable by trenching and where necessary placement of external cable protection in the form of rock berms and concrete mattresses. A detailed project description is provided in Section 2 and an overview of the proposed remedial works areas is provided in Figure 1-1.

Figure 1-1 Overview of the proposed remedial works areas



1.3 Legislative Background

1.3.1 Environmental Impact Assessment

Submarine cables do not require an Environmental Impact Assessment (EIA) to be conducted as they are not listed under Schedule A1 or A2 of The Marine Works (EIA) (Amendment) Regulations 2017 (HM Government, 2017). However, this Environmental Supporting Information (ESI) Report presents an overview of the baseline environment and provides the necessary environmental assessment to support the Marine Licence Application through consideration of the potential impacts of the Proposed Works to the marine environment.

1.3.2 Marine Licencing

The placement of cable protection material (concrete mattresses and/or rock) on the seabed requires a marine licence under Section 66 of the Marine and Coastal Access Act, 2009 (MCAA). A marine licence is required from Natural Resources Wales (NRW) Marine Licensing Team for any activities involving a deposit (or removal) of a material or substance or object using a vehicle or vessel below the mean high-water springs mark or in any tidal river to the extent of the tidal influence.

1.3.3 Water Framework Directive Assessment

Undertaking a Water Framework Directive (WFD) screening assessment provides the regulator with information to understand the impact of the proposed activity on the immediate water body and any linked water bodies. The assessment also determines if the proposed activities would have an effect on Shellfish Water Protected Areas and Bathing Waters through the River Basin Management Plan (RBMP) Structure.

1.3.4 Habitats Regulation Assessment

The Conservation of Habitats and Species Regulations 2017 (CHSR) transpose the requirements of Articles 6(3) and 6(4) of EC Council Directive 92/43/EC on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) into UK statute.

The Habitats Directive and EC Council Directive 2009/147/EC on the conservation of wild birds (Birds Directive) require European Union member states to work together within the same legislative framework to protect Europe's most valuable species and habitats, irrespective of political or administrative boundaries. At the heart of these Directives is the creation of a network of Europe's most valuable species and habitat sites known as Natura 2000.

The aim of the Natura 2000 network is to ensure the long-term survival of European threatened species and habitats. The network comprises SACs designated under the Habitats Directive, and Special Protection Areas (SPAs) designated under the Birds Directive.

UK Government policy (ODPM Circular 06/2005) states that sites designated under the Convention on Wetlands (Ramsar, Iran 1971) known as the "Ramsar Convention" are also included under the definition Natura 2000. The vast majority of Ramsar sites are also classified as SPAs.

Collectively, SPAs, SACs and Ramsar sites are referred to as European sites under UK Regulations. Sites which are in the process of designation (e.g. Sites of Community Importance (SCI), candidate or possible SACs, proposed SPAs) are included in the definition as if fully protected.

A key protection mechanism under these directives is to consider the possible nature conservation implications of any plan or project on the European site network before any decision is made to allow that plan or project to proceed. Each plan considered for approval, must take into consideration the possible effects it may have alone or in combination with other plans and projects when going through the process referred to in the UK as the Habitats Regulation Assessment (HRA) process.

1.3.5 European Portected Species (EPS) Licence

Under the Conservation of Habitats and Species Regulations 2017 and the Conservation of Offshore Marine Habitats and Species Regulations 2017, it is an offence if you:

- Deliberately capture, injure or kill any wild animal of an EPS
- Deliberately disturb wild animals of any such species
- Deliberately take or destroy the eggs of such an animal, or
- Damage or destroy a breeding site or resting place of such an animal

Disturbance includes, but is not limited to, any disturbance which is likely:

- To impair their ability –
  - To survive, to breed or reproduce, or to rear or nurture their young, or
  - In the case of animals of a migratory species, to migrate; or
- To affect significantly the local distribution or abundance of the species to which they belong

NRW issues licences under Regulation 55 of the Conservation of Habitats and Species Regulations 2017 and the Conservation of Offshore Marine Habitats and Species Regulations 2017 to allow work to be undertaken within the law. They are issued for specific purposes stated in the Regulations, if the following three tests are met:

- The purpose of the work meets one of those listed in the Habitats Regulations
- That there is no satisfactory alternative
- That the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status (FCS) in their natural range

The Habitats Regulations permits licences to be issued for a specific set of purposes including:

- Include preserving public health or public safety or other imperative reasons of over-riding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment (including development)
- Scientific and educational purposes
- Ringing or marking
- Conserving wild animals

Further consultation will be undertaken with NRW as to the requirement for an EPS Licence to undertake the proposed remedial works.

1.4 Objectives and scope of the Environmental Supporting Information Report

On the 9th March 2020, EirGrid requested pre-application advice relating to the marine licence application and required documents. As part of initial consultation with NRW Marine Licencing Team it was confirmed that the marine licence application should be supported by an HRA Screening and WFD Assessment. Further to this on the 15th July 2020, EirGrid held a pre-application consultation meeting with NRW Marine Licensing Team to discuss the approach to and level of content to be provided in the ESI Report. This included providing an overview of the proposed remedial works and discussion of the potential impacts and how they should be assessed further in the ESI Report. The objective of the meeting was to determine whether the proposed approach to environmental

assessment was adequate to support the Marine Licence Application and proportionate to the proposed remedial works.

This ESI Report therefore provides an overview of the baseline environment along the existing EWIC cable route including the physical, biological, and human environment and identifies and assesses potential impacts from the proposed remedial works. The ESI Report and marine licence application is supported by a number of additional documents as listed in Table 1-1 and provided in Appendices A to C.

Table 1-1 Supporting documents for the Marine Licence application

Appendix	Document
A	Habitats Regulations Assessment (HRA) Screening
B	Water Framework Directive (WFD) Assessment

2. PROJECT DESCRIPTION

2.1 Requirement for the Works

Post-installation inspections undertaken during 2019, incorporating a marine survey and geophysical condition survey, have identified two cable exposures and several areas of low sediment cover (less than 0.5m depth) along the EWIC cable route which need remedial works to reinstate the EWIC cable back to a level of acceptable risk. Intertek have undertaken a Cable Integrity Risk Assessment (CIRA) of the entire EWIC cable route which identified the need for remedial works at a total of eleven locations along the route. The remedial works may include a combination of reburial of the cable by trenching at all locations and placement of external cable protection in the form of concrete mattresses and/or rock placement at five of the eleven locations. At this stage the exact combination of methods which will be required to protect the cable is not known as this will be informed by burial success achieved by trenching and as such the worst case for each of the methods has been assumed.

2.2 Description of the Works

2.2.1 Vessels

2.2.1.1 Cable lay vessel (CLV)

If reburial and concrete mattress placement is undertaken, then the cable lay vessel (CLV) NKT Victoria (as shown in Figure 2-1 below) is likely to be used. A CLV is a specialist ship designed specifically to carry and handle long lengths of heavy power cables. NKT Victoria is equipped with dynamic positioning (DP) systems, which enable the ship to be held very accurately in position despite the effects of currents and wind. This vessel has been proposed by the contractor NKT and would be suitable to undertake cable reburial and protection by trenching and mattress placement. Prior to mobilising to the work site, the vessel will transit to a port close to the work site for final mobilisation of cable handling crew, client personnel and equipment.

Figure 2-1 NKT Victoria

2.2.1.2 Rock Placement Vessel

Should rock placement be required a specialist vessel would be utilised. Rock placement vessels feature a large hopper to transport the rock, and a mechanism for deployment of the rock on site. The usual mechanisms are:

- Side dumping, whereby the rock is pushed or tipped over the side of the vessel;
- Split hopper, the halves of which separate to allow the rock to fall through the vessel; and
- Flexible fall pipe, where a retractable chute is used to control the flow of rock to the seabed.

Fall-pipe vessels (Figure 2-2) provide the greatest accuracy as Remote Operated Vehicles (ROVs) can be used to monitor the position of the fall pipe, allowing rock to be more accurately placed, but can only be used in water depths greater than 10m. For rock placement works it is envisaged that a fall-pipe vessel would be utilised.

Figure 2-2 Illustrative construction support vessels

Clockwise from left: Fall pipe vessel, construction support vessel, dive support vessel, crew transfer vessel

2.2.2 Generic Trencher (Jet Trencher)

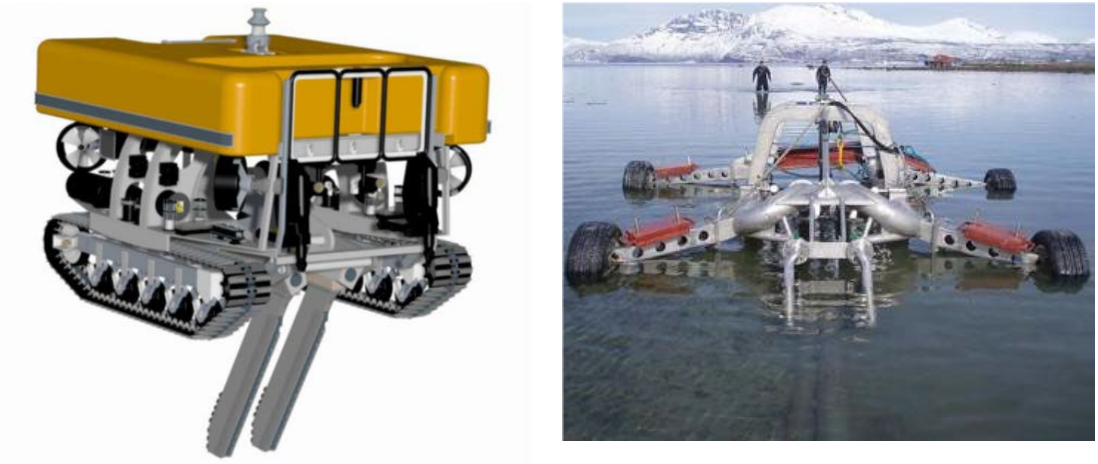
Jet trenching is a cable installation technique which can be used to bury the cable in areas of loose non cohesive sediments such as sand and silt. It uses a powerful water-jetting tool to fluidise sediments in the seabed, allowing pre-laid cables to sink to the required burial depth.

Most jet trenchers are a self-propelling ROV which is powered and controlled from the CLV or another support vessel. Some are towed rather than self-propelled.

The jet trencher will sit on the seabed and follow the laid cables. High powered pumps inject sea-water into the seabed either side of the cables through jetting 'swords' (Figure 2-3). This fluidises the seabed beneath the cables allowing them to naturally sink to the required burial depth. The seabed sediments naturally re-form and 'back-fill' the trench covering the cables, only creating localised and temporary (less than one tidal cycle) turbidity plumes. If the required burial depth is not achieved, several passes can be made. The system does not remove any seabed sediments from the area.

The jet trencher requires a minimum distance of 100m for the deployment and recovery of the trenching tool which is associated with grading in and out of the seabed. The maximum width expected to be affected by a jetting trencher is 10m wide associated with the jet trencher's tracks on the seabed. The width of the trench itself will be only 1m.

Figure 2-3 Typical water jetting machines



2.2.3 External Cable Protection

Where cable burial is not feasible due to difficult ground conditions, external protection such as concrete mattressing and rock protection is generally used to protect installed cables.

2.2.3.1 Concrete mattressing

Concrete mattresses are matrices of interlinked concrete blocks which form a close-fitting layer over the cable to provide a strong protective cover to prevent potential impact and snagging by fishing gear or anchors. Typically, concrete mattresses are 6m long by 3m wide.

The mattresses are installed via a crane from either a dive support vessel or a construction support vessel; which lowers them one at a time or in batches using a special frame (Figure 2-4).

Figure 2-4 Concrete mattress deployment (courtesy of FoundOcean)

2.2.3.2 Rock placement

Where the seabed composition is not suitable for concrete mattresses, or where it is expected that mattresses may not provide the protection required, external cable protection will be provided through rock placement. Rock placement is used to protect subsea cables by covering them in a continuous profiled berm of graded rock. The size of the berm will depend on the location, the site-specific anchor and fishing risks and metocean conditions.

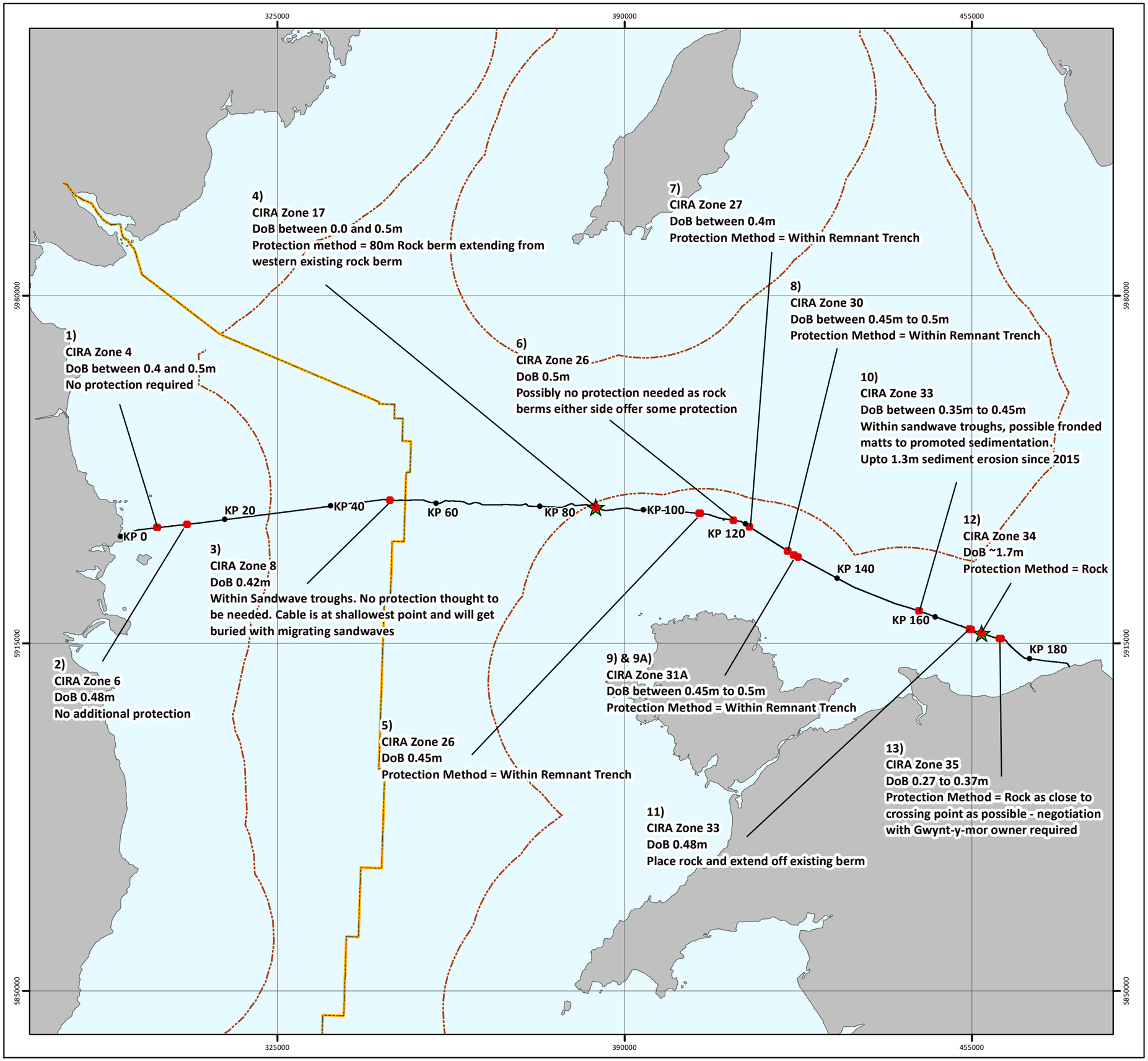
2.2.3.3 Indicative locations for trenching and external cable protection

At all 11 remedial works locations the primary method for reburying the cable will be via trenching. However, the CIRA indicates that five out of the eleven locations may require external cable protection should the installation contractor not achieve sufficient reburial using trenching alone. It should be noted that external cable protection may be a combination of both concrete mattresses and rock protection. For the purposes of the assessment, worst-case scenarios have been considered relating to either concrete mattress placement at all five locations and rock protection at all five locations which are worst case scenarios.

The locations that require remedial works are shown in in Figure 2-5 (Drawing Number P2226-LOC-009-A). Table 2-1 provides further details for the locations where remedial works will be required in Welsh Territorial Waters. For the worst-case scenario (i.e. in the event external cable protection is required at five remedial works locations using either concrete mattresses or rock protection) the total requirement is estimated to be:

- Total length of trenching= 1,100m
- Footprint of concrete mattresses[1] = 1,620m^2
- Footprint of rock protection[2] = 5,400m^2
- Rock protection volume[2] = 3,861m^3 (including 30% contingency)

[1] Assuming concrete mattresses are used at all five locations
[2] Assuming rock protection is used at all five locations



EAST WEST INTERCONNECTOR

LOCATION OVERVIEW
Remedial Assessment Areas

Drawing No: P2226-LOC-009 | **A**

Legend

- KP
- EWIC Remedial Assessment Areas
- EWIC Cable Exposure
- EWIC Cable Route
- EEZ Boundary
- 12nm Territorial Sea Limit

N W E S

NOTE: Not to be used for Navigation

Date	22 June 2020
Coordinate System	WGS 1984 UTM Zone 30N
Projection	Transverse Mercator
Datum	WGS 1984
Data Source	UKHO; MARINE REGIONS; GEBCO; ESRI: DCCAE
File Reference	J:\P2226\Mxd\02_LOC\ P2226-LOC-009.mxd
Created By	Chris Carroll
Reviewed By	Chris Dawe
Approved By	Andrew Page

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0 10 20 30 40 km

Table 2-1 Indicative trenching and external cable protection locations

Assessment Area	CIRA Zone ID	Start KP	End KP	Approximate Distance of Required Work (m)	Primary Action	Secondary Action if Primary is unfeasible	Footprint of Concrete Mattresses (m^2)***	Footprint of Rock (m^2)	Volume of Rock (m^3)****
1	4	7.3	7.3	50m	Reburial by Trenching**	N/A	N/A	N/A	N/A
2	6	12.9	12.9	20m	Reburial by Trenching**	N/A	N/A	N/A	N/A
3	8	51.3	51.3	20m	Reburial by Trenching**	N/A	N/A	N/A	N/A
4*	17	90.8	90.9	80m	Reburial by Trenching**	Concrete mattress/Rock protection	240	800	400
5	26	110.5	110.7	x1 20m area x1 30m area (50m total)	Reburial by Trenching**	N/A	N/A	N/A	N/A
6	26	117.6	117.6	20m	Reburial by Trenching**	Concrete mattress/Rock protection	60	200	110
7	27	121.0	121.0	20m	Reburial by Trenching**	N/A	N/A	N/A	N/A
8	30	129.5	129.5	25m	Reburial by Trenching**	N/A	N/A	N/A	N/A
9	31A	130.8	130.8	35m	Reburial by Trenching**	N/A	N/A	N/A	N/A
9A	31A	131.7	131.7	20m	Reburial by Trenching**	N/A	N/A	N/A	N/A
10	33	156.5	156.5	20m	Reburial by Trenching**	N/A	N/A	N/A	N/A

11	33	167.1	167.4	x3 50m areas, (150m total)	Reburial by Trenching**	Concrete mattress/Rock protection	450	1500	825
12*	34	169.4	169.4	20m	Reburial by Trenching**	Concrete mattress/Rock protection	60	200	110
13	35	173.0	173.3	x1 220m area, x1 30m area and x1 20m area (270m total)	Reburial by Trenching**	Concrete mattress/Rock protection	810	2700	1485

* Areas of exposed cable

** Minimum distance of reburial by trenching to be 100m

*** Based on standard concrete mattress size (W= 3m X L= 6m)

**** Based on width and heights of existing EWIC rock berms (W=10m X H=1m) and assuming a 1:5 slope

Remedial Works located within Irish Waters

Locations where external cable protection may be required

2.2.4 Post Remedial Works Geophysical Survey

Following the trenching and deployment of external cable protection, a geophysical survey will be undertaken to determine whether the EWIC cable has been buried to the recommended depth at each of the remedial works locations. The geophysical survey acquisition methodology will comprise multi beam echo sounding (MBES) and is non-intrusive and will not interact with the seabed. The geophysical survey is non-invasive but is based on acoustic methods. The bathymetric survey system proposed is characterised by a limited acoustic footprint with the high directional, high frequency, short duration output attenuated within a few hundred metres of the survey vessel.

The specific equipment to be used during the geophysical survey has not yet been specified. Examples of industry standard equipment for the purpose of geophysical and geotechnical survey have therefore been used in this description. The frequencies and decibels of the equipment to be used to obtain the survey data will be within similar ranges for the equipment described.

2.2.4.1 Multibeam echo sounder (MBES)

MBES is a remote sensing acoustic device typically attached to a vessels hull. The purpose of this equipment will be to map the water depth to seabed (bathymetry). The Kongsberg EM2040 is an example of a MBES device that may be used for the proposed survey works (Figure 2-6).

Figure 2-6 Kongsberg EM2040 MBES

2.3 Proposed Works Programme

The proposed remedial works are anticipated to take up to 12 days, plus any additional time required for weather downtime and breakdown. It is anticipated that trenching and mattressing could take up to seven days and should rock protection be required in a separate campaign window it is anticipated this will take up to five days.

2.4 Design Constraints

Table 2-2 below lists constraints built into the design of the proposed remedial works so that the installation contractor ensures compliance with national and international statute or adopts best practice as determined by the cable industry as the basic standard for how to proceed on a project. These are not additional measures proposed specifically to address the potential for environmental effects, but constraints built into the design of the proposed remedial works. The main drivers behind

the constraints typically relate to compliance with environmental law; or known health and safety issues.

Table 2-2 Design Constraints

ID	Design Constraints
1	Notices shall be provided to other sea users in the area of operations via issue of a Notice to Mariners
2	A Fisheries Liaison Officer (FLO) has been appointed who will be the direct point of contact between the Applicant and fishing stakeholders
3	Project vessel(s) will be equipped with waste disposal facilities (sewage treatment or waste storage) to IMO MARPOL Annex IV Prevention of Pollution from Ships standards.
4	Ship Oil Pollution Emergency Plans (SOPEPs) shall be provided by Contractor and implemented covering all vessels in accordance with MARPOL Annex I requirements
5	Ballast water discharges from all vessels shall be managed under the International Convention for the Control and Management of Ships' Ballast Water and Sediments standard
6	Hazardous chemicals and materials shall be managed in accordance with applicable standards and guidelines, including maintenance of an inventory of such substances that are used and/or stored, provision of Material Safety Data Sheets (MSDSs), preparation of Chemical Risk Assessments and storage in designated, secure facilities with suitable spill protection and control
7	A Biosecurity Plan (BSP) shall be prepared and implemented
8	A 500m safety zone would be established around the Project vessel(s) to ensure the safety of other sea users

2.5 Consideration of Alternatives

If remedial works are not undertaken, the EWIC cable will remain exposed in two areas and may become uncovered in the other areas identified with low sediment cover. This means that the cable is at risk from interaction with fishing gear and ships anchors, which may result in damage to the cable, the cable being out of service for a period of time and the requirement for a lengthy repair procedure to be undertaken. The exposed cable may also pose a threat to other vessels including fishing vessels, from anchor strike or should fishing gear become entangled.

3. ENVIRONMENTAL CONSIDERATIONS

An understanding of the potential impacts from an operation on the environment requires a clear understanding of the present state of the environmental baseline. For the purposes of this report this section focuses on the environmental receptors which have the potential to be affected by the proposed remedial works.

3.1 Physical Processes

Semi-diurnal tides are the dominant physical process along the EWIC cable route, propagating into the Irish Sea from the Atlantic Ocean through the North Channel and St Georges Channel. There are areas along the route with a very large tidal range (i.e. at Liverpool Bay where the largest spring tides exceeds 10m) and small tidal range (in proximity to Arklow in the St. George's Channel and between Islay and the Mull of Kintyre in the North Channel. The time of high water varies little over a wide area to the east and west of the Isle of Man, where two waves meet, forming a standing wave. At the landfall site the tide floods to the east-north east and ebbs to the west-south-west as water moves in and out of the Dee Estuary and along the North Wales Coast. The speed and direction of the tidal currents varies with location due to frictional effects of the seabed and the complex nature of the tidal flow in the area as water enters and exits the River Dee.

The prevailing wind in the Irish Sea is south-westerly with it contributing to the water movements in the Irish Sea with a net flow from the south towards the north responsible for the spatially and temporally variable currents in the North Channel. The constrained nature of the Irish Sea basin makes it susceptible to storm surges, resulting in unpredictable currents. This is complicated by seasonal thermal stratification, which occurs during the summer. Generally, in Liverpool Bay, a counter-clockwise wind-driven circulation adverts run-off from the Mersey northwards towards the Fylde coast. Under calm conditions however, the circulation is driven clockwise by the density circulation induced by run-off from the Mersey, Ribble and Dee. In such cases, run-off from the Mersey moves to the west and can be detected along the North Wales Coast. The maximum tidal current speed during an average spring tide (mean spring tidal current) is 0.7ms^{-1} rising to 2ms^{-1} along the EWIC cable route.

The Irish Sea is sheltered with only two narrow windows, along the axes of the St Georges and North Channels, most waves are locally generated, of fairly short duration. Swell waves are only present near entrances, at the southern end of the St. Georges Channel and the northern end of the North Channel. The wind direction leading to the largest waves depends on the locality, for example in Liverpool Bay, winds from between the west and north-west cause the largest waves, whereas winds from the north cause the largest waves on the North Wales coast. The EWIC cable route and landfall site are exposed to severe wave conditions. The predominantly south-westerly winds have an effective fetch length of over 200km, and the waves are enhanced by the swell entering from St Georges Channel.

A Metocean study completed by HR Wallingford prior to the EWIC cable installation concluded that many points along the route showed a highest significant wave height within 5m. One location situated in the middle of the EWIC cable route in the St Georges Channel exceeded this. Wave heights at that same location reached 7.73m in the previous 10 years from the study and 8.9m in the last century.

The bathymetry throughout the EWIC cable route is variable and generally characterised by ripples and megaripples with isolated areas of sandwaves, where in certain areas, steep slopes of more than 15 degrees and present. The shallowest areas (2m below LAT) are observed in the nearshore areas and locally over sandbanks and sandwaves where typically the highest slopes are also associated. Generally, the seabed morphology changes from smooth and homogenous to textured and rough. The maximum water depths of roughly 11m below LAT are observed at approximately KP40 further offshore.

The CIRA interpreted superficial sediment types based on the acoustic character of the high and low frequency side scan sonar (SSS) and MBES bathymetric data. The CIRA concluded that the majority of superficial geology within the survey corridor (80m width of the EWIC cable route) comprised of sand, gravelly sand and sandy gravel, with areas of outcropping bedrock and diamicton[3]. The areas of outcropping correspond well with the majority of the existing external cable protection which would indicate shallow or no burial during the original installation campaign.

Seabed features such as trawl scars and boulder fields are present within the survey corridor as well as mobile bedforms, mainly ripples and megaripples and occasionally sandwaves. Rock berms, seemingly intact were observed on top of the existing cable and several concrete mattresses were identified.

3.2 Protected Sites

In accordance with the provisions of Article 6(3) of the EC Habitats Directive (92/43/EEC), Screening for Appropriate Assessment (Stage 1) has been undertaken for European sites and is presented in Appendix B.

The HRA Screening identified 13 protected sites of relevance to the proposed remedial works which are presented in Figure 3-1 and 3-2 below. The 13 sites assessed by the HRA Screening are listed in Table 3-1.

Table 3-1 Protected sites identified within the HRA

Protected Site Type	Site Code & Name
Special Area of Conservation (SAC)	North Anglesey Marine / Gogledd Môn Forol (UK0030398)
	North Channel (UK0030399)
	West Wales Marine / Gorllewin Cymru Forol (UK0030397)
	Bristol Channel Approaches SAC (UK0030396)
	Cardigan Bay/ Bae Ceredigion SAC (UK0012712)
	Pen Llŷn a'r Sarnau/ Lleyn Peninsula and the Sarnau (UK0013117)
	Pembrokeshire Marine/ Sir Benfro Forol (UK0013116)
	Rockabill to Dalkey Island (IE0003000)
	Lambay Island (IE000204)
	Dee Estuary/ Aber Dyfrdwy (UK0030131)
	River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid (UK0030252)
Special Protection Area (SPA)	Liverpool Bay SPA (UK9020294A)
	Anglesey Terns / Morwenoliaid Ynys Môn (UK9013061)

[3] Unsorted to poorly sorted and contains particles ranging in size from clay to boulders suspended in a matrix of mud or sand

EAST WEST INTERCONNECTOR

ENVIRONMENTAL DESIGNATIONS
SAC's within Zones of Influence

Drawing No: P2226-ENV-002	A

Legend

- EWIC Remedial Assessment Areas (UK Waters)
- KP
- EWIC Cable Route
- 12nm Territorial Sea Limit
- EEZ Boundary
- SAC

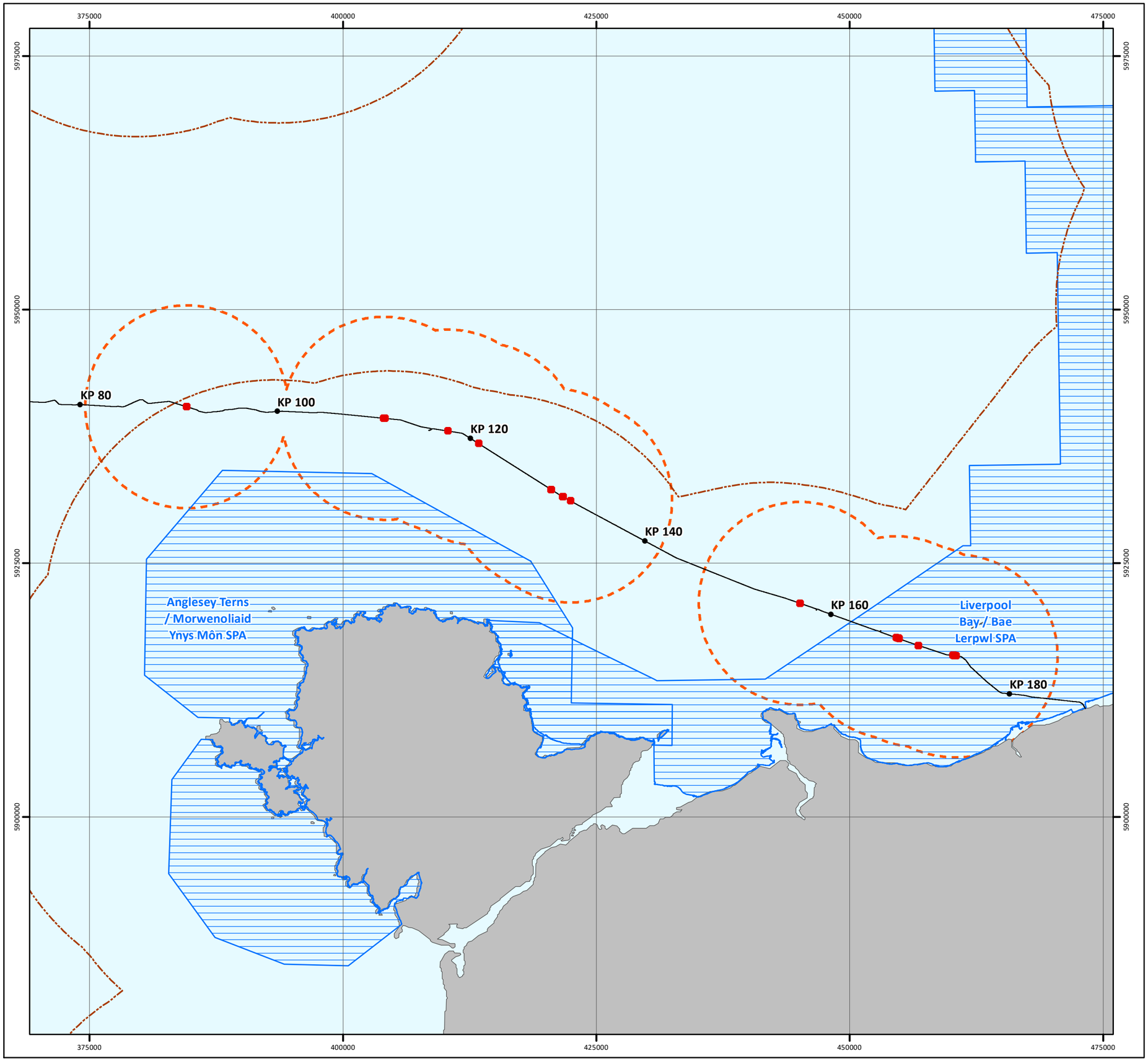
Zone of Influence

- 40km - Fish
- 100km - Pinnipeds

NOTE: Not to be used for Navigation

Date	03 August 2020
Coordinate System	WGS 1984 UTM Zone 30N
Projection	Transverse Mercator
Datum	WGS 1984
Data Source	JNCC; NPWS; UKHO; DCCAE; MARINE REGIONS; GEBCO; ESRI:
File Reference	J:\P2226\Mxd\05_ENV\ P2226-ENV-002.mxd
Created By	Chris Dawe
Reviewed By	Chris Carroll
Approved By	Nick Archibald

km 0 10 20 30 40



EAST WEST INTERCONNECTOR

ENVIRONMENTAL DESIGNATIONS
SPA's within Zones of Influence

Drawing No: P2226-ENV-003	A

Legend

- EWIC Remedial Assessment Areas (UK Waters)
- KP
- EWIC Cable Route
- 12nm Territorial Sea Limit
- SPA

Zone of Influence

- 10km - Birds

NOTE: Not to be used for Navigation

Date	03 August 2020
Coordinate System	WGS 1984 UTM Zone 30N
Projection	Transverse Mercator
Datum	WGS 1984
Data Source	JNCC; UKHO; GEBCO; ESRI:
File Reference	J:\P2226\Mxd\05_ENV\ P2226-ENV-003.mxd
Created By	Chris Dawe
Reviewed By	Chris Carroll
Approved By	Nick Archibald

0 5 10 15 20 km

3.3 Benthic Ecology

Benthic ecology comprises the habitats and species (flora and fauna) present in, on or closely associated with the seabed. A high-level assessment of the key sensitive intertidal and benthic habitats and species within the vicinity of the Proposed Works has been made by reviewing the following desk-based data sources:

- European Marine Observation Data Network (EMODnet) Seabed Habitats project (www.emodnet-seabedhabitats.eu) - EUSeaMap broad-scale predictive mapping based on physical hydrographic information within different habitats areas and water depths.

The MESH project has collated studies and survey data to map European Nature Information System (EUNIS) and Marine Strategy Framework Directive (MSFD) broadscale habitats present on the seabed of north-west Europe. This data is predictive rather than definitive however it does provide some indication to the types of benthic habitats that may be found within the Proposed Works. The EUNIS habitats identified along the EWIC cable route are listed in Table 3-1 and shown in Figure 3-3 (Drawing P2278-HAB-003-A) below.

Table 3-2 Summary of benthic seabed habitats along the EWIC cable route in Welsh Territorial Waters

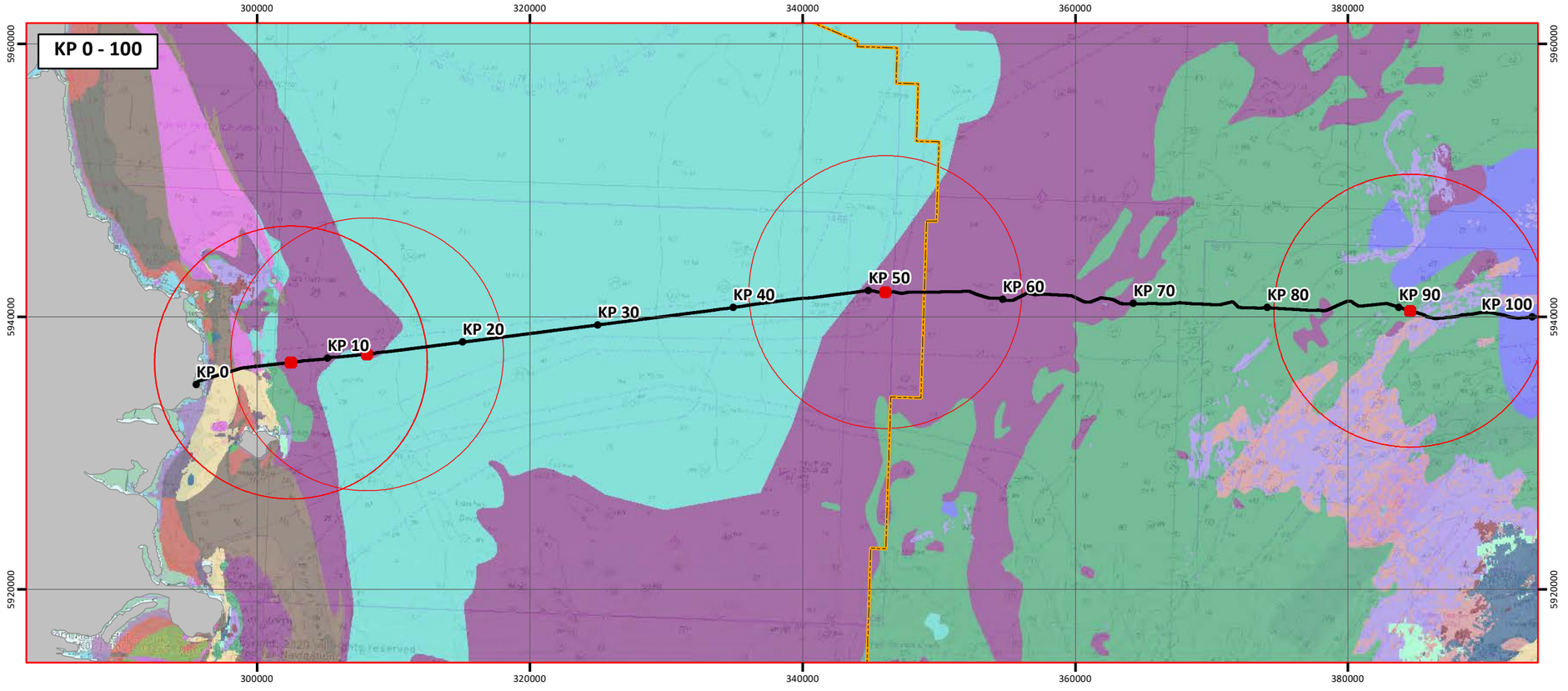
EMODNet Habitat	EUNIS Description
A5.14 Circalittoral coarse sediment	Tide-swept circalittoral coarse sands, gravel and shingle generally in depths of over 15-20m. This habitat may be found in tidal channels of marine inlets, along exposed coasts and offshore. This habitat, as with shallower coarse sediments, may be characterised by robust infaunal polychaetes, mobile crustacea and bivalves. Certain species of sea cucumber (e.g. *Neopentadactyla*) may also be prevalent in these areas along with the lancelet *Branchiostoma lanceolatum*.
A5.15 deep circalittoral coarse sediment	Offshore (deep) circalittoral habitats with coarse sands and gravel or shell. Such habitats are quite diverse compared to shallower versions of this habitat and generally characterised by robust infaunal polychaete and bivalve species. Animal communities in this habitat are closely related to offshore mixed sediments and in some areas settlement of *Modiolus modiolus* larvae may occur and consequently these habitats may occasionally have large numbers of juvenile *M. modiolus*. In areas where the mussels reach maturity their byssus threads bind the sediment together, increasing stability and allowing an increased deposition of silt leading to the development of the biotope A5.622.
A5.23 or A5.24: Infralittoral fine sand or Infralittoral muddy sand	**A5.23** - Clean sands which occur in shallow water, either on the open coast or in tide-swept channels of marine inlets. The habitat typically lacks a significant seaweed component and is characterised by robust fauna, particularly amphipods (*Bathyporeia*) and robust polychaetes including *Nephtys cirrosa* and *Lanice conchilega*. **A5.24** - Non-cohesive muddy sand (with 5% to 20% silt/clay) in the infralittoral zone, extending from the extreme lower shore down to more stable circalittoral zone at about 15-20 m. The habitat supports a variety of animal-dominated communities, particularly polychaetes (*Magelona mirabilis*, *Spiophanes bombyx* and *Chaetozone setosa*), bivalves (*Fabulina fibula* and *Chamelea gallina*) and the urchin *Echinocardium cordatum*.
A5.25 or A5.26 Circalittoral fine sand or circalittoral muddy sand	**A5.25** - Clean fine sands with less than 5% silt/clay in deeper water, either on the open coast or in tide-swept channels of marine inlets in depths of over 15-20 m. The habitat may also extend offshore and is characterised by a wide range of echinoderms (in some areas including the pea urchin *Echinocyamus pusillus*), polychaetes and bivalves. This habitat is generally more stable than shallower, infralittoral sands and consequently supports a more diverse community. **A5.26** - Circalittoral non-cohesive muddy sands with the silt content of the substratum typically ranging from 5% to 20%. This habitat is generally found in water depths of over 15-20 m and supports animal-dominated communities characterised by a wide variety of polychaetes, bivalves such as *Abra alba* and *Nucula nitidosa*, and echinoderms such as *Amphiura* spp and *Ophiura* spp., and *Astropecten irregularis*. These circalittoral

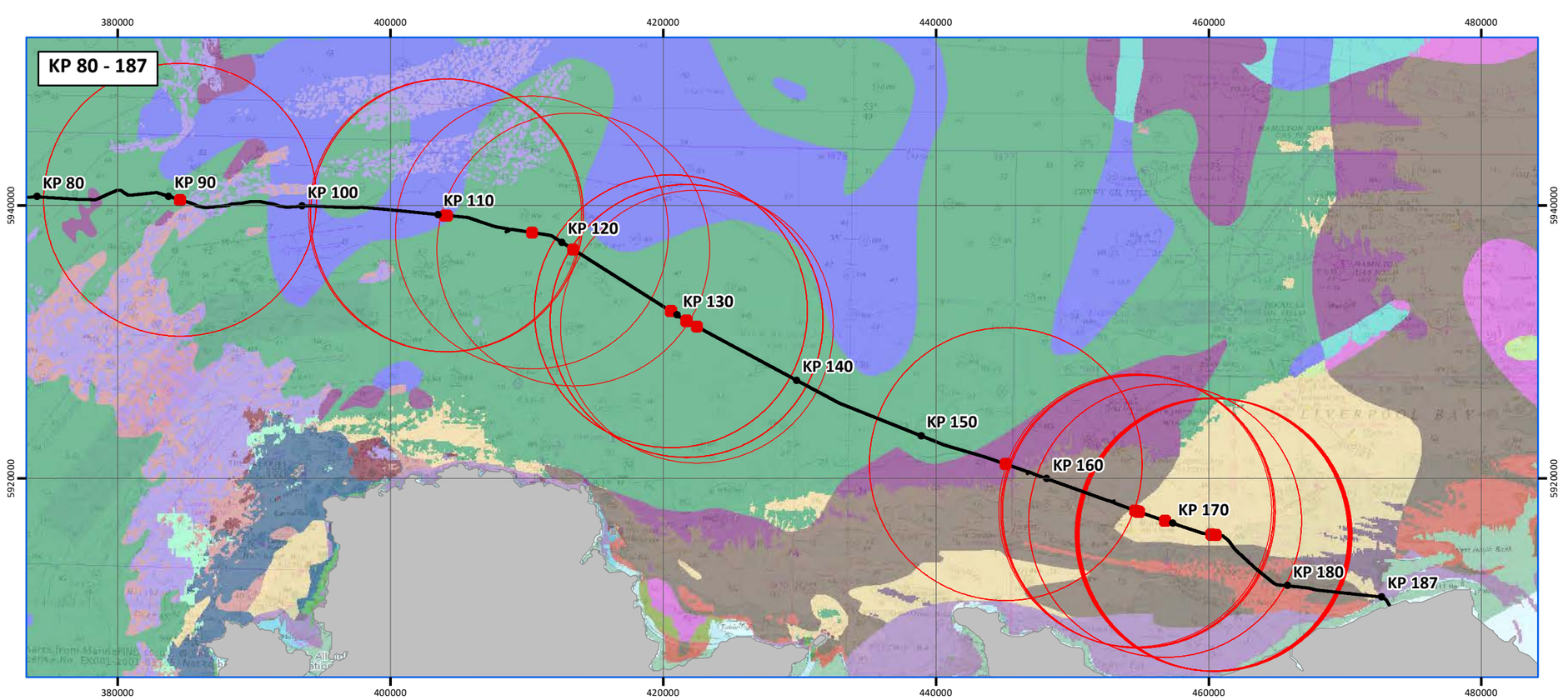
EMODNet Habitat	EUNIS Description
	habitats tend to be more stable than their infralittoral counterparts and as such support a richer infaunal community.
A5.27 deep circalittoral sand	Offshore (deep) circalittoral habitats with fine sands or non-cohesive muddy sands. Very little data is available on these habitats however they are likely to be more stable than their shallower counterparts and characterised by a diverse range of polychaetes, amphipods, bivalves and echinoderms.
A5.37 Deep circalittoral mud	In mud and cohesive sandy mud in the offshore circalittoral zone, typically below 50-70 m, a variety of faunal communities may develop, depending upon the level of silt/clay and organic matter in the sediment. Communities are typically dominated by polychaetes but often with high numbers of bivalves such as *Thyasira* spp., echinoderms and foraminifera.
A5.45 deep circalittoral mixed sediments	Offshore (deep) circalittoral habitats with slightly muddy mixed gravelly sand and stones or shell. Such habitats are often highly diverse with a high number of infaunal polychaete and bivalve species. Animal communities in this habitat are closely related to offshore gravels and coarse sands and in some areas populations of the horse mussel *Modiolus modiolus* may develop in these habitats.
High energy infralittoral seabed	Infralittoral zone (Low water down to 5 m) subject to exposed to extremely exposed wave action or strong tidal streams.

EAST WEST INTERCONNECTOR

SEABED HABITATS
EMODnet EUSeaMap Habitats

Drawing No: P2226-HAB-003 | **A**





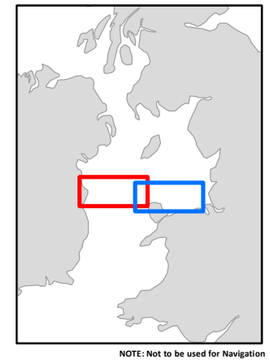
Legend

- EWIC Remedial Assessment Areas
- KP
- EWIC RPL Rev10
- EEZ Boundary
- Remedial Works 10km Buffer

EU Sea Map

EUNIS classification

- A3
- A3.1
- A3.2
- A3.3
- A4
- A4.1
- A4.12
- A4.2
- A4.27
- A4.3
- A4.33
- A5
- A5.13
- A5.14
- A5.15
- A5.23 or A5.24
- A5.25 or A5.26
- A5.27
- A5.33
- A5.35
- A5.37
- A5.43
- A5.44
- A5.45
- Na



NOTE: Not to be used for Navigation

Date	28 July 2020
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Projection	Transverse Mercator
Datum	WGS 1984
Data Source	MarineRegions; MarineFind; EMODnet; ESRI; GEBCO;
File Reference	J:\P2226\Mxd\01_HAB\ P2226-HAB-003.mxd
Created By	Chris Dawe
Reviewed By	Emma Storey
Approved By	Andrew Page

EIRGRID intertek

0 5 10 15 20 km

3.4 Marine mammals

3.4.1 Cetaceans

All available data indicates that the coastal waters of the eastern Irish Sea have a low abundance of cetaceans. With the exception of harbour porpoise (*Phocoena phocoena*), cetaceans appear to occur only as visitors in the eastern Irish Sea. To the east of the EWIC cable route, harbour porpoise, bottlenose dolphin (*Tursiops truncates*) and white-beaked dolphins (*Lagenorhynchus albirostris*) have all been recorded but in low densities during the summer months. The common dolphin (*Delphinus delphis*) has also been recorded in the eastern Irish Sea in offshore waters between June and October, particularly to the south-west of the Isle of Man. Other occasional visitors to the eastern Irish Sea include sperm whale (*Physeter macrocephalus*), striped dolphin (*Stenella coeruleoalba*), Rissos dolphin (*Grampus griseus*), killer whale (*Orcinus orca*) and long-finned pilot whale (*Globicephala melas*).

Most cetaceans are wide-ranging, and individuals encountered within Irish and Welsh waters form part of a much larger biological population whose range extends into adjacent jurisdictions. As a result, management units (MUs) have been outlined for seven of the common regularly occurring species following advice from the Sea Mammals Research Unit (IAMMWG[4] 2015) and the International Council for the Exploration of the Sea (ICES). These provide an indication of the spatial scales at which impacts of anthropogenic activities should be taken into consideration. A summary of the abundance and estimated density of the above species within the Celtic and Irish Seas MU is provided in Table 3-3.

Table 3-3 Cetacean species within the application area

Species	Abundance of animals in MU*	Estimation of density (individuals per km²)*
Harbour porpoise (*Phocoena phocoena*)	9,376	0.086 – 0.239
Bottlenose dolphin (*Tursiops truncatus*)	288	0.008
Striped dolphin (Stenella coeruleoalba)	No data available	No data available
Risso's dolphin (*Grampus griseus*)	1,090	0.031
White-beaked dolphin (*Lagenorhynchus albirostris*)	No data available	No data available
Long-finned pilot whale (*Globicephala melas*)	No data available	No data available
Minke whale (*Balaenoptera acutorostrata*)	1,146	0.011 – 0.017
Killer whale (*Orcinus orca*)	No data available	No data available
Sperm whale (*Physeter macrocephalus*)	No data available	No data available

* Hammond *et al.* (2017). ICES Management Units E & F

3.4.2 Pinnipeds

Two species of seal are resident within UK waters, the grey seal (*Halichoerus grypus*) and harbour (or common) seals (*Phoca vitulina*). Grey seals are present in coastal waters around Wales throughout the year (Baines and Evans 2012). It is estimated that the mean number of individuals in the waters in the vicinity of the EWIC cable route will vary from 0 to 10 individuals per 5km^2 (Russel, Jones & Morris 2017). Numbers generally increase towards the Welsh coast with individuals using Liverpool Bay to

[4] Inter-Agency Marine Mammal Working Group

haul out, feed and moult (Cheshire Wildlife Trust 2020). Based on a recent review on the status of harbour seals in the UK (Thompson *et al*. 2019), harbour seals are effectively absent from the UK coastline between Dover and the Solway Firth. The only exception is occasional sightings of individuals or small groups of seals in the Dee estuary in North Wales (Thompson *et al*. 2019). The estimated mean number of individuals present in coastal waters off the north Wales coast is 0-1 individuals per 5km^2 (Russell, Jones & Morris 2017).

3.4.3 Otter

Otter (*Lutra lutra*) are semi-aquatic mammals which may inhabit rivers, lakes, coastal areas and marshy areas some distance from open water. Coastal populations utilise shallow, inshore marine areas for feeding but also require fresh water for bathing and terrestrial areas for resting and breeding holts. They are commonly seen foraging within a narrow zone close to the shore (<100m) and only rarely cover larger distances, moving between islands (DECC 2016). Otter are a qualifying feature of both the Pen Llŷn a'r Sarnau/ Lleyn Peninsula and the Sarnau, Pembrokeshire Marine/ Sir Benfro Forol and River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SACs.

3.5 Marine birds

The coastal sea cliffs, estuaries and offshore islands of Wales are host to several nationally and internationally important bird species, with many areas designated as SPA's and Ramsar sites. Coastal habitats provide important breeding sites for many species of seabirds, several of which are protected under national and European legislation. Several large seabird colonies exist around the coast of northern Wales with species such as gannets, shearwaters, petrels, auks and gulls breeding, feeding and migrating in significant numbers. Due to the extensive area of good feeding opportunities, these species will tend to be well dispersed throughout the Irish Sea, including within proximity to the Proposed Works.

Birds are mobile and for this reason accurate assessments of their temporal and spatial distribution are difficult to make, particularly at sea. There are a wide variety of birds and seabirds that are either endemic or regular visitors to the coastline and offshore waters of the Irish Sea.

The Proposed Works are located within or near to the following SPA's:

- Liverpool Bay SPA
- Anglesey Terns SPA; and

The Liverpool Bay SPA is designated for nationally important red-throated diver, little gull, little tern, common tern and migratory common scoter populations. Diving species including red-throated diver, common scoter and tern species rely on plunge diving in order to feed. Little gull typically feeds of fish and insects on the sea surface. An assessment of numbers and distribution of wintering waterbirds in Liverpool Bay SPA over 5 years (Lawson *et al*. 2016) showed all species are commonly found and other than little gull, their distribution is primarily restricted to the coast. Further information on the density and distribution of bird species is provided in Appendix B: HRA Screening.

The Anglesey Terns SPA historically included Ynys Feurig, Cemlyn Bay and the Skerries SPA. These SPA's have recently been reclassified and extended to form the Anglesey Terns / Morwenoliaid Ynys Môn SPA. This site regularly supports more than 1% of the Great Britain population of Common tern, Arctic tern, Roseate tern and Sandwich tern.

Further details on these sites are provided in Appendix B: HRA Screening.

3.6 Fish and Shellfish

Cefas have undertaken a series of trawls in the Irish Sea to inform the North West Groundfish Survey. The data collected highlighted trawls were dominated by European plaice, lesser spotted dogfish, thornback ray, dragonet, grey gurnard, whiting, dab and sole, all of which are considered abundant within the eastern Irish Sea and Liverpool Bay (Innogy 2020).

Otter trawls conducted across the Irish Sea as part of the Northern Ireland Groundfish Surveys were dominated by whiting, haddock, small spotted catshark, plaice and herring. In addition, *Nephrops* were recorded in high abundance closer to the Isle of Man (Innogy 2020).

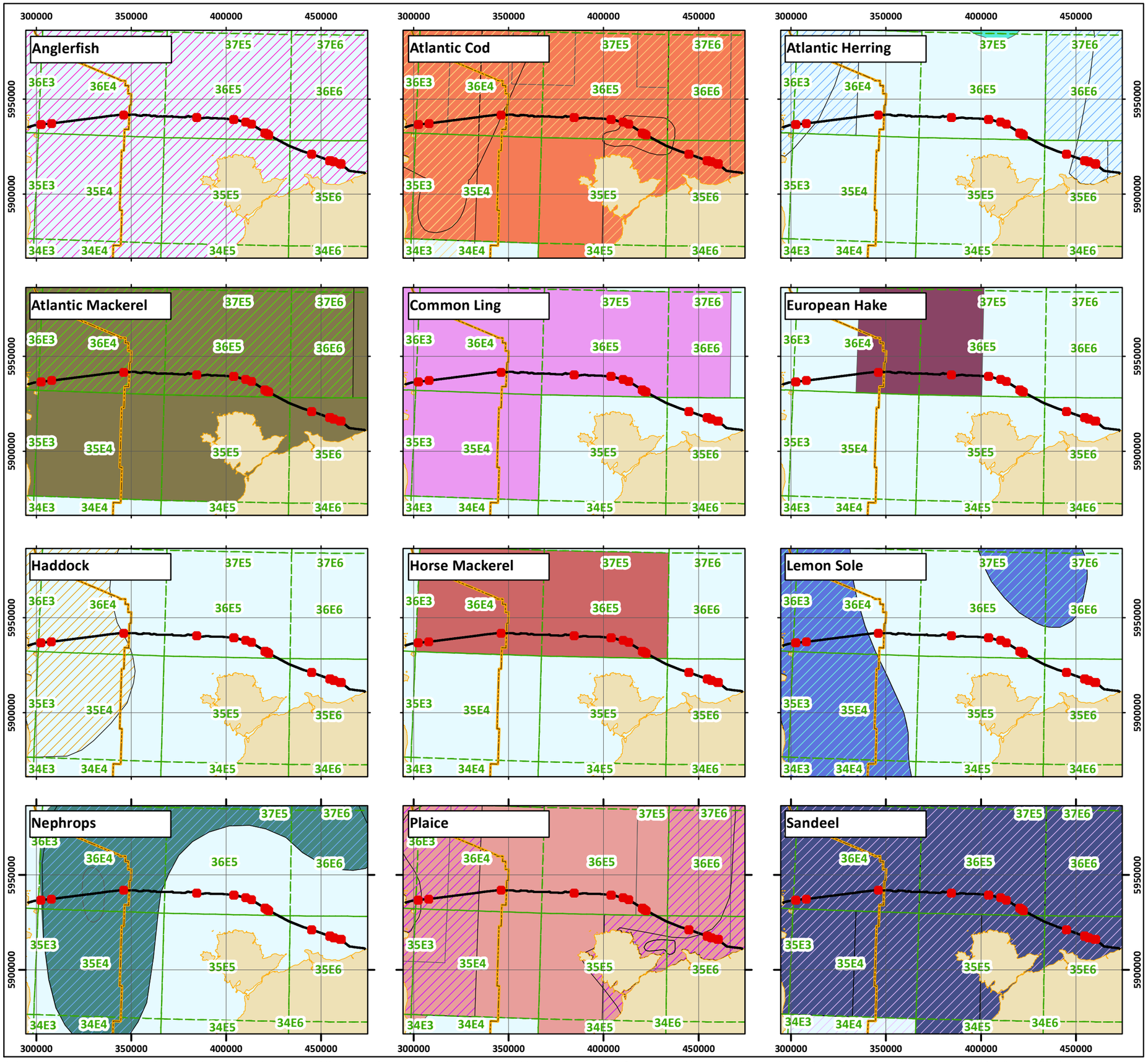
Previous studies have shown two shellfish resources within the Irish Sea, a scallop ground across the eastern Irish Sea and a *Nephrops* resource located to the north of Liverpool Bay, between the Isle of Man. Inshore shellfish species are primarily cockles, crab, lobsters, mussels, shrimp and whelk (Innogy 2020).

3.6.1 Fish Spawning and Nursery Grounds

The EWIC cable route is within important spawning and nursery grounds as summarised in Table 3-4 and Figures 3-3 and 3-4. The Proposed Works are within the spawning and nursery grounds for nineteen species of fish (Figure 3-3 Drawing P2278-FISH-001 and Figure 3-4 P2278-FISH-002). The application area is a spawning ground for twelve species.

Table 3-4 Summary of spawning and nursery grounds present within and proximity to the EWIC cable route

Species	Within Spawning Grounds	Within Nursery Grounds
Anglerfish	×	✓
Cod	✓	✓
Haddock	×	✓
Hake	✓	✓
Herring	✓	✓
Horse Mackerel	✓	×
Lemon Sole	✓	✓
Ling	✓	×
Mackerel	✓	✓
Nephrops	✓	✓
Plaice	✓	✓
Sandeel	✓	✓
Sole	✓	✓
Spotted ray	×	✓
Sprat	✓	✓
Spurdog	×	✓
Thornback ray	×	✓
Tope shark	×	✓
Whiting	✓	✓



EAST WEST INTERCONNECTOR

FISH ACTIVITY

Spatial Patterns of Fish Spawning and Nursing

Sheet 1 of 2

Drawing No: P2226-FISH-001	A

Legend

- EWIC Remedial Assessment Areas
- EWIC RPL Rev10
- EEZ Boundary
- ICES Block

Nursery Grounds

Species

- Anglerfish
- Atlantic Cod
- Atlantic Herring
- Atlantic Mackerel
- Haddock
- Lemon Sole
- Nephrops
- Plaice
- Sandeel

Spawning Grounds

Species

- Atlantic Cod
- Atlantic Herring
- Atlantic Mackerel
- Common Ling
- European Hake
- Horse Mackerel
- Lemon Sole
- Nephrops
- Plaice
- Sandeel

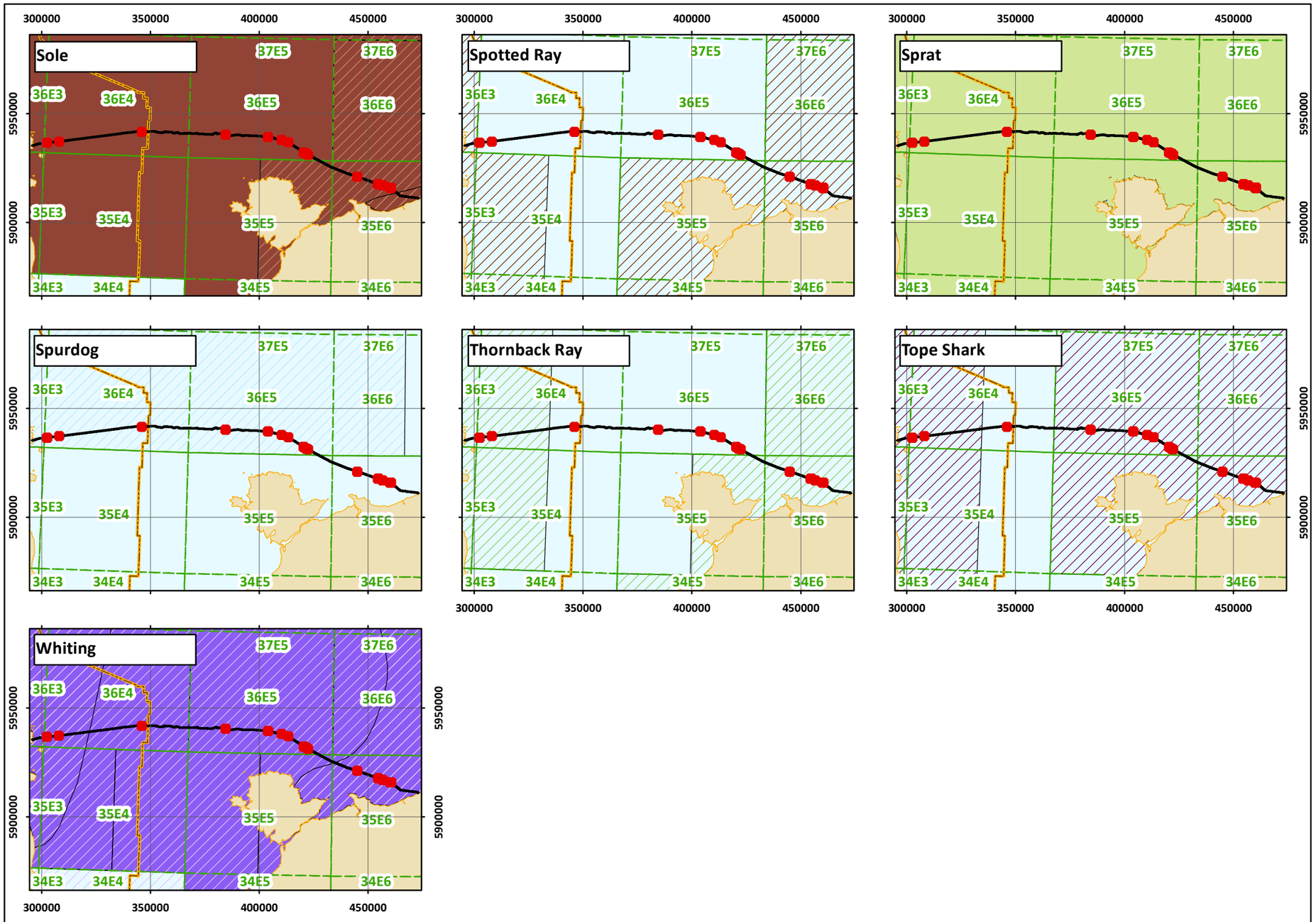
NOTE: Not to be used for Navigation

Date	28 July 2020
Coordinate System	WGS 1984 UTM Zone 30N
Projection	Transverse Mercator
Datum	WGS 1984
Data Source	MarineRegions; CEFAS; OSOD; ESRI; ICES
File Reference	J:\P2226\Mxd\07_FISH\ P2226-FISH-001.mxd
Created By	Chris Dawe
Reviewed By	Emma Storey
Approved By	Nick Archibald

EIRGRID intertek

0 20 40 60 80 km

Flanders Marine Institute (2019). Maritime Boundaries Geodatabase: Exclusive Economic Zone (EEZ), version 11. Available online at http://www.marineregions.org/. https://doi.org/10.14284/386; Contains Ordnance Survey data © Crown copyright and database right 2013; Contains public sector information licensed under Open Government Licence v3.0. Data from Ellis, J.R. et al. (2012) Spawning and Nursery Grounds of Selected Fish Species in UK Waters. CEFAS Lowestoft Science Series Technical Report, 147: 55pp. © ESRI; ©ICES



EAST WEST INTERCONNECTOR

FISH ACTIVITY

Spatial Patterns of Fish Spawning and Nursing
Sheet 2 of 2

Drawing No: P2226-FISH-002	A

Legend

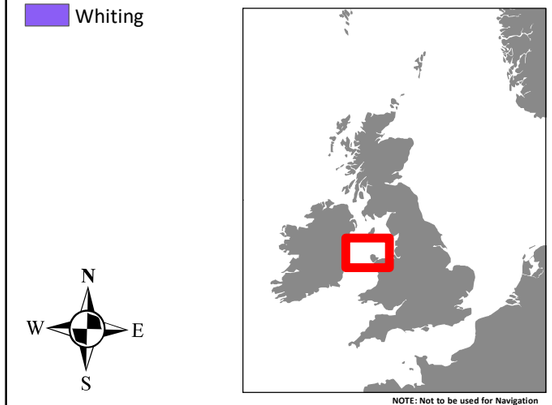
- EWIC Remedial Assessment Areas
- EWIC RPL Rev10
- EEZ Boundary
- ICES Block

Nursery Grounds

Species
- Sole
- Spotted Ray
- Spurdog
- Thornback Ray
- Tope Shark
- Whiting

Spawning Grounds

Species
- Sole
- Sprat
- Whiting



NOTE: Not to be used for Navigation

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Created By	NAME OF CREATOR
Reviewed By	NAME OF APPROVER
Approved By	NAME OF APPROVER

0 20 40 60 80 km

Flanders Marine Institute (2019). Maritime Boundaries Geodatabase: Exclusive Economic Zone (EEZ), version 11. Available online at http://www.marineregions.org/. https://doi.org/10.14284/386; Contains Ordnance Survey data © Crown copyright and database right 2013; Contains public sector information licensed under Open Government Licence v3.0. Data from Ellis, J.R. et al. (2012) Spawning and Nursery Grounds of Selected Fish Species in UK Waters. CEFAS Lowestoft Science Series Technical Report, 147: 55pp. © ESRI; ©ICES

The EC Habitats Directive Annex II listed species, sea lamprey, river lamprey, brook lamprey and Atlantic salmon are listed as designated features of the Dee Estuary and River Dee SACs. Although these sites lie more than 10km distant from the Proposed Works, all are migratory species that may be found in the application area at certain times of the year:

- Sea lamprey – October - December
- River lamprey – October - December
- Atlantic salmon – Early summer – late autumn

Brook lamprey do not migrate and are a freshwater species, therefore will not be observed in proximity to the Proposed Works.

3.7 Marine Activity

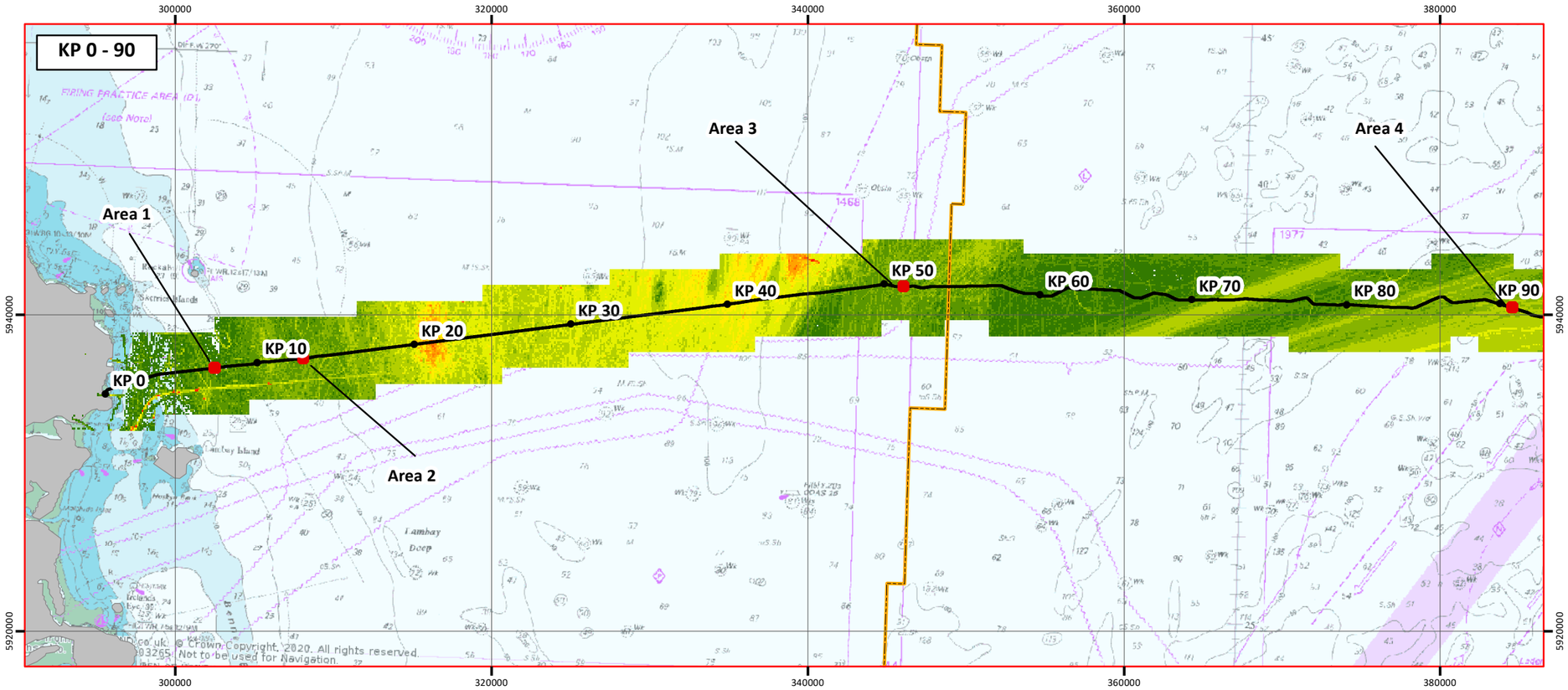
3.7.1 Commercial fishing

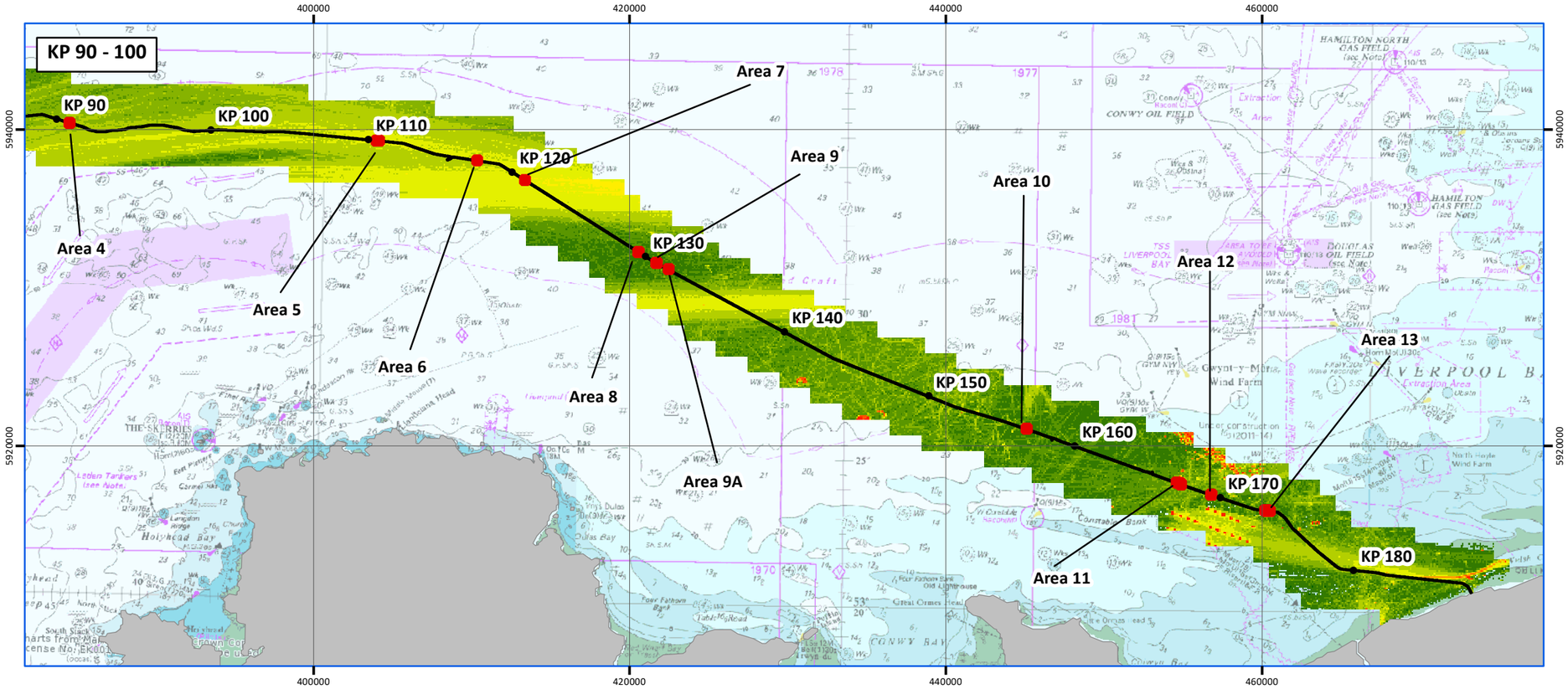
Fishing activity in the southern Irish Sea and in the vicinity of the EWIC cable route can be divided into two key areas. Fishing activity in Irish waters and in the area along the EWIC cable route between approximately KP10 to KP55 is primarily carried out by Irish prawn trawlers that concentrate on fishing soft, muddy ground. This was further evidenced by extensive trawl scars highlighted in the 2015 and 2019 geophysical data. Between KP55 and KP160, the primary fishing activity is beam trawling and scallop dredging (on harder, rocky ground). Static gear fishing activity using crab and whelk pots is also carried out in English/Welsh waters. Static gear fishing is also carried out on the inshore grounds off Rush Beach, Ireland between KP0 and KP10 and off Barkby Beach, north Wales between KP160 and KP185. Inshore fishing activity mainly involves local inshore boats fishing with pots and set nets.

3.7.2 Shipping and Navigation

AIS (Automatic Identification System) is an automatic tracking system used on ships for identifying and locating vessels by electronically exchanging data with other nearby ships and AIS base stations and satellites. The International Maritime Organisation (IMO) requires AIS to be fitted aboard international voyaging ships with gross tonnage of 300 or more tons, and all passenger ships regardless of size. This would cover almost all commercial vessels and most private vessels that would be of risk to the cable; however, some smaller fishing vessels could be missing from the AIS dataset. Information provided by the AIS equipment usually consists of unique identification number for each vessel, vessel name, vessel type, vessel position, course and speed. Other attributes like vessel deadweight tonnage and draught may be completed by the AIS supplier. To quantify the anchoring risk to the cable, Intertek was provided historical AIS (by EIDAC) data along the EWIC cable route for the period of January 2019 to December 2019 (inclusive) from Ultramap for a study area of approximatively 3km wide either side of the cable route. The 3km study area allows insight into vessel movements by vessel type/size in the surrounding geography. For the purpose of evaluating changes in the key shipping routes in the region, Intertek obtained free, anonymised AIS data from the EMODNET for the year 2018. Figure 3-6 provides a visualisation of this dataset which provides an overview of vessel movement density.

There are four areas of high shipping density along the cable route, between KP 20 to 45, KP 90 to 125. and KP135 to 140 orientated in an east/west direction. The EWIC cable crosses these areas in a relatively perpendicular direction.





EAST WEST INTERCONNECTOR

AIS VESSEL DENSITY & ASSESSMENT AREAS
Vessel Hours Per Year Per km²
All Vessel Bands

Drawing No: P2226-AIS-016	A

Legend

- KP
- EWIC Remedial Assessment Areas
- EWIC RPL Rev10
- EEZ Boundary

Vessel Density
vhpy/km²

- <1
- 1 - 2
- 2 - 5
- 5 - 10
- 10 - 25
- 25 - 50
- 50 - 75
- 75 - 100
- 100 - 150
- 150 - 200
- 200 - 500
- >500

N
W E
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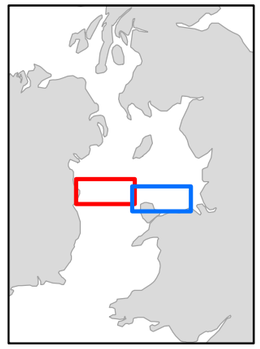

NOTE: Not to be used for Navigation

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File Reference	J:\P2226\Mxd\04_AIS\ P2226-AIS-016.mxd
Created By	Chris Dawe
Reviewed By	Chris Carroll
Approved By	Andrew Page

EIRGRID intertek

0 5 10 15 20 km

3.7.3 Subsea Infrastructure and Wrecks

There are several offshore oil and gas fields located within the Irish Sea. The Liverpool Bay Development consists of four oil and gas fields within Irish Sea block 110/13 and 110/15 which are located in excess of 10km to the north east of the proposed remedial works. Blocks awarded under the 31st licensing rounds are located north of the proposed remedial works in the central Irish Sea. A gas pipeline between Ireland and Scotland runs in parallel to the EWIC cable route from landfall to KP44. Furthermore, there is a pipeline that transports gas from the Douglas complex south to a processing terminal at Point of Ayr which is located to the east of the proposed remedial works.

The EWIC cable route is crossed by or crosses 11 existing cables, all of which are in service. Each crossing has either mattressing or rock berms in place for external protection measures when the EWIC cable was originally surface laid or crossing assets surface laid across EWIC.

There are several wrecks in proximity to the existing EWIC cable route, however the route was designed to avoid all of these.

3.7.4 Aggregate Extraction

Within UK and Irish waters all active and historical dredging areas are known and have detailed surveys undertaken to ascertain sediment levels. All disposal and dumping sites are also known and are contaminated with material such as heavy metals and in some extreme cases radioactive waste. Aggregation extraction areas have also been avoided. There are no observed areas in the vicinity of the EWIC cable route.

3.7.5 Recreation

Recreational activities in the coastal areas of north Wales include kayaking, canoeing, sail boats and personal watercraft which are primarily restricted to the welsh coastline. Recreational marine traffic is most abundant within Conwy Bay and in the mouth of the Menai Straits and in Liverpool Bay. Recreational boating takes place around English, Welsh and Irish coasts as well as routes to and from the Isle of Man. The RYA UK Coastal Atlas of Recreational Boating identifies low intensity route across the majority of the Irish Sea, with higher intensity areas restricted to the Irish and north Wales coastline and at entrances and exits of various ports (RYA 2020). The north Wales coastline has extensive areas of beaches from Rhos point to the Point of Ayr which are highly utilised.

3.8 Other Proposed Activities in the Area

A search of marine licence applications for other activities which could interact with the proposed remedial works was conducted using GIS and a review of marine licence applications on the NRW Public Register (NRW 2020). Table 3-5 lists all current and previous (Jan 2019 – June 2020) applications listed on the Public Register which may interact with the Proposed Works.

Table 3-5 Development applications near the Proposed Works

Name of development	Licence ref	Type of survey/activity	When planned to commence	Licence Status	Distance from Proposed Works (km)
Holyhead Breakwater Refurbishment	SC2002	Remedial Works	March 2021 – January 2023	Scoping Opinion	31
Holyhead Marina Re-build Project	SC1906	Construction	Unknown	Scoping Opinion	35
Enhancement of coastal defence at East Rhyl	CML1873	Remedial Works	July 2019 – July 2023	Granted	10.5

Name of development	Licence ref	Type of survey/activity	When planned to commence	Licence Status	Distance from Proposed Works (km)
Morlais Tidal Array	ORML1938	Energy	Unknown	Scoping Opinion	27
Port of Mostyn	RML2027	Maintenance Dredging	Unknown	Pending	25
NRW Grab Sampling Survey Programme	RML1903	Survey	2019 - 2021	Granted	12
Holyhead Harbour Maintenance Dredging	DML1935	Maintenance Dredging	December 2019 – December 2022	Granted	32
Holyhead Port Expansion	CML1931	Construction	Unknown	Unknown	35
Holyhead Waterfront Development	RML1937	Survey	February 2020 – October 2020	Granted	36
Deganway Marine Dredging Conwy	DML1942	Maintenance Dredging	May 2020 – May 2023	Granted	19
Awel y Môr Offshore Wind Farm	RML2023	Survey	July 2020 – June 2021	Granted	1

4. SCOPE OF ENVIRONMENTAL ASSESSMENT

4.1 Identification of Pressures

The OSPAR Intercessional Correspondence Group on Cumulative Effects (ICG-C) pressure list and descriptions (OSPAR Commission 2011) have been used to describe the potential pressures expected from the proposed remedial works. A list of all relevant pressures identified has been provided below:

- Barrier to species movement;
- Changes in suspended solids (water clarity)
- Death by injury or collision;
- Electromagnetic changes;
- Habitat structure changes – removal of substratum (extraction)
- Hydrocarbon and PAH contamination;
- Introduction of light;
- Introduction or spread of non-indigenous species;
- Litter;
- Penetration and/or disturbance of the substrate below and on the surface of the seabed, including abrasion;
- Physical change (to another seabed type);
- Siltation rate changes, including smothering (depth of vertical sediment overburden);
- Temperature changes – local;
- Transition elements and organo-metal contamination;
- Underwater noise changes;
- Visual disturbance;
- Water flow (tidal current) changes – local, including sediment transport considerations
- Wave exposure changes - local
- Snagging hazard
- Displacement of vessels fishing activity;
- Loss or damage to fisheries habitats/fish stocks;
- Restricted access to recreational users; and
- Cumulative and in-combination effects.

4.2 Pressures Scoped Out of Assessment

While the above pressures have been identified, using professional judgement, and considering the description of the proposed remedial works, a number of pressures have been scoped out of the assessment. These pressures, including justification for being scoped out are provided in Table 4-1. The remaining pressures have been assessed for each receptor/topic where relevant.

Table 4-1 Pressures Scoped Out of the Assessment

Pressure Scoped Out of Assessment	Receptor/Topic	Justification for Scoping Pressure Out of Assessment
Barrier to species movement	All species	The Project will not introduce any elements that will represent a significant barrier to the movement of species. The presence of Project vessel(s) may lead to temporary disturbance
Changes in suspended solids (water clarity)	Benthic and Intertidal Ecology Fish and Shellfish Marine Mammals Marine Birds	Any changes to water clarity will be temporary and localised based on the strong tidal flows in the area which will disperse suspended solids rapidly
Death by injury or collision	Marine mammals	Although shipping collision is a recognised cause of basking shark and marine mammal mortality worldwide, the key factor influencing the injury or mortality caused by collisions is ship size and speed. Ships travelling at 14 knots or faster are most likely to cause lethal or serious injuries. Although the presence of Project vessel(s) marginally increases the level of vessel activity within the area for the duration of the proposed remedial works, none of the Project vessel(s) will be travelling at speeds exceeding 14 knots. The Project vessel(s) are likely to traverse the EWIC cable at a rate of 190m per hour (equivalent to 0.1 knots) resulting in a low likelihood of collision. Given that Project vessel(s) will be operating at less than 14 knots, the effect is scoped out of the assessment as it is not likely to be significant.
Electromagnetic changes	Fish and Shellfish Marine Mammals	EWIC is already in operation, therefore the effects of EMF were considered in the EIA submitted with the original marine licence application prior to installation.
Hydrocarbon and PAH contamination	All	Unplanned events (accidental oil spill or chemical spills) have been scoped out of the assessment for the following reasons; the likelihood of a large oil spill occurring from Project vessel(s) is extremely low and the risk is no greater than that of any other vessel within vicinity to the Proposed Works. In addition, Project vessel(s) will have control measures and shipboard oil pollution emergency plans (SOPEP) in place and will adhere to International Convention for the Prevention of Pollution from Ships (MARPOL) Annex I requirements.
Introduction of light	All	The proposed remedial works will only be carried out during daytime hours, therefore there will be no introduction of light other than navigational and safety lights on the Project vessel(s) and ROV during the geophysical survey. Therefore, this pressure has been scoped out of the assessment.
Litter	Benthic and Intertidal Ecology Fish and Shellfish Marine Mammals Marine Birds	The proposed remedial works will not result in the discarding, disposing or abandoning of marine litter.
Temperature changes - local	Benthic and Intertidal Ecology Fish	EWIC is already in operation, therefore the effects of local temperature changes were considered in the EIA submitted with the original marine licence application prior to installation.

Pressure Scoped Out of Assessment	Receptor/Topic	Justification for Scoping Pressure Out of Assessment
Transition elements and organo-metal contamination;	All	Transition elements and organo-metal contamination has been considered as part of the Water Framework Directive (WFD) Assessment submitted in support of the marine licence application
Wave exposure changes - local	Physical Processes	The introduction of external cable protection of height 1m will not significantly influence wave action based on the water depth at remedial works locations and strong wave action in the region
Deoxygenation Nutrient enrichment Organic enrichment	Benthic and Intertidal Ecology Fish and Shellfish	During the proposed remedial works, it is possible that the Project vessel(s) will discharge grey water (sewage, food waste and drainage water) which can have potentially toxic effects on species and lead to localised nutrient enrichment, organic enrichment and deoxygenation. Considering the temporary nature of the Proposed Works and the relatively small volume of discharges from the Project vessel(s), the marine environment will be able to rapidly assimilate any discharges. In addition, strong tidal action is likely to disperse and organic matter or nutrients swiftly, therefore nutrient and organic enrichment and deoxygenation has been scoped out of the assessment.
Visual disturbance	Fish	The effect could occur during trenching, the deployment of external cable protection and geophysical survey due to the presence of Project vessel(s) and equipment. This may result in the displacement of fish within the water column. The disturbance from these activities will be temporary, localised and not considered likely to result in significant effects given existing levels of shipping within the Irish Sea. Therefore, this pressure has been scoped out of the assessment.
Siltation rate changes, including smothering (depth of vertical sediment overburden)	Fish	There are three pathways for species to be smothered as a result of project activities: by displaced sediments during trenching; by the re-deposition of suspended sediment; and by cable protection material being placed on the seabed. The effect from displaced sediment will be very localised, only effecting species in the immediate vicinity of cable trenching activity. Suspended sediment settlement levels are expected to be minimal with any material deposited likely to be quickly re-suspended and distributed by natural hydrodynamic processes. Therefore, this aspect of the effect on fish and shellfish has been scoped out of the HRA. The suspension of sediments within the water column from trenching may cause small, localised and temporary turbidity before being re-deposited on the seabed. A temporary reduction in the feeding capability of species relying on sight to locate their prey may occur. Most species are likely to be tolerant to any changes in turbidity levels (likely to be equivalent to those experienced during storm events). Therefore, this pressure on fish and shellfish has also been scoped out of the assessment. The effects of depositing cable protection material has been assessed.

5. ASSESSMENT OF EFFECTS

5.1 Approach to Assessment

To assess the significance of effects on the environment from the Proposed Works it is first necessary to identify the pressures and impacts the works may have.

Pressures are the mechanism through which an activity has an effect on any part of the ecosystem. The nature of the pressure is determined by the activity type, intensity and distribution. A list of marine physical / chemical and biological pressures and their definitions has been formally agreed by the OSPAR Intercessional Correspondence Group on Cumulative Effects (ICG-C) (OSPAR 2011) and has been used in the assessment. The ICG pressure list does not include human pressures, and therefore, categories have been developed based on industry experience.

An impact is the consequence of the pressure i.e. a predicted change in the baseline environment. The effect is the consequence of the impact and is usually measurable. Effects only occur when an impact is present within an environment that is sensitive to it. In assessing the significance of the effect, the magnitude (the spatial extent of the impact, the duration and frequency) and sensitivity, recoverability and importance of the receptor are considered. The following definitions of significance have been used in the assessment as follows:

- **Imperceptible** – An effect capable of measurement but without significant consequences.
- **Not Significant** – An effect which causes noticeable changes in the character of the environment but without significant consequences.
- **Slight** – An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
- **Moderate** – An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
- **Significant** – An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
- **Very Significant** – An effect which, by its character, magnitude, duration or intensity alters most of a sensitive aspect of the environment.
- **Profound** – An effect which obliterates sensitive characteristics.

For the purposes of assessment, two scenarios have been considered:

1. Cable burial through trenching; and
2. Cable burial through external cable protection.

Each scenario will be assessed with Scenario 1 representing best case and Scenario 2 worst case. If the remedial works contractor cannot successfully re-bury the cable using trenching, consideration will be given to the use of external cable protection using either concrete mattressing or rock placement or a combination of both.

5.2 Physical Processes

5.2.1.1 Penetration and/or disturbance of the substrate on the surface and below the surface of the seabed including abrasion

The footprint of the trench will be limited to a few metres. As trenching will only be taking place over the existing cable, penetration and disturbance to the seabed will be highly localised and limited to the width of the trenching tool. Based on this, effects as a result of trenching are imperceptible.

If external cable protection is required, there are two possibilities, concrete mattresses or rock protection. Concrete mattresses will result in the permanent occupation of 1,620m^2 of the seabed whereas rock protection will occupy 5,200m^2 of seabed. Effects of penetration and/or disturbance to the seabed will be limited to the direct footprint of external cable protection. In the context of the wider seabed, this represents a small area. Furthermore, the locations that may require external cable protection are located within areas of gravel and gravelly sand which are widely distributed on the seabed. Effects of the proposed remedial works on the seabed from external cable protection will have a larger impact than trenching, however the overall significance of effect on physical processes is considered to be Not Significant.

5.2.1.2 Physical change (to another seabed type)

In areas requiring external cable protection, there will be a permanent change to the seabed from coarse natural materials to a hard-anthropogenic structure. Despite this, it is important to consider the addition of anthropogenic structures in the context of the existing seabed types. The geophysical survey undertaken in 2019 along the EWIC route identified frequent outcrops of diamicton and bedrock and several localised boulder fields (MMT 2019). The introduction of external cable protection is therefore not outside the existing character of the seabed. Considering this and the small footprint of external cable protection, effects relating to a physical change in seabed type are considered to be Not Significant.

5.2.1.3 Water flow (tidal current) changes, including sediment transport considerations

The introduction of external cable protection has the potential to cause localised changes in water flow. Typically, it is the action of waves on seabed sediments that causes the development of pits, roughs or depressions (i.e. scour) in the seabed sediment around the edges of external cable protection. Where this modifies the seabed from its natural state it can affect sensitive receptors through habitat alteration and rate of additional sediment suspension. The placement of external cable protection can also result in turbulent flow from acceleration or deceleration of tidal flow over the cable protection structure. The magnitude of turbulence created by external cable protection corresponds to the shape and size of the protection. It is considered that hydrodynamic changes as a result of the low profile of external cable protection will be highly localised with turbulent flow present for a few metres downstream of each external cable protection structure. While there is a slight difference in the heights of rock protection (1m) and concrete mattresses (0.15 – 0.45m), for the purposes of this assessment there will not be noticeable differences in potential water flow changes.

As changes to water flow are limited to within a few metres of the external cable protection there will be no significant changes to sediment transport at the areas of the proposed remedial works, especially considered the strong nature of currents experienced in the region.

Effects on water flow due to placement of external cable protection on the seabed are considered Not Significant based on the localised changes anticipated and the exiting strong current and sediment transport processes in the region.

5.3 Protected Sites

The HRA screening presented in Appendix B assessed 13 European sites that are either within the direct zone of influence of the proposed remedial works or contain mobile Annex II species which could potentially travel into the area of the proposed remedial works.

It was identified that the proposed remedial works had the potential to induce the following pressures on European sites:

- Underwater noise changes;
- Visual disturbance;
- Changes in supporting habitat and prey availability.

Consideration was given to other planned activities in the region that could interact with the Proposed Works and result in in-combination effects. The Proposed Works are temporary and localised.

Of the 13 sites assessed, it was considered possible that a pressure-receptor pathway between the Proposed Works and the qualifying features of all 13 sites. Table 5-1 provides a summary of the HRA Screening assessment which concluded that potential likely significant effects could be ruled out for all sites identified.

Table 5-1 Summary - Potential for likely significant effects

Site Code & Name	Qualifying Interest Screened In for LSE	Potential pressure	Potential in-combination effects	Conclusion
North Anglesey Marine / Gogledd Môn Forol SAC (UK0030398)	Harbour porpoise	Underwater sound changes	**No LSE**	**No LSE**
Liverpool Bay SPA (UK9020294A)	Red throated diver Little gull Little tern Common tern Common scoter	Visual disturbance	**No LSE**	**No LSE**
		Changes to supporting habitat and prey availability	**No LSE**	**No LSE**
Anglesey Terns / Morwenoliaid Ynys Môn SPA (UK9013061)	Common tern Arctic tern Roseate tern Sandwich tern	Visual disturbance	**No LSE**	**No LSE**
		Changes to supporting habitat and prey availability	**No LSE**	**No LSE**
North Channel SAC (UK0030399)	Harbour porpoise	Underwater sound changes	**No LSE**	**No LSE**
West Wales Marine / Gorllewin Cymru Forol SAC (UK0030397)	Harbour porpoise	Underwater sound changes	**No LSE**	**No LSE**
Bristol Channel Approaches SAC (UK0030396)	Harbour porpoise	Underwater sound changes	**No LSE**	**No LSE**
Cardigan Bay/ Bae Ceredigion (UK0012712)	Bottlenose dolphin Grey seal	Underwater sound changes	**No LSE**	**No LSE**
Pen Llŷn a'r Sarnau/ Lleyn Peninsula and the Sarnau (UK0013117)	Bottlenose dolphin Grey seal	Underwater sound changes	**No LSE**	**No LSE**

Site Code & Name	Qualifying Interest Screened In for LSE	Potential pressure	Potential in-combination effects	Conclusion
Pembrokeshire Marine/ Sir Benfro Forol SAC (UK0013116)	Grey seal	Underwater sound changes	**No LSE**	**No LSE**
Rockabill to Dalkey Island SAC (IE0003000)	Harbour porpoise	Underwater sound changes	**No LSE**	**No LSE**
Lambay Island SAC	Grey seal	Underwater sound changes	**No LSE**	**No LSE**
Dee Estuary/ Aber Dyfrdwy SAC (UK0030131)	Sea lamprey River lamprey	Underwater sound changes	**No LSE**	**No LSE**
River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC (UK0030252)	Atlantic salmon Sea lamprey River lamprey	Underwater sound changes	**No LSE**	**No LSE**

5.4 Benthic Ecology

5.4.1 Potential Impacts

5.4.1.1 Habitat structure changes – removal of substratum (extraction)

This pressure considers the temporary and/or reversible habitat loss because of trenching. The process of trenching will result in the temporary disturbance of the seabed of 1m in width. Any benthic communities within the direct footprint of the trench will therefore be disturbed or displaced during trenching activities. Most of the sediment will fall back within the trench, therefore the seabed following trenching will be returned to pre-trenching conditions very swiftly and will be suitable for benthic communities to return to or recolonise. Effects on habitat structure due to removal of sediment during trenching are considered Imperceptible.

5.4.1.2 Penetration and/or disturbance of the substrate below and on the surface of the seabed, including abrasion

Small areas of seabed will be affected by the trenching and external cable protection activities. The total footprint anticipated to be affected by trenching is approximately 11,000m^2 based on 1,100m of EWIC requiring reburial and assuming a worst case 10m footprint for the trenching tool. It should be noted however that disturbance will only be limited to the direct footprint of trenching (1m) and the trenching tool tracks on the seabed and therefore will be less than 10m. When considering the width of the trench, the area affected is reduced to 1,100m^2. If trenching is not successful at re-burying the cable to target depth and external cable protection is required, a footprint of 1620m^2 would be affected by concrete mattressing and roughly 5,400m^2 (representing worst-case) of seabed will be affected if rock protection is used.

Any benthic communities within the direct footprint of trenching (1m) or beneath the tracks of the trenching tool will be impacted through mortality, injury or displacement. However, softer sediments (such as sand and mud) are highly recoverable to disturbance and typical species are generally adapted to change through natural disturbance due to the mobility of sandy substrates (RPS 2019). In addition, the majority of fauna in the area is infaunal and therefore species will be able to burrow away from areas of disturbance. External cable protection will also lead to the mortality, injury or displacement of benthic communities following their placement. As external cable protection is a permanent feature, infaunal communities inhabiting sedimentary habitats are unlikely to recover, however there is sufficient sedimentary habitat in the surrounding region that there will be no significant impacts to benthic communities.

The benthic habitats identified within the EWIC cable route are widespread and common for the region. Therefore, any disturbance is not expected to have an impact on the wider population of benthic fauna and the significance of any effect will be Imperceptible.

5.4.1.3 Physical change (to another seabed type)

There is the potential for a worst case of 5,400m^2 of seabed to be permanently changed from sand and gravelly sand to a hard-anthropogenic structure on the seabed. When considering the infaunal nature of the benthic communities present along the EWIC route, this will result in the permanent loss of primarily sedimentary habitats. Any effects experienced by benthic communities due to external cable protection will be highly localised and considering the wider context of sedimentary habitat along and surrounding the EWIC route, external cable protection is not considered to have a significant effect on benthic communities. Furthermore, it should be noted that the introduction of hard substrate is not outside the context of existing habitats in the region with an area of faunal communities on deep moderate energy circalittoral rock (EUNIS Habitat: A4.27) located between KP90 and KP100.

Considering this, effects as a result of external cable protection measures will be Not Significant.

5.4.1.4 Siltation rate changes, including smothering (depth of vertical sediment overburden)

In relation to sediment transport, the seabed sediments in the vicinity of the Proposed Works are typical of highly energetic conditions, with a lower abundance of fine sediments such as silt and clay. Fugro undertook grab sampling at 28 locations along the EWIC route which are presented in Appendix A of the CIRA. A review of this information demonstrates that the majority of grab samples had a fines content of less than 24% with only two areas demonstrating a higher fines content of 31% (KP 42 – KP56) and 54% (KP 70.5 – KP 74).

Sediment suspended into the water column during trenching and the subsequent deposition of this material back to the seabed has the potential to adversely impact benthic communities on and in proximity to the Proposed Works. During trenching seabed sediment will be re-suspended into the water column increasing suspended sediment concentrations (SSC) and creating sediment plumes that can have negative effects on habitats and species. The magnitude of effect is dependent on the sediment size and the scale of disturbance undertaken but in general sediment plumes created by subsea cable activities are of smaller magnitude than those associated with other marine activities, such as aggregate extraction (NIRAS 2015). Coarser sediments such as sand and gravel settle relatively close to the origin of disturbance, with finer sediments including clay and silt can be suspended for longer periods of time. In 2008, the Department for Business Enterprise & Regulatory Reform reviewed cabling techniques and environmental effects used in the offshore windfarm industry. The conclusions of this review in relation to jetting and subsequent sediment dispersion were that most of the sediment deposition occurs within tens of meters of the cable route. Case studies have shown the largest deposition footprint is 200m either side of the cable with the vast majority of the disturbed sediment will initially resettle within 20m of the cable, with almost no sand being carried more than 100m from the cable except as part of the natural background transport (BERR 2008).

When considering the above discussions, the coarse nature of sediments in the region and strong tidal currents the distance of any sediment plume would be expected to be advected a maximum of 200m either side of the Proposed Works. Considering the length of trenching required (1,100m) multiplied by the distance the sediment plume is advected by the current (400m) equates to a total area affected of 0.44km^2. While this represents a considerable area, it is important to note that trenching will be a series of spatially and temporally limited plumes over the entire duration of the Proposed Works. Sediment plumes relating to sand and gravel sediments and subsequent deposition effects will be temporary (return to baseline levels within hours), and localised (within 400m of the Proposed Works).

It is recognised that there are some discreet areas with the presence of fine sediments (i.e. clays) and in these areas the spatial extent of sediment plumes has the potential to extend thousands of metres

from the source. It is however anticipated that suspended sediment concentrations in these areas will be limited to the source of the Proposed Works with strong tidal currents in the area dispersing any fine plumes which will return below background levels within a few hundred metres of the Proposed Works. The suspended sediment concentrations experienced are considered within the natural variability of storms in the region.

As discussed in Section 5.2.1.3, trenching will lead to temporary increases in SSC's. The resulting sediment plume in areas of sand and gravel is anticipated to extend a worst-case of 200m either side of the proposed remedial works and will resettle on the seabed within seconds (gravel) and minutes (sand) of disturbance. For Remedial Work locations with a higher fines context, sediment plumes are anticipated to travel further (tens of thousands of metres) with elevated levels of SSC's limited to the immediate vicinity of the Proposed Works and rapidly dispersed by strong tidal currents. The majority of sand and gravel will fall back within the trench, however the subsequent deposition of sediment within 400m of the Proposed Works is unlikely to have any significant smothering effect, considering the small volume of sediment mobilised and the localised footprint. In addition, most species likely to be observed in the Proposed Works are infaunal, therefore they will be adapted to high sediments loads and will be able to burrow away from areas of sediment deposition. Therefore, any disturbance from smothering and siltation rate changes is not expected to have an impact on the wider population of benthic fauna and the significance of any effect will be Imperceptible.

5.5 Marine Mammals

5.5.1 Potential Impacts

5.5.1.1 Underwater sound changes

One of the most important environmental considerations related to the Proposed Works is the potential effects of underwater sound. This pressure considers the potential for harbour porpoise to be affected by sound associated with activities undertaken during the Proposed Works, such as vessel movements, trenching and geophysical survey. Focus has been given to harbour porpoise as they are a primary feature within the North Anglesey Marine / Gogledd Môn Forol SAC (UK0030398) and are most sensitive to underwater noise changes. An assessment of underwater noise changes on protected sites has been undertaken within Appendix B: HRA Screening.

Both cetaceans and pinnipeds have evolved to use sound as an important aid in navigation, communication and hunting (Richardson et al. 1995). It is generally accepted that exposure to anthropogenic sound can induce a range of behaviour effects and, in the extreme, to permanent injury in marine mammals. Loud and prolonged sound above background levels is considered to be noise and may have an effect on marine life. This may mask communicative or hunting vocalisations, preventing social interactions and effective hunting.

High intensity noises can cause temporary or permanent changes to animals' hearing if the animal is exposed to the sound in close proximity and, in some circumstances, can lead to the death of the animal (Richardson et al. 1995). Where the threshold of hearing is temporarily damaged, it is considered a temporary threshold shift (TTS), and the animal is expected to recover. If there is permanent damage (permanent threshold shift (PTS)) where the animal does not recover, social isolation and a restricted ability to locate food may occur, potentially leading to the death of the animal (Southall et al. 2007).

Behavioural disturbance from underwater sound sources is more difficult to assess than injury and is dependent upon many factors related to the circumstances of the exposure (Southall et al. 2007, NFMS 2018). An animal's ability to detect sounds produced by anthropogenic activities depends on its hearing sensitivity and the magnitude of the noise compared to the amount of natural ambient and background anthropogenic sound. In simple terms for a sound to be detected it must be louder than background and above the animal's hearing sensitivity at the relevant sound frequency.

For the purposes of this assessment, a qualitative approach has been taken using existing literature as this was considered proportionate to the Proposed Works being undertaken and their potential to generate underwater sound changes which could affect marine mammals.

Continuous sound

Continuous sound, e.g. from shipping, is non-pulsed and can be broadband, narrowband or tonal. Continuous sound can either be intermittent or continuous within a 24hr period (NMFS 2018). Of the activities to be undertaken during the proposed remedial works, the following produce continuous sound: trenching; the use of thrusters on the Project vessel(s) for dynamically positioning (DP); and the placement of deposits on the seabed i.e. (rock placement and potentially concrete mattresses). Continuous sound will be produced intermittently over a period of 24hrs (several hours at each location). Table 5-2 below outlines the parameters for the Proposed Works.

Table 5-2 Proposed Works Continuous Sound Sources

Activity	DP vessel (Genesis 2011)	Trenching (Nedwell 2003)	Rock placement (Wyatt 2008)
Source Level: SPL RMS (dB re 1 µPa^2 @ 1m)	184	178	188
Source Level : 24 hr SEL RMS (dB re 1 µPa^{2}s @ 1m)	233	227	237
Frequency: Hz	63	125	10,000

The estimated unweighted source level for sound from the Project vessel(s) is 184dB re 1 µPa @ 1m and 178dB re 1 µPa @ 1m for trenching. There are no published guidelines on disturbance thresholds due to the complexity and variability of the responses of marine mammals to anthropogenic disturbance. For the purposes of this assessment the threshold for behavioural disturbance is considered to be 120dB re 1 µPa^{-2}s (RMS) (Gomez et al. 2016, BOEM 2017, NMFS 2018) and has been used for continuous sound for all cetacean species.

It is important to note that the Project vessel(s), trenching and concrete mattress/rock placement will not occur continuously during the Proposed Works. The Project vessel(s) will use thrusters sporadically, to maintain a position over the remedial works locations, therefore the source level will fluctuate throughout the duration of the Proposed Works and will only peak at the 184 dB re 1 µPa @ 1m for short periods. Trenching will only be operational in discrete areas corresponding to the Proposed Works and therefore will only reach a peak of 178dB re 1 µPa @ 1m for short durations. In the worst-case, rock placement may be required at up to five locations, therefore noise generated by this activity will be at discrete points along the route and will be temporary, lasting several hours at each location. Activities at each Remedial Works location will therefore be limited to a few hours.

At the estimated sound levels, the likelihood of potential injury has been assessed as low and limited to discrete windows during the Proposed Works and only in close vicinity (<10m) to the works. It is assumed that all marine mammals will move away at a speed of 1.5m/s (Otani et al. 2000, Lepper et al. 2012) from a sound source level. This is considered conservative as there is data (McGarry et al. 2017, Kastelein et al. 2018, van Beest et al. 2018) to suggest that animals will move away at much higher speeds (e.g. harbour porpoise at 1.9m/s (Kastelein et al. 2018), at least initially. During the Proposed Works, the Project vessel(s) will be operating at slow speeds, therefore it is expected that any individuals in proximity of the Project vessel(s) and the trenching tool will be able to move away from the area affected to avoid injurious noise levels. However, the action of moving away from a sound level is a behavioural response. Whether this can be considered disturbance relates to whether the animal(s) is significantly affected by the response e.g. will it lead to a change in the animals' condition. immediately following the proposed remedial works, individuals will be able to return to the area once activities have ceased.

The Proposed Works also need to be considered in the context of the existing baseline sound environment. Shipping density in the area was considered as part of the CIRA which concluded there were four areas of high shipping density, between KP 20 to 45, KP 90 to 125, KP135 to KP140 and KP170, all orientated in an east-west orientation across the Proposed Works. The high shipping density in the region suggests individuals are already habituated to higher levels of underwater sound and therefore underwater sound from the Proposed Works will not be discernible above natural and anthropogenic noise in the region. Overall, effects of continuous underwater sound changes as part of the Proposed Works are considered Not Significant based on the temporary and intermittent activities occurring at discrete locations and the localised effects and ability for marine mammals to avoid areas temporarily affected.

Impulsive noise

The geophysical survey following the trenching will produce impulsive noise of 235dB re 1 µPa @ 1m (SPL RMS). There are no published guidelines on disturbance thresholds due to the complexity and variability of the responses of marine mammals to anthropogenic disturbance. For the purposes of this assessment the threshold for behavioural disturbance has been assessed as 140dB re 1 µPa for impulsive noise. Prior modelling for similar geophysical surveys (Lurton 2016) has demonstrated the zone of influence for injurious effects from geophysical survey is within proximity to the equipment, therefore individuals would need to be present near the Project vessel(s) to experience injurious effects. It is suggested that cetacean and pinniped species can swim out of the spatially limited zone for injurious effects. The zone of influence relating to disturbance from geophysical survey is expected to be larger, however considering the temporary nature of the geophysical survey, individuals can return to the area immediately after the activity ceases.

It is noted in the JNCC guidelines for minimising the risk of injury and disturbance to marine mammals from seismic surveys (JNCC 2017) that JNCC advise that mitigation is not required for multi-beam echosounder surveys in shallower waters (<200m). This is because the higher frequencies used typically fall outside the hearing frequencies of cetaceans and the sounds produced are likely to attenuate more quickly than the lower frequencies used in deeper waters (JNCC 2017).

Based on the above, the effects of geophysical survey on marine mammals is Not Significant when considering the localised zone of influence and temporary nature of the proposed remedial works.

5.6 Marine Birds

5.6.1 Potential Impacts

5.6.1.1 Visual disturbance

The additional activity in the region during the Proposed Works may disturb birds in the vicinity which use the area for feeding and loafing.

Disturbance can lead to a number of physiological and behavioural responses which can affect demographic characteristics of the population. Responses to disturbance can result in loss of energy; impaired breeding; unrest through increased vigilance; and disruption to incubation leading to increased nest failures due to predation and nest abandonment (Valente and Fischer 2011).

The extent to which a seabird responds to disturbance is dependent upon a number of factors including: period of breeding cycle during which disturbance occurs; duration, type and intensity of the disturbance; presence of opportunistic predators; and the degree of habituation with the disturbance (Showler et al. 2010). Some seabirds are more resilient to disturbance than others.

Whilst birds present on the surface waters in the vicinity of the Project vessel(s) could be temporarily displaced from their chosen feeding/resting location, they are likely to readily move to another nearby location. Given the short duration of the Proposed Works (12 days maximum at discrete locations

over two separate campaigns), any disturbance at a given location is likely to be minimal and given the level of shipping activity in the region, disturbance is unlikely to be felt against background levels. Therefore, the significance of effects on birds from the Proposed Works will be Imperceptible.

The HRA screening (Appendix B) concluded that the likelihood of breeding birds being present in the area during the Proposed Works was very low as the areas recognised for breeding and nesting bird populations within the Liverpool Bay SPA and Anglesey Terns SPA are located over 10km from the Proposed Works. In addition, disturbance from the Proposed Works will be transient and take place against a background of existing sources of disturbance such as other vessels/ recreational boating and fishing activities.

5.7 Fish and Shellfish

5.7.1 Potential Impacts

5.7.1.1 Habitat structure changes – removal of substratum (extraction)

Species that have early life stages, either egg laying or larval juvenile ages are most likely to be affected by the Proposed Works. In particular, species which lay their eggs on the seabed such as herring and sandeel, or those species that live in contact with the seabed such as *Nephrops*. Trenching will result in the disturbance of the seabed habitat primarily within the direct footprint of the trench. Therefore, there will be temporary habitat loss while trenching occurs, however following this activity the seabed will return to baseline conditions almost immediately with no change to the seabed. Any eggs or larvae within the direct zone of influence of the trenching may be lost and/or disturbed, however considering the small area of disturbance and the wider suitable spawning and nursery habitat in the region, the significance of any effect will be Imperceptible.

5.7.1.2 Penetration and/or disturbance of the substrate below and on the surface of the seabed, including abrasion

As outlined in Section 5.5.1.1, species with demersal life stages are most vulnerable to this this pressure. This particular pressure focusses on the permanent penetration and/or disturbance associated with external cable protection. A worst case of 5,400m^2 of the seabed will be affected by the installation of external cable protection. Species such as sandeel and herring if present within the direct footprint of the external cable protection will be lost through mortality, injury or disturbance.

Adult sandeel remain burrowed in the substrate during winter in response to decreased food availability, day length and temperature. Sandeel emerge briefly from hibernation to spawn in December or January. The adhesive eggs stick to the substrate and are often partly buried within the upper few centimetres of substrate; hatching occurs during February and March (Wright and Bailey 1996). Considering the lifecycle of sandeel, the Proposed Works will not be undertaken during a sensitive time for this species, however the potential exists for individuals burrowed in the substrate to be affected. Herring in the Irish Sea spawn between late September over a period of 3-4 weeks. Eggs hatch after 1-3 weeks, depending on the water temperature, and pelagic larvae will drift towards important nursery grounds (Coull et al. 1998). Based on the timing of the Proposed Works, there is the potential for direct loss or injury to spawning herring and eggs. Despite this, any loss will have no impact of the population or viability of herring within the Irish Sea. Effects to herring and sandeel as a result of this pressure are considered Not Significant based on the localised footprint of external cable protection and wider availability of spawning and egg-laying habitat.

For more mobile demersal fish species, the effects of penetration and/or disturbance of the seabed are considered Imperceptible based on their ability to move away from the area of disturbance.

5.7.1.3 Siltation rate changes, including smothering (depth of vertical sediment overburden)

Impacts resulting from trenching on spawning and nursery grounds due to changes in siltation rate and smothering have been assessed as Imperceptible based on the small volume of sediment suspended from trenching activities, the limited dispersion of mobilised sediment and the wider expanse of spawning and nursery grounds available. Considering the localised extent of sediment dispersion, spawning and nursery grounds, particularly for herring and sandeel would only be affected within a few metres either side of the trench. Furthermore, most of the sediment mobilised will fall back within the trench therefore the risk of smothering outside of the trench is low.

5.7.1.4 Physical change (to another seabed type)

As outlined in Section 5.5.1.2, species with egg laying or larval juvenile ages and species that rely on the seabed sediment are most likely to be affected by this pressure. The deployment of external cable protection will result in a permanent change to another seabed type of a worst-case of 5,400m^2. The wider availability of spawning habitat within the region means the effects of this pressure have been assessed as Not Significant.

5.7.1.5 Underwater sound changes

The ability of fish to hear noise is dependent on their hearing structures, which indicate their sensitivity to sound. Sound pressure is only detected by those species possessing a swim bladder; the otolith organ acts as a particle motion detector and where linked to the swim bladder, converts sound pressure into particle motion, which is detected by the inner ear. High sensitivity hearing species such as clupeids (e.g. herring, sprat, twaite shad and allis shad) have specialisations of the auditory apparatus where the swim bladder and inner ear are intimately connected and are able to detect frequencies to over 3kHz; with optimum sensitivity between 300Hz-1kHz (Nedwell et al. 2007). Medium sensitivity species (including cod and European eel) have a swim bladder but no specialisation of the auditory apparatus. Low sensitivity species with no swim bladder include bass and flat fish such as plaice (Nedwell et al. 2004). There is also potential for some fish and shellfish species to be vulnerable to acoustic survey activities during sensitive life stages, for example during the egg and larvae development stages.

Existing environmental conditions of background sound within the sea are considered when assessing anthropogenic activities that produce additional sound. Sources of background sound come from shipping, interaction of waves and currents with the seabed, seabed development and operation, fishing industry and recreational activities (Bass and Clark 2003, Southall et al. 2007, OSPAR 2009, Hawkins and Popper 2012, Popper et al. 2014). Fish are likely to become habituated to levels of background sound. A decreased responsiveness over time could arise through a change in tolerance, through habituation (Radford et al. 2016). Therefore, effects are only expected if sound produced during the Proposed Works is significantly above the background sound levels. For continuous activities it is unlikely that death or tissue damage (barotrauma) will occur to fish. The typical behavioural response to sounds by fish might range from no change in behaviour, to a mild awareness (startle response) to larger movements of temporary displacement for the duration of the sound (Popper and Hastings 2009). Popper et al. (2014) identified that there is no direct evidence of permanent injury to fish species from shipping and other continuous noise (such as trenching).

Clupeids are the only hearing specialist fish present within the Proposed Works. Nedwell *et al*. (2012) reviewed herring sensitivity to sources of noise from non-pulse cable laying operations (i.e. cable lay and trenching) and proposed effect ranges. Clupeids are expected to show strong avoidance behaviour (i.e. reaction by virtually all individuals) within 8m of the works, whilst significant avoidance (85% of individuals will react to noise) is expected within 66m. Upon reviewing AIS data, it is clear that shipping density, particularly towards the coast of North Wales is relatively high compared to the surrounding area. Therefore, it is likely that existing background noise levels from shipping within the Irish Sea will mask the disturbance effect to herring within the Proposed Works.

The presence of a Project vessel(s) means it is likely that the most hearing specialist fish will demonstrate temporary avoidance behaviour. The Proposed Works will not lead to any long-term displacement as they are transient and temporary. Individuals would be expected to be able to return once the Proposed Works are complete. However, it should be noted that the ability of small fish to take avoiding action may be limited, and temporary displacement may not therefore occur.

Geophysical survey activity is not considered in the discussion above. Multi-beam echosounder geophysical survey will be used during post-installation inspection surveys. Most noise from a geophysical survey is likely to be generated at frequencies greater than 1kHz, above the auditory capacity of fish (generally between 0.2Hz to 1kHz). In addition, sound from survey equipment is targeted towards the seabed, meaning that effects to fish are only expected if they are within the immediate zone of ensonification below the ROV or Project vessel(s). It is expected that fish will avoid the area once the geophysical survey has started and are extremely unlikely to move towards the sound source. Therefore, fish will experience temporary displacement from the immediate area surrounding the Proposed Works, however individuals will return to the area quickly as the based on the temporary nature of the geophysical survey and as it progresses to each location. In conclusion, underwater noise changes will be Not Significant on fish or shellfish receptors.

All SAC's within 40km of the Proposed Works were screened for the presence of Annex II migratory fish species as qualifying features in recognition that as mobile species, fish could potentially migrate through the Proposed Works. The HRA Screening identified the following Annex II species that are likely to migrate through or be present within the Proposed Works:

- Sea lamprey
- River lamprey
- Atlantic salmon

An assessment of underwater sound changes for these species has been considered within the HRA Screening provided in Appendix B The HRA Screening concluded no likely significant effects from underwater sound changes on all of these species, and that Appropriate Assessment is not required.

5.8 Marine Activity

5.8.1 Commercial Fisheries

5.8.1.1 Potential Impacts

Snagging hazard

A potential impact from external cable protection on commercial fishing is the risk of fishing gear becoming snagged or entangled on concrete mattresses or rock protection. Fishing activity along the route is primarily Irish prawn trawlers between KP10 to KP55, beam trawling and scallop dredging between KP55 and KP 160 with further commercial fishing activity taking place in inshore waters of North Wales. The risk of snagging hazards is higher for rock protection compared to concrete mattresses as most fishing activities can still occur over concrete mattresses based on their lower profile. At this stage it is not possible to determine which external cable protection measures will be utilised as this is dependent on the success of trenching at reburying the cable. While the level of external cable protection in the region will be increasing, the risk of snagging does not increase over and above the risk presented by the original EWIC external cable protection and will decrease when taking into account the purpose of the Proposed Works which is to reduce the risk represented by the two identified cable exposures and the shallow sediment cover identified at the other remedial works locations. The effect of snagging hazards on commercial fisheries as a result the proposed remedial works is considered Not Significant. This assessment considers design constraint two which ensures Notice to Mariners are issued to make other sea users aware of the Proposed Works and design

constraint three which involves the FLO communicating and informing fishing stakeholders in the region.

Displacement of fishing vessels

The Proposed Works are minor, temporary activities involving Project vessel(s) on location for a maximum of twelve days. In addition, this will not be twelve consecutive days but will be split across to installation campaigns, should rock protection be required. Therefore, any potential impact is expected to be localise and temporary and therefore minor.

Notices to Mariners will be issued by the installation contractor requesting that vessels keep a safe distance from the works. The Applicant's Fisheries Liaison Officer for the Proposed Works will ensure that all local fishing organisations are in receipt of the Notice to Mariners and are aware of the Proposed Works ahead of mobilisation. The safety zone is generally 500m radial distance, although might be extended further to the rear of the Project vessel(s) if towed gear is in use. The FLO will request fishermen with static gear in the application area move static gear until the survey has been completed. The installation contractor will define specific 'blocks' in which Proposed Works will be completed before the next block starts. This will minimise the time a particular area has to be cleared by static gear. Section 3.7 indicates that between KP55 and KP160, the primary fishing activity is beam trawling and scallop dredging (on harder, rocky ground). In addition, there are static fishing activities in Welsh waters and the inshore grounds off Barkby Beach, north Wales between KP160 and KP185.

As the safety zone moves with the installation vessel or survey spread, potential displacement impacts will be temporary and restricted to this relatively small zone.

The execution of the Proposed Works will increase the volume of shipping traffic by an Imperceptible amount; within the boundary of seasonal fluctuations. Therefore, there will be no additional navigational safety implications. However, established marine navigation practices will be adhered to and maintained by the Project vessel(s) involved.

As the works are temporary there will be no effect on marine navigation and fishing activity once the Proposed Works has been completed. Therefore, the significance of effects on commercial fisheries in the area will be Imperceptible.

Loss or damage to fisheries habitats/fish stocks

Trenching may temporarily increase the volume of SSC's in the water column and external cable protection could result in the permanent loss of habitats providing for target species in local fisheries. The Proposed Works are located within key offshore beam trawling and scallop dredging fisheries and inshore pots and set nets. Furthermore, the Water Framework Directive Assessment provided in Appendix C identified the Rhos-on-sea mussel shellfish waters which are located 9.5km from the nearest Remedial Works location, however this site is not currently commercially exploited and therefore has not been considered further.

Trenching will result in a localised and temporary increase in SSC which will rapidly return to pre-trenching conditions. Therefore, trenching will not result in a significant or long-term loss or damage to fisheries habitats or fish stocks in the region. The deployment of external cable protection may reduce the availability of habitat for species that rely on sedimentary habitats such as herring and sandeel. However, as discussed in Section 5.7 any potential loss of habitat will have no impact on the population or viability of sandeel and herring within the Irish Sea based on the localised footprints of disturbance and seabed change and the wider availability of sedimentary habitats throughout the region. Therefore, effects of the Proposed Works on fisheries habitats and potential fish stocks is considered to be Not Significant.

5.8.2 Shipping and Navigation

5.8.2.1 Potential Impacts

Displacement of vessels

As mentioned in Section 5.8.8.1 Notices to Mariners will be issued by the installation contractor requesting that vessels keep a safe distance from the works. The Applicant's Fisheries Liaison Officer for the Proposed Works will ensure that all local fishing organisations are in receipt of the Notice to Mariners and are aware of the Proposed Works ahead of mobilisation. The safety zone is generally 500m radial distance, although might be extended further to the rear of the Project vessel(s) if towed gear is in use. As the safety zone moves with the survey spread, potential impacts will be temporary and restricted to this relatively small zone.

As the works are temporary there will be no effect on marine navigation and shipping and navigation activity once the survey has been completed. Therefore, the significance of effects on shipping and navigation in the area will be Imperceptible.

Snagging hazard

This requirement for external cable protection is dependent on the level of cable exposure or sediment cover that is identified along the cable. If required, concrete mattresses and/or rock protection will be placed to protect the cable and prevent the potential impact of vessels anchors snagging the cable. The deployment of external cable protection is expected to result in a Not Significant effect on shipping and navigation.

5.8.3 Recreation

5.8.3.1 Potential Impacts

Restricted access to recreational users

The main recreational activities with potential to be affected by the Proposed Works is likely to be restricted to personal watercraft, with water sports such as kayaking, canoeing and sailing restricted to the North Wales coastline due to the strong tidal action in the region. The Proposed Works will involve the addition of one Project vessel(s) at any one time over a maximum period of 12 days (at discrete locations over two separate campaigns). During this time, the Project vessel(s) will be moving slowly between each Remedial Works Area and almost stationary during trenching and external cable protection deployment. Recreational receptors will have restricted access during this time due to the application of a Safety Zone around the operations, however as identified within Section 3.7.5, the region is primarily within low intensity recreational routes. Considering the temporary nature of the Proposed Works (maximum of 12 days), this will not have a significant effect on recreational receptors in the region. Design constraint two includes Notices to Mariners that will be issued by the installation contractor to ensure other sea users are made aware and maintain a safe distance from the Proposed Works. Considering the above, effects of restricted access to recreational users will be Imperceptible.

5.9 Other Proposed Activities in the Area

5.9.1.1 Cumulative and in-combination effects

Section 3.8 identified 11 projects within the proximity and that have the potential to overlap with the Proposed Works. A high-level assessment for each project is presented below.

Holyhead Breakwater Refurbishment

A screening and scoping opinion was provided by NRW on the 23rd July 2020 stating that the remedial works at Holyhead Breakwater will be subject to an EIA. According to the scoping report, the remedial works would involve fabrication and regrading works anticipated to take place between March 2021

to January 2023 depending on the construction programme selected. The other option is to begin works in March 2022 over three stages lasting until October 2027. There is the potential for the Proposed Works to overlap with the Holyhead Breakwater Refurbishment should a second installation campaign be required in 2021.

Holyhead Marina Re-build Project

On the 4th February 2020, a screening and scoping opinion was provided by NRW pertaining to the construction of a rubble mound breakwater, bridgehead, access, security, fuel pontoon, RNLI lifeboat, mooring and tethering and shore-side infrastructure associated within the re-building of the marina. NRW confirmed that the project should be subject to an EIA, specifically in relation to marine mammals within the North Anglesey Marine SAC and Holy Island SAC. While the dates of implementation are unknown, it is reasonable to assume that this project could overlap with the Proposed Works, this is only likely if a second installation campaign is required.

Enhancement of coastal defence at East Rhyl

On the 5th July 2019, NRW granted a marine licence in relation to the construction of rock revetment and replacement of the existing sea wall in East Rhyl. Construction works are set to take place between July 2020 and July 2022. Based on the dates of construction, there is the potential that the Proposed Works will overlap with the coastal defence works are East Rhyl.

Morlais Tidal Array

On the 17th September 2019, Menter Mon submitted a marine licence application to NRW relating to the Morlais Tidal Array. A consultation ran between 27th November 2019 and 8th January 2020, however following this NRW requested further information from Meter Mon regarding the environmental assessment of the project. Further information was received from Meter Mon on the 8th July 2020 which is undergoing consultation with final responses due by the 9th September 2020. While works on the Morlais Tidal Array are unlikely to occur alongside the Proposed Works in October, there is the potential for the second installation campaign to overlap with this project.

Port of Mostyn

On the 7th July 2020, a marine licence application was submitted to NRW relating to site investigation work in the Dee Estuary, including core penetration tests, vibrocores and boreholes. No information of program is available, however with the decision of the marine licence pending there is the potential for the Proposed Works to overlap with the Port of Mostyn site investigation.

NRW Grab Sampling Survey Programme

On the 1st March 2019, NRW granted a marine licence application to undertake benthic grab sampling and removal of sand, gravel and seabed sediment relating to NRW's ongoing grab sampling survey programme 2019 – 2021. While there is no information on specific timescales, the marine licence lasts until December 2021, therefore there is the potential for the Proposed Works to overlap with the survey programme.

Holyhead Harbour Maintenance Dredging

A marine licence was granted to Sterna Line Ports on the 25th October 2019 relating to maintenance dredging subsequent deposition of material within the inner and outer Holyhead harbour. There is no information of timescales, however the licence is valid until 22nd December 2022 and on this basis could overlap with the Proposed Works.

Holyhead Port Expansion

An environmental statement was submitted to NRW on the 19th July 2019 in relation to the Holyhead Port Expansion. The port expansion comprises the reclamation of two intertidal/subtidal areas and the dredging of an approach channel to 10m. The reclamation work is anticipated to begin in Spring 2020 and last 24 months. There is no current status on this project, however following the proposed

timescales outlined in the environmental statement, there is the potential to overlap with the Proposed Works.

Holyhead Waterfront Development
NRW granted a marine licence on the 26th February 2020 in relation to the Holyhead waterfront development. The works relate to ground investigation works at Holyhead harbour including vibrocores and grab samples. The is no information of programme, however the marine licence application expires on the 24th October 2020. There is therefore the potential for the Proposed Works to overlap with the Holyhead ground investigation works.

Deganway Marine Dredging Conwy
On the 9th June 2020, NRW granted a marine licence to Lakeland Leisure Estates in relation to water injection dredging at Deganwy Marina, Conwy. There is no information on the programme available, however the marine licence expires on the 25th May 2023, therefore there is the potential for the Proposed Works to overlap with this project.

Awel y Môr Offshore Wind Farm
NRW granted a marine licence on the 22nd June 2020 relating to 33 sediment grab samples off the coast of North Wales for the Awel y Môr Offshore Wind Farm. The marine works are due to take place between 15th July and 30th August 2020, however the marine licence covers until 30 June 2021 for operational flexibility. There is therefore the potential for the Proposed Works to overlap with the benthic survey.

5.9.1.2 Assessment

Considering the above, the potential exists for the Proposed Works to overlap with ten other projects within the area. For the purposes of the assessment, these schemes have been grouped by pressures based on the activities being undertaken for each scheme. The pressures identified are:

- Underwater noise changes;
- Habitat structure changes – removal of substratum (extraction).
- Penetration and/or disturbance of the substrate below and on the surface of the seabed, including abrasion
- Siltation rate changes, including smothering (depth of vertical sediment overburden)

Underwater Noise Changes
The Holyhead Breakwater Refurbishment, Holyhead Marine Rebuild Project, Holyhead Port Expansion the Rhyl Coastal Defence Scheme are all likely to result in underwater noise changes as a result of construction or remedial work activities. The Rhyl coastal defence scheme is located 10.5km from the Proposed Works, however this scheme is primarily associated with the intertidal and subtidal area. Given the distance and temporary nature of the Proposed Works, the Proposed Works will result in Imperceptible cumulative effects with the East Rhyl Coastal Defence Scheme. The schemes taking place within Holyhead are all located within or in close proximity to the North Anglesey Marine SAC designated for harbour porpoise. Cumulative effects on this site have been considered as part of HRA Screening provided in Appendix B. Cumulative effects of underwater noise for all other receptors are considered Imperceptible based on the temporary nature of the Proposed Works and the distance from the other schemes (>30km).

Habitat structure changes – removal of substratum (extraction) and penetration and/or disturbance of the substrate below and on the surface of the seabed, including abrasion
Several of the identified schemes involve either grab sampling, dredging or ground investigation, including the Holyhead Harbour Maintenance Dredging, Port of Mostyn, Holyhead Port Expansion Deganway Marine Dredging Conwy, NRW Grab Sampling Programme, Holyhead Waterfront

Development and Awel y Môr Offshore Wind Farm. The above schemes will involve the temporary disturbance of the seabed and the associated benthic and intertidal communities that may be present. The Proposed Works will involve the temporary disturbance of benthic habitat within a width of a few metres of the trenching tool for a combined length of 1,100m. Considering the highly localised and reversible nature of the disturbance and the fact that all schemes will not occur at the same time as the Proposed Works, cumulative effects will be Imperceptible. This is based on the ability of sedimentary habitats to rapidly recover and the distance from the Proposed Works. Locations of benthic sampling for the Awel y Môr Offshore Wind Farm are not known, however it is likely they will be near the Proposed Works. While the exact timescales for the benthic sampling are not known, the small, localised, and reversible nature of grab sampling means the Proposed Works will result in Imperceptible cumulative effects with Awel y Môr Offshore Wind Farm in relation to habitat structures.

Siltation rate changes, including smothering (depth of vertical sediment overburden)

All other projects involving dredging, grab sampling or ground investigation works will result in sediment plumes of different forms and scales. The magnitude of the plume is dependent on the volume of sediment to be disturbed and the sediment type. Activities such as dredging are likely to result in larger changes in siltation rates and are anticipated to travel further than grab sampling and ground investigation works. The Proposed Works will result in highly localised changes to siltation rate as a result of trenching, the effects will be limited to within 400m of the Proposed Works. Given the localised nature of the Proposed Works and the distance of the Holyhead Harbour Maintenance Dredging, Port of Mostyn, Holyhead Port Expansion Deganway Marine Dredging Conwy, NRW Grab Sampling Programme, and Holyhead Waterfront Development from the Proposed Works, cumulative effects from this pressure are Imperceptible.

Similarly to the Proposed Works, benthic sampling for the Awel y Môr Offshore Wind Farm will result in highly localised changes in siltation rates, therefore while there may be the potential for sediment plumes to overlap, this would only occur if both are undertaken on the same day which is considered unlikely. Furthermore, if they were to be undertaken at the same time, the depth of vertical sediment overburden would not result in significant effects. Cumulative effects as a result of siltation rate changes with the Awel y Môr Offshore Wind Farm are Imperceptible.

6. CONCLUSIONS

The conclusion of the environmental assessment is that the Proposed Works will not result in significant effects to any receptors or as a result of any pressures identified. A summary of the receptors, pressures identified, and significance of effect is provided in Table 6-1.

Table 6-1 Summary of Assessment

Receptor	Pressure	Significance of Effect
Physical Process	Penetration and/or disturbance of the substrate on the surface and below the surface of the seabed including abrasion	Not Significant
	Physical change (to another seabed type)	Not Significant
	Water flow (tidal current) changes, including sediment transport considerations	Not Significant
Protected Sites	Underwater noise changes	No Likely Significant Effects
	Visual Disturbance	
	Changes in supporting habitat and prey availability	
Benthic Ecology	Habitat structure changes – removal of substratum (extraction)	Imperceptible
	Penetration and/or disturbance of the substrate below and on the surface of the seabed, including abrasion	Imperceptible
	Physical change (to another seabed type)	Not Significant
	Siltation rate changes, including smothering (depth of vertical sediment overburden)	Imperceptible
Marine Mammals	Underwater noise changes	Not Significant
Marine Birds	Visual Disturbance	Imperceptible
	Changes in supporting habitat and prey availability	Imperceptible
Fish and Shellfish	Habitat structure changes – removal of substratum (extraction)	Imperceptible
	Penetration and/or disturbance of the substrate below and on the surface of the seabed, including abrasion	Not Significant (Herring and Sandeel) Imperceptible (All other species)
	Siltation rate changes, including smothering (depth of vertical sediment overburden)	Imperceptible
	Physical change (to another seabed type)	Not Significant
	Underwater noise changes	Not Significant
Marine Activity	Snagging hazard	Not Significant
	Displacement of vessels	Imperceptible
	Loss or damage to fisheries habitats/fish stocks	Imperceptible
	Restricted access for recreational users	Imperceptible

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APPENDIX A

Habitats Regulations Assessment Screening

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East West Interconnector Cable Remedial Works - Marine Licence Application

Appendix A: Habitats Regulations Assessment Screening

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Intertek Energy & Water Consultancy Services
Exchange House, Station Road, Liphook, Hampshire GU30 7DW, United Kingdom

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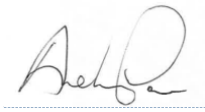
East West Interconnector Cable Remedial Works - Marine Licence Application

Appendix A: Habitats Regulations Assessment Screening

Author/s

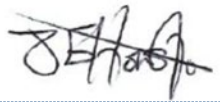
Nick Archibald

Project Manager



Andy Page

Authoriser



Eric Houston

Rev No	Date	Reason	Author	Checker	Authoriser
Rev 0	11/08/2020	Original	NJA	EH/AF	EH

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GLOSSARY

AA
Appropriate Assessment

BSP
Biosecurity Plan

CIRA
Cable Risk Integrity Assessment

CLV
Cable Lay Vessel

CSHR
Conservation of Habitats and Species Regulations

DAERA
Department of Agriculture, Environment and Rural Affairs

DP
Dynamic Positioning

EDR
Effective Deterrent Range

EMODnet
European Marine Observation and Data Network

EWIC
East West Interconnector

FCS
Favourable Conservation Status

FLO
Fisheries Liaison Officer

GIS
Geographic Information System

HRA
Habitats Regulations Assessment

HVDC
High Voltage Direct Current

IROPI
Imperative Reasons of Overriding Public Interest

JNCC
Joint Nature Conservation Committee

MBES
Multi-Beam Echosounder

MU
Management Unit

NRW
Natural Resources Wales

OMR
Conservation of Offshore Marine Habitats and Species Regulations

PTS
Permanent Threshold Shift

RMS
Root Mean Square

ROV
Remote Operated Vehicle

SAC
Special Area of Conservation

SEL
Sound Exposure Level

SPA
Special Protection Area

SPL
Sound Pressure Level

SSSI
Site of Special Scientific Interest

TTS
Temporary Threshold Shift

WFD
Water Framework Directive

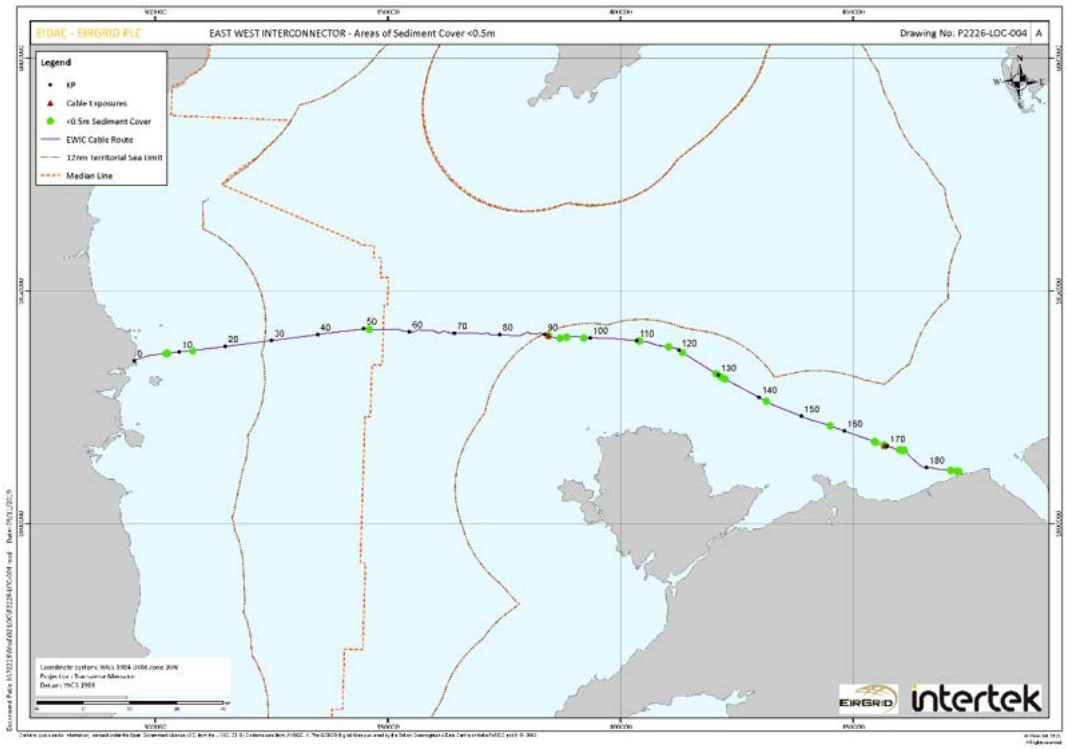
ZOI
Zone of Influence

1. INTRODUCTION

1.1 Project Background

The East West Interconnector (EWIC) is a 500 MW High Voltage Direct Current (HVDC) electricity interconnector linking the Irish and British electricity markets. Following post-installation inspections, incorporating a marine survey and geophysical condition survey, two cable exposures and several areas of low sediment cover (less than 0.5m) were identified along the EWIC cable route which require remedial works to reinstate the EWIC cable back to a level of acceptable risk. In addition to these areas, Intertek have undertaken a Cable Integrity Risk Assessment (CIRA) of the entire EWIC cable route and have identified the need for remedial works at seven other locations along the EWIC cable route. The remedial works consist of a combination of reburial of the cable by trenching and where necessary placement of external cable protection in the form of rock berms and concrete mattresses. A detailed project description is provided in Section 2 and an overview of the proposed remedial works areas is provided in Figure 1-1.

Figure 1-1 Overview of the proposed remedial works areas



1.2 Requirement for Habitats Regulations Assessment

The Birds Directive (2009/147/EC) and the Habitats Directive (92/42/EEC) put an obligation on European Union (EU) Member States to establish the Natura 2000 network of sites of highest biodiversity importance for rare and threatened habitats and species across the EU. The network comprises Special Areas of Conservation (SACs) designated under the Habitats Directive, and Special Protection Areas (SPAs) designated under the Birds Directive. SPAs and SACs are designated by the individual member states. UK Government policy (ODPM Circular 06/2005) states that sites designated under the Convention on Wetlands known as the "Ramsar Convention"1 are also included under the definition Natura 2000. The vast majority of Ramsar sites are also classified as SPAs. Collectively, SPAs, SACs and Ramsar sites are referred to as European sites under UK Regulations. A key protection

mechanism under these Directives is to consider the possible nature conservation implications of any plan or project on the European site network before any decision is made to allow that plan or project to proceed. Each plan considered for approval, must take into consideration the possible effects it may have in combination with other plans and projects when going through the process known as the Habitats Regulation Assessment (HRA) process.

The obligation to undertake the HRA process derives from Article 6(3) and 6(4) of the Habitats Directive, and both involve several steps and tests that need to be applied in sequential order. Each step in the assessment process precedes and provides a basis for other steps. The results at each step must be documented so there is transparency of the decisions made.

The proposed remedial works are located within the North Anglesey Marine / Gogledd Môn Forol SAC (UK0030398) and the Liverpool Bay SPA (UK9020294A). As the Proposed Works are not directly connected with or necessary to the management of the European sites, under the Habitats Regulations it is necessary that they should be subject to the HRA process.

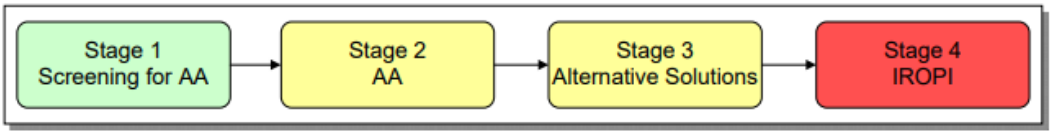
1.3 Legislative Context

Under Article 6(3) of the EU Habitats Directive (Directive 92/43/EEC), any plan or project within or adjacent to a European site must be assessed regarding their implications for the site conservation objectives. If the project is likely to have a significant negative effect on a European site, either alone or in combination with other plans or projects, it must undergo an Appropriate Assessment (AA) by the competent authority (those with decision making powers). Normally, the competent authorities cannot consent the plan / project without first having ascertained that it will not have an adverse effect on the integrity of the site concerned.

If an adverse negative effect is identified it may be possible to adjust the plan/project or introduce certain mitigation measures to avoid or pre-empt, remove or reduce effects to a non-significant level so that the plan/project may be approved (European Commission 2018a).

The European Commission's methodological guidance (European Commission 2002) outlines a four-stage approach to the AA process, where the outcome at each successive stage determines whether a further stage in the process is required. The four stages are shown in Figure 1-2 and described below. Collectively they make up what is referred to in the UK as the Habitat Regulations Assessment (HRA) process.

Figure 1-2 Stages of HRA



The requirements for AA are transposed into UK statute through The Conservation of Habitats and Species Regulations 2017 (CHSR) for territorial waters (out to 12 nm); and The Conservation of Offshore Marine Habitats and Species Regulations 2017 (OMR) for UK Exclusive Economic Zone waters. Collectively they are referred to as the 'Habitat Regulations'.

Whilst the obligation to undertake the AA is derived from Articles 6(3) and 6(4) of the Habitats Directive, it is Regulation 28(2) of the OMR and 63(1) of the CHSR that sets out procedural requirements. They require that the applicant provide such information as the component authority may reasonably require for the purposes of assessment or to enable them to determine whether an AA is required.

There is no statutory method for undertaking the HRA process, but Welsh Government (2017) guidance outlines the steps to be taken by the applicant at each Stage.

1.3.2 Stage 1 - Screening for Appropriate Assessment

Screening is the process that addresses and records the reasoning and conclusions in relation to the first two tests of Regulation 28 of the OMR and Regulation 63 of the CHSR:

- Whether a plan or project is directly connected to or necessary for the management of the site, and
- Whether a plan or project, alone or in combination with other plans and projects, is likely to have significant effects on a European site in view of its conservation objectives.

Where significant effects are likely, uncertain, or unknown at screening stage, then the process must proceed to Stage 2 (AA). Screening should be undertaken without the inclusion of mitigation, unless potential impacts clearly can be avoided through the modification or redesign of the plan or project, in which case the screening process is repeated on the altered plan. The greatest level of evidence and justification will be needed in circumstances when the process ends at screening stage on grounds of no effect.

1.3.3 Stage 2 - Appropriate Assessment

If Stage 1 concludes that an AA is required, then the AA must be undertaken by the Competent Authority licensing the plan or project.

To inform the AA the applicant must provide data and information on the project and on the European site. An analysis of potential effects on the site must be completed and presented as 'Information to Inform Appropriate Assessment'. This is a more detailed ecological assessment of the proposed activities and looks to answer two key questions:

- What are the likely effects of the proposed activity?
- How quickly could the Qualifying Feature recover from the effect, if at all?

The duty to undertake AA, having considered the 'Information to Inform AA', and to ensure that the stringent evaluation and decision-making procedure is applied correctly, lies with the competent authority, which for the Proposed Works is Natural Resources Wales (NRW). The AA will be a focused and detailed impact assessment of the implications of the plan or project, alone and in combination with other plans and projects, on the integrity of a European site in view of its conservation objectives.

If the assessment concludes that the plan or project will adversely affect the integrity of a European site, then the process must proceed to Stage 3, or the plan or project should be abandoned.

Any mitigation measures necessary to avoid, reduce or offset negative effects should be proposed at this stage.

1.3.4 Stage 3 – Alternative solutions

This stage examines any alternative solutions or options that enable the plan or project to proceed without adverse effects on the integrity of a European site. The process must return to Stage 2 as alternatives will require AA to proceed. Demonstrating that all reasonable alternatives have been considered and assessed, and that the least damaging option has been selected, is necessary to progress to Stage 4.

1.3.5 Stage 4 - Imperative Reasons of Overriding Public Interest (IROPI)/Derogation

Stage 4 is the main derogation process of Article 6(4) which examines whether there are imperative reasons of overriding public interest (IROPI) for allowing a plan or project that will have adverse effects on the integrity of a European site to proceed in cases where it has been established that no less damaging alternative solution exists.

The extra protection measures for Annex I priority habitats come into effect when making the IROPI case. IROPI reasons that may be raised for sites hosting priority habitats are those relating to human health, public safety, or beneficial consequences of primary importance to the environment. In the case of other IROPI, the opinion of the European Commission is necessary and should be included in the AA. Compensatory measures must be proposed and assessed. The European Commission must be informed of the compensatory measures. Compensatory measures must be practical, implementable, likely to succeed, proportionate and enforceable, and they must be approved by the NRW.

1.4 Purpose of this Report

The purpose of this report is to inform the HRA process in determining whether the Proposed Works, both alone and in combination with other plans or projects, is likely to have a significant effect on any European site in the context of their conservation objectives and specifically on the habitats and species for which the sites have been designated.

The HRA Screening provides a description of the Proposed Works (Section 2); identifies the European sites that could be affected by the plans (Section 3); and identifies the potential pressures that could arise from the planned activities on the sites (Section 3). It determines it there is any connectivity between the Proposed Works and any European sites (Stage 1 Appropriate Assessment Screening, Section 3) and considers the potential for likely significant effects on the qualifying feature(s) within the affected European site(s).

This report has been prepared in accordance with current guidance, including:

- Managing Natura 2000 sites. The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (European Commission, EC 2018a);
- Guidance on Energy Transmission Infrastructure and EU nature legislation (EC 2018b);
- The Planning Series 16 – Habitats Regulations Assessment (Welsh Government 2017);
- EU Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC (EC 2007); and
- Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (EC 2002).

1.5 Consultation

Consultation has been undertaken with Natural Resources Wales (NRW) at various points during the EIA and HRA processes. On the 9th March 2020, the applicant requested pre-application advice relating to the marine licence application and required supporting documents. NRW confirmed that the marine licence application should be supported by HRA and Water Framework Directive (WFD) Assessment. Further to this on the 15th July 2020, the applicant held a pre-application consultation meeting with NRW Marine Licensing Team to discuss the Proposed Works and any associated environmental and constraints or considerations.

2. PROJECT DESCRIPTION

2.1 Requirement for the Works

Post-installation inspections undertaken during 2019, incorporating a marine survey and geophysical condition survey, have identified two cable exposures and several areas of low sediment cover (less than 0.5m) along the EWIC cable route which require remedial works to reinstate the EWIC cable back to a level of acceptable risk. Intertek have undertaken a Cable Integrity Risk Assessment (CIRA) of the entire EWIC cable route which identified the need for remedial works at a total of eleven locations along the route. The remedial works will include a combination of reburial of the cable by trenching at all locations and placement of external cable protection in the form of concrete mattresses and/or rock placement at five of the eleven locations. At this stage the exact combination of methods which will be required to protect the cable is not known as this will be informed by burial success achieved by trenching and as such the worst case for each of the methods has been assumed.

2.2 Description of the Works

2.2.1 Vessels

2.2.1.1 Cable lay vessel (CLV)

If reburial and concrete mattress placement is undertaken, then the cable lay vessel (CLV) NKT Victoria (as shown in Figure 2-1 below) is likely to be used. A CLV is a specialist ship designed specifically to carry and handle long lengths of heavy power cables. NKT Victoria is equipped with dynamic positioning (DP) systems, which enable the ship to be held very accurately in position despite the effects of currents and wind. This vessel has been proposed by the contractor NKT and would be suitable to undertake cable reburial and protection by trenching and mattress placement. Prior to mobilising to the work site, the vessel will transit to a port, close to the worksite for final mobilisation of cable handling crew, client personnel and equipment.

Figure 2-1 NKT Victoria

2.2.1.2 Rock Placement Vessel

Should rock placement be required a specialist vessel would be utilised. Rock placement vessels feature a large hopper to transport the rock, and a mechanism for deployment of the rock on site. The usual mechanisms are:

- Side dumping, whereby the rock is pushed or tipped over the side of the vessel;
- Split hopper, the halves of which separate to allow the rock to fall through the vessel; and
- Flexible fall pipe, where a retractable chute is used to control the flow of rock to the seabed.

Fall-pipe vessels (Figure 2-2) provide the greatest accuracy as Remote Operated Vehicles (ROVs) can be used to monitor the position of the fall pipe, allowing rock to be more accurately placed, but can only be used in water depths greater than 10m. For rock placement works it is envisaged that a fall-pipe vessel would be utilised.

Figure 2-2 Illustrative construction support vessels

Clockwise from left: Fall pipe vessel, construction support vessel, dive support vessel, crew transfer vessel

2.2.2 Generic Trencher (Jet Trencher)

Jet trenching is a cable installation technique which can be used to bury the cable in areas of loose non cohesive sediments such as sand and silt. It uses a powerful water-jetting tool to fluidise sediments in the seabed, allowing pre-laid cables to sink to the required burial depth.

Most jet trenchers are a self-propelling ROV which is powered and controlled from the CLV or another support vessel. Some are towed rather than self-propelled.

The jet trencher will sit on the seabed and follow the laid cables. High powered pumps inject sea-water into the seabed either side of the cables through jetting 'swords' (Figure 2-3). This fluidises the seabed beneath the cables allowing them to naturally sink to the required burial depth. The seabed sediments naturally re-form and 'back-fill' the trench covering the cables, only creating localised and temporary (less than one tidal cycle) turbidity plumes. If the required burial depth is not achieved, several passes can be made. The system does not remove any seabed sediments from the area.

The jet trencher requires a minimum distance of 100m for the deployment and recovery of the trenching tool which is associated with grading in and out of the seabed. The maximum width expected

to be affected by a jetting trencher is 10m wide associated with the jet trencher's tracks on the seabed. The width of the trench itself will be only 1m.

Figure 2-3 Typical water jetting machines

2.2.3 External Cable Protection

Where cable burial is not feasible due to difficult ground conditions, external protections such as concrete mattressing and rock protection is generally used to protect installed cables.

2.2.3.1 Concrete mattressing

Concrete mattresses are matrices of interlinked concrete blocks which form a close-fitting layer over the cable to provide a strong protective cover to prevent potential impact and snagging by fishing gear or anchors. Typically, concrete mattresses are 6m long by 3m wide.

The mattresses are installed via a crane from either a dive support vessel or a construction support vessel; which lowers them one at a time or in batches using a special frame (Figure 2-4).

Figure 2-4 Concrete mattress deployment (courtesy of FoundOcean)

2.2.3.2 Rock placement

Where the seabed composition is not suitable for concrete mattresses, or where it is expected that mattresses may not provide the protection required, external cable protection will be provided through rock placement. Rock placement is used to protect subsea cables by covering them in a continuous profiled berm of graded rock. The size of the berm will depend on the location, the site-specific anchor and fishing risks and metocean conditions.

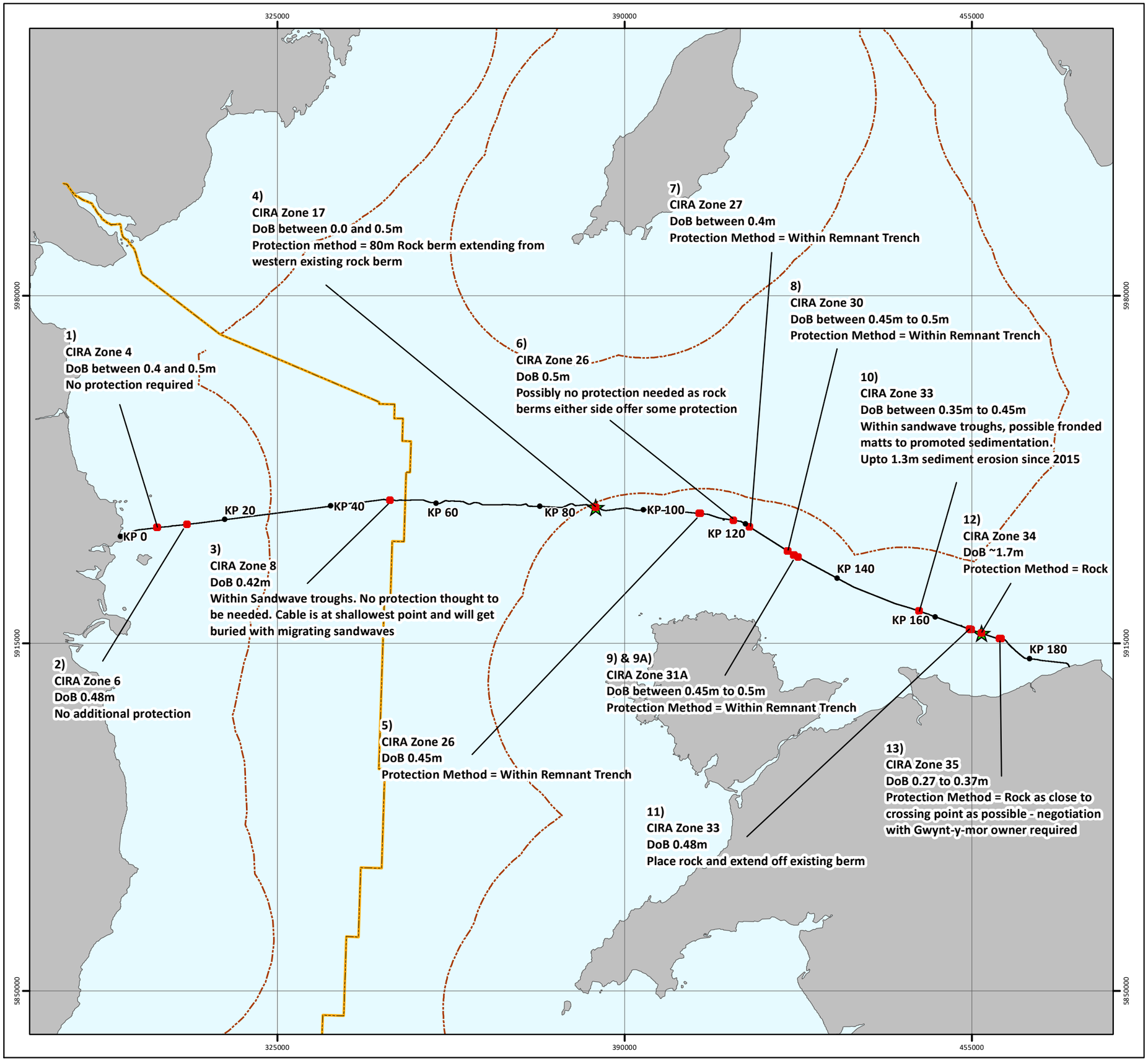
2.2.3.3 Indicative locations for trenching and external cable protection

At all 11 remedial works locations the primary method for reburying the cable will be via trenching. Five out of the eleven locations may require external cable protection should the installation contractor not achieve sufficient reburial using trenching alone. It should be noted that external cable protection may be a combination of both concrete mattresses and rock protection. For the purposes of the assessment, worst-case scenarios have been considered relating to either concrete mattress placement at all five locations and rock protection at all five locations which are worst case scenarios.

The locations that require remedial works are shown in in Figure 2-5 (Drawing Number P2226-LOC-009-A). Table 2-1 provides details of the locations of where remedial works will be required. The worst-case scenario (i.e. in the event external cable protection is required at five remedial works locations) the total requirement is estimated to be:

- Total length of trenching= 1,100m
- Footprint of concrete mattresses[1] = 1,620m^2
- Footprint of rock protection[2] = 5,400m^2
- Rock protection volume = 3,861m^3 (including 30% contingency)

[1] Assuming concrete mattresses are used at all five locations
[2] Assuming rock protection is used at all five locations



EAST WEST INTERCONNECTOR

LOCATION OVERVIEW
Remedial Assessment Areas

Drawing No: P2226-LOC-009 | **A**

Legend

- KP
- EWIC Remedial Assessment Areas
- EWIC Cable Exposure
- EWIC Cable Route
- EEZ Boundary
- 12nm Territorial Sea Limit

N W E S

NOTE: Not to be used for Navigation

Date	22 June 2020
Coordinate System	WGS 1984 UTM Zone 30N
Projection	Transverse Mercator
Datum	WGS 1984
Data Source	UKHO; MARINE REGIONS; GEBCO; ESRI: DCCAE
File Reference	J:\P2226\Mxd\02_LOC\ P2226-LOC-009.mxd
Created By	Chris Carroll
Reviewed By	Chris Dawe
Approved By	Andrew Page

EIRGRID intertek

0 10 20 30 40 km

Table 2-1 Indicative trenching and external cable protection locations

Assessment Area	CIRA Zone ID	Start KP	End KP	Approximate Distance of Required Work (m)	Primary Action	Secondary Action if Primary is unfeasible	Footprint of Concrete Mattresses (m^2)***	Footprint of Rock (m^2)	Volume of Rock (m^3)****
1	4	7.3	7.3	50m	Reburial by Trenching**	N/A	N/A	N/A	N/A
2	6	12.9	12.9	20m	Reburial by Trenching**	N/A	N/A	N/A	N/A
3	8	51.3	51.3	20m	Reburial by Trenching**	N/A	N/A	N/A	N/A
4*	17	90.8	90.9	80m	Reburial by Trenching**	Concrete mattress/Rock protection	240	800	400
5	26	110.5	110.7	x1 20m area x1 30m area (50m total)	Reburial by Trenching**	N/A	N/A	N/A	N/A
6	26	117.6	117.6	20m	Reburial by Trenching**	Concrete mattress/Rock protection	60	200	110
7	27	121.0	121.0	20m	Reburial by Trenching**	N/A	N/A	N/A	N/A
8	30	129.5	129.5	25m	Reburial by Trenching**	N/A	N/A	N/A	N/A
9	31A	130.8	130.8	35m	Reburial by Trenching**	N/A	N/A	N/A	N/A
9A	31A	131.7	131.7	20m	Reburial by Trenching**	N/A	N/A	N/A	N/A
10	33	156.5	156.5	20m	Reburial by Trenching**	N/A	N/A	N/A	N/A

11	33	167.1	167.4	x3 50m areas, (150m total)	Reburial by Trenching**	Concrete mattress/Rock protection	450	1500	825
12*	34	169.4	169.4	20m	Reburial by Trenching**	Concrete mattress/Rock protection	60	200	110
13	35	173.0	173.3	x1 220m area, x1 30m area and x1 20m area (270m total)	Reburial by Trenching**	Concrete mattress/Rock protection	810	2700	1485

* Areas of exposed cable

** Minimum distance of reburial by trenching to be 100m

*** Based on standard concrete mattress size (W= 3m X L= 6m)

**** Based on width and heights of existing EWIC rock berms (W=10m X H=1m) and assuming a 1:5 slope

Remedial Works located within Irish Waters

Locations where external cable protection may be required

2.2.4 Post Remedial Works Geophysical Survey

Following the trenching and deployment of external cable protection, a geophysical survey will be undertaken to determine whether the EWIC cable has been buried to the recommended depth at each of the remedial works locations. The geophysical survey acquisition methodology will comprise multi beam echo sounding (MBES) and is non-intrusive and will not interact with the seabed. The geophysical survey is non-invasive but is based on acoustic methods. The bathymetric survey system proposed is characterised by a limited acoustic footprint with the high directional, high frequency, short duration output attenuated within a few hundred metres of the survey vessel.

The specific equipment to be used during the geophysical survey has not yet been specified. Examples of industry standard equipment for the purpose of geophysical and geotechnical survey have therefore been used in this description. The frequencies and decibels of the equipment to be used to obtain the survey data will be within similar ranges for the equipment described.

2.2.4.1 Multibeam echo sounder (MBES)

MBES is a remote sensing acoustic device typically attached to a vessels hull. The purpose of this equipment will be to map the water depth to seabed (bathymetry). The Kongsberg EM2040 is an example of a MBES device that may be used for the proposed survey works (Figure 2-6).

Figure 2-6 Kongsberg EM2040 MBES

2.3 Proposed Works Programme

The proposed remedial works are anticipated to take up to 12 days, plus any additional time required for weather downtime and breakdown. It is anticipated that trenching and mattressing could take up to seven days and should rock protection be required in a separate campaign window it is anticipated will take up to five days.

2.4 Design Constraints

Case C-323/17 People Over Wind and Peter Sweetman v Coillte establishes that, in determining the likelihood of significant effects (and the need for a Stage 2 Appropriate Assessment under the second step of Article 6(3) of the Habitats Directive) measures to avoid or reduce significant effects on European sites (sometimes referred to as ‘mitigation measures’) cannot be taken into account at the

screening stage. No such measures have been considered in the Stage 1 Screening for Appropriate Assessment.

The table below lists constraints built into the design of the proposed remedial works so that the installation contractor ensures compliance with national and international statute or adopts best practice as determined by the cable industry as the basic standard for how to proceed on a project. These are not additional measures proposed specifically to address the potential for a likely significant effect on a Qualifying Interest, but constraints built into the design of the proposed remedial works.

The main drivers behind the constraints typically relate to compliance with environmental law; or known health and safety issues. Environmental laws and regulations protect the environment. The applicant has a legal obligation to comply with environmental law and therefore it is appropriate to assume that legal compliance will be achieved when conducting Stage 1 Screening for Appropriate Assessment

They have been described in the table to provide the public and stakeholders with a better knowledge of the standard design constraints included in the proposed remedial works description being assessed.

Table 2-2 Design constraints

ID	Design constraints	Driver
1	Notices shall be provided to other sea users in the area of operations via Notice to Mariners	Navigational safety
2	A Fisheries Liaison Officer has been appointed who will be the direct point of contact between the Applicant and fishing stakeholders	Navigational safety
3	Project vessel(s) will be equipped with waste disposal facilities (sewage treatment or waste storage) to IMO MARPOL Annex IV Prevention of Pollution from Ships standards.	Compliance with environmental law
4	Ship Oil Pollution Emergency Plans (SOPEPs) shall be provided by Contractor and implemented covering all vessels in accordance with MARPOL Annex I requirements	Compliance with environmental law
5	Ballast water discharges from all vessels shall be managed under the International Convention for the Control and Management of Ships' Ballast Water and Sediments standard	Compliance with environmental law
6	Hazardous chemicals and materials shall be managed in accordance with applicable standards and guidelines, including maintenance of an inventory of such substances that are used and/or stored, provision of Material Safety Data Sheets (MSDSs), preparation of Chemical Risk Assessments and storage in designated, secure facilities with suitable spill protection and control	Compliance with environmental law
7	A Biosecurity Plan (BSP) shall be prepared and implemented	Compliance with environmental law
8	A 500m safety zone would be established around the Project vessel(s) to ensure the safety of other sea users	Navigational safety

2.5 Consideration of Alternatives

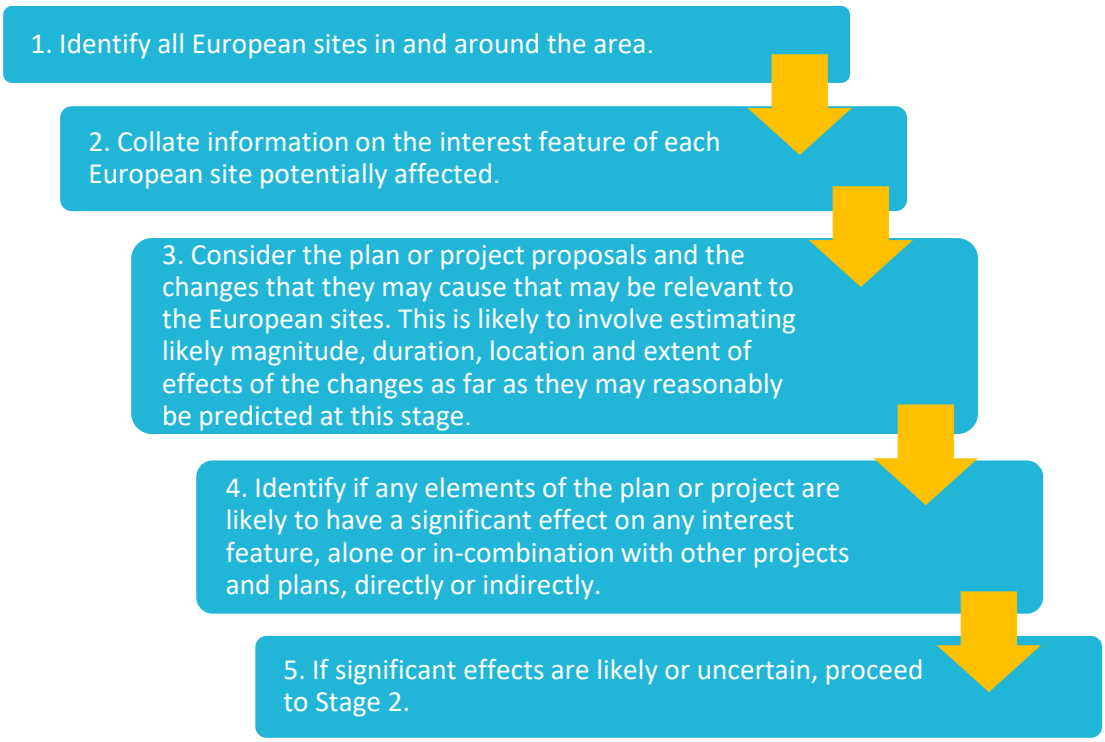
If remedial works are not undertaken, the EWIC cable will remain exposed in two areas and may become uncovered in the other areas identified with low sediment cover. This means that the cable is at risk from interaction with fishing gear and ships anchors, which may result in damage to the cable, the cable being out of service for a period of time and the requirement for a lengthy repair procedure to be undertaken. The exposed cable may also pose a threat to other vessels including fishing vessels, from anchor strike or should fishing gear become entangled.

3. STAGE 1 – APPROPRIATE ASSESSMENT SCREENING

3.1 Assessment Approach

This AA screening has been undertaken according the process set out in Welsh Government (2017) guidance, as illustrated in Figure 3-1. It has considered all case law relevant to the Habitats Directive summarised in the EC Guidance (November 2018a).

Figure 3-1 HRA Screening Process



3.2 Identification of Relevant European Sites

The potential for a European site to be significantly affected depends on whether receptors which are designating features of a European Site:

a. Can come into contact with the Proposed Works; and

b. Are sensitive to the Proposed Works activities to the extent that the activity is likely to have an adverse effect on the conservation objectives for the features.

Identifying relevant European Sites has therefore been achieve by applying the following steps:

1. Identify the potential pressures the Proposed Works could have on receptors and the zone of influence (ZOI) for identified receptors (i.e. the spatial extent over which effects could occur);
2. Using ZOI as a guide, define a search area within which European Sites are screened for the relevant Qualifying Features; and

3. Screen SACs, SPAs and Ramsar sites within the defined search areas to identify designating features and assess whether interest features of the site could be significantly affected by the Proposed Works.

3.2.1 Identification of Sensitive Receptors

The receptors which could potentially be affected by the Proposed Works and could be the designated interest features of European Sites are:

- Subtidal habitats;
- Fish;
- Birds; and
- Marine mammals (including cetaceans, pinnipeds, and otter).

3.2.2 Defining a search area (identification of potential pressures and ZOI)

The OSPAR Intercessional Correspondence Group on Cumulative Effects (ICG-C) pressure list and descriptions (OSPAR Commission 2011) have been used to describe the potential pressures expected from the Proposed Works. Listed in Table 3-1, these potential pressures may be direct or indirect, temporary, or permanent, beneficial, or harmful to the site, or a combination of these. The ZOI – spatial extent over which effects may be extend – has also been defined.

The ZOI has been used to establish a search area within which European Sites are screened for the relevant Qualifying Feature. Since mobile species from conservation sites further field may travel into the ZOI, the ZOI cannot be used alone as a distance to screen in relevant conservation sites. Therefore, search areas (distances from the Proposed Works) for each receptor group have been applied taking into consideration other information such as marine mammal management units and expert judgement to use for the initial screening of sites. Justification for the spatial extent of the search area is provided in Table 3-1.

Table 3-2 identifies the pressures that have been scoped out of the HRA and the reason for the exclusion. These pressures will not be discussed further.

Table 3-1 Potential pressures, ZOI and European Site Search Area

Receptor	Potential Pressure	Aspect of Proposed Development	Zone of Influence	Search Area and Justification
Habitats	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	Trenching	15m	**200m** Trenching will result in a brief localised sediment plume. Although levels of suspended sediments will be diluted, as a precaution the maximum distance sediment is anticipated to travel has been used to define the search area.
		External Cable Protection	Footprint of External Cable Protection	
	Changes in suspended solids (water clarity)	Trenching	200m	
		External Cable Protection	200m	
	Siltation rate changes, including smothering (depth of vertical sediment overburden)	Trenching	200m	
		External Cable Protection	200m	
	Water flow (tidal current) changes, including sediment transport considerations	External Cable Protection	Footprint of External Cable Protection	
	Physical change to another seabed type	External Cable Protection	Footprint of External Cable Protection	
	Physical change to another sediment type	External Cable Protection	Footprint of External Cable Protection	
	Introduction or spread of invasive non-indigenous species (INIS)	External Cable Protection	Footprint of External Cable Protection	
Birds	Visual disturbance	Trenching	Radial distances from Proposed Works ▪ 4km divers and sea ducks ▪ 2km all other species	**10km** It is recognised that some seabirds from other SPA's will forage and loaf within the ZOI. The disturbance however will be limited in extent and duration and there is sufficient space in the surrounding environment for birds to temporarily relocate. Therefore, only sites within 10km of the Proposed Works have been screened for qualifying bird features.
		External Cable Protection		
		Geophysical Survey		
	Changes to supporting habitat and prey availability	Trenching		
		External Cable Protection		
Fish	Underwater sound changes	Continuous sound from trenching and vessel	Not defined	**40km** There is the potential that the Proposed Works could impede migration to and from rivers. Therefore, the search area is 40km recognising the mobile and
		Continuous sound – external cable protection	Not defined	
		Impulsive sound – geophysical survey	Not defined	

Receptor	Potential Pressure	Aspect of Proposed Development	Zone of Influence	Search Area and Justification
	Siltation rate changes, including smothering (depth of vertical sediment overburden)	Trenching	200m	migratory nature of Annex II species within the region.
	Physical change to another seabed type	External Cable Protection	Footprint of External Cable Protection	
	Physical change to another sediment type	External Cable Protection	Footprint of External Cable Protection	
Cetaceans	Underwater sound changes	Continuous sound from trenching and vessel	Not defined	**Management Unit** In recognition of the highly mobile nature of cetaceans the relevant species management unit will define the search area.
		Continuous sound – external cable protection	Not defined	
		Impulsive sound – geophysical survey	5km*	
Pinnipeds	Underwater sound changes	Continuous sound from trenching and vessel	Not defined	**100km grey seal** It is estimated that grey seal forage up to 100km from their haul out sites (DECC 2016). **50km harbour seal** Harbour seal are not known to make trips greater than 50km from haul out sites (DECC 2016).
		Continuous sound – external cable protection	Not defined	
		Impulsive sound – geophysical survey	5km*	

* Based on the Effective Deterrent Range (EDR) for geophysical survey outlined in JNCC, DAERA and Natural England (2020)

Table 3-2 Pressures scoped out and justification for exclusion

Pressure Scoped Out of Assessment	Receptor/Topic	Justification for Scoping Pressure Out of Assessment
Barrier to species movement	Marine Mammals Fish Birds	The Project will not introduce any elements that will represent a significant barrier to the movement of species. The presence of Project vessel(s) may lead to the temporary disturbance
Changes in suspended solids (water clarity)	Benthic Ecology Fish and Shellfish Marine Mammals Marine Birds	Any changes to water clarity will be temporary based on the strong tidal flows in the area which will disperse suspended solids swiftly
Death by injury or collision	Marine Mammals	Although shipping collision is a recognised cause of basking shark and marine mammal mortality worldwide, the key factor influencing the injury or mortality caused by collisions is ship size and speed. Ships travelling at 14 knots or faster are most likely to cause lethal or serious injuries. Although the presence of Project vessel(s) marginally increases the level of vessel activity within the area for the duration of the Proposed Works, none of the Project vessel(s) will be travelling at speeds exceeding 14 knots. The Project vessel(s) is likely to traverse the EWIC cable at a rate of 190m per hour (equivalent to 0.1 knots) resulting in a low likelihood of collision. Given that Project vessel(s) will be operating at less than 14 knots, the effect is scoped out of the HRA as it is not likely to be significant.
Electromagnetic changes	Fish and Shellfish Marine Mammals	EWIC is already in operation, therefore the effects of local temperature changes were considered in the EIA submitted with the marine license application.
Hydrocarbon and PAH contamination	All	Unplanned events (accidental oil spill or chemical spills) have been scoped out of the assessment for the following reasons; the likelihood of a large oil spill occurring from a Project vessel is extremely low and the risk is no greater than that of any other vessel within vicinity to the Proposed Works. In addition, all Project vessel(s)s will have control measures and shipboard oil pollution emergency plans (SOPEP) in place and will adhere to International Convention for the Prevention of Pollution from Ships (MARPOL) Annex I requirements.
Introduction of light	All	The Remedial Works will only be carried out during daytime hours, therefore there will be no introduction of light other than navigational and safety lights on the Project vessel(s) and ROV during the geophysical survey. Therefore, this pressure has been scoped out of the assessment
Litter	Benthic Ecology Fish and Shellfish Marine Mammals Marine Birds	The Remedial Works will not result in the discarding, disposing, or abandoning of marine litter
Temperature changes - local	Benthic Ecology Fish	EWIC is already in operation, therefore the effects of local temperature changes were considered in the EIA submitted with the marine license application.

Pressure Scoped Out of Assessment	Receptor/Topic	Justification for Scoping Pressure Out of Assessment
Transition elements and organo-metal contamination;	All	Transition elements and organo-metal contamination will be considered as part of the Water Framework Directive (WFD) Assessment submitted in support of the marine license application
Deoxygenation Nutrient enrichment Organic enrichment	Benthic Ecology Fish and Shellfish	During the Proposed Works, it is possible that the Project vessel(s) will discharge grey water (sewage, food waste and drainage water) which can have potentially toxic effects on species and lead to localised nutrient enrichment, organic enrichment and deoxygenation. Considering the temporary nature of the Proposed Works and the relatively small volume of discharges from the Project vessel(s), the marine environment will be able to rapidly assimilate any discharges. In addition, strong tidal action is likely to disperse and organic matter or nutrients swiftly, therefore nutrient, and organic enrichment and deoxygenation has been scoped out of the assessment.
Visual disturbance	Fish	The effect could occur during trenching, the deployment of external cable protection and geophysical survey due to the presence of Project vessel(s) and equipment. This may result in the displacement of fish within the water column. The disturbance from these activities will be temporary, localised, and not considered likely to result in significant effects given existing levels of shipping within the Irish Sea. Therefore, this pressure has been scoped out of the HRA.
Siltation rate changes, including smothering (depth of vertical sediment overburden)	Fish	There are three pathways for species to be smothered because of project activities: by displaced sediments during trenching; by the re-deposition of suspended sediment; and by cable protection material being placed on the seabed. The effect from displaced sediment will be very localised, only effecting species in the immediate vicinity of cable trenches. Suspended sediment settlement levels are expected to be minimal with any material deposited likely to be quickly re-suspended and distributed by natural hydrodynamic processes. Therefore, this aspect of the effect on fish and shellfish has been scoped out of the HRA. The suspension of sediments within the water column from trenching may cause small, localised, and temporary turbidity before being re-deposited on the seabed. A temporary reduction in the feeding capability of species relying on sight to locate their prey may occur. Most species are likely to be tolerant to any changes in turbidity levels (likely to be equivalent to those experienced during storm events). Therefore, this pressure on fish and shellfish has also been scoped out of the HRA. The effects of depositing cable protection material will be assessed.

3.2.3 Screening of European Sites

A geographic information system (GIS) was used to map the boundaries of European Sites in relation to the Proposed Works. All designated sites with marine components which are within the defined search areas for identified receptors have been listed along with their qualifying features in Table 3-4. Figure 3-2 (Drawing P2226-ENV-002-A) identifies SAC's located within the defined search areas outlined in Table 3-1. It should be noted that not all sites within the Irish and Celtic Seas cetacean Management Unit are shown in Figure 3-2 for presentation purposes. Figure 3-3 shows SPA's located within 10km of the Proposed Works. No Ramsar sites or SSSI's were identified within 10km of the Proposed Works.

A total of 13 sites were screened in as part of this assessment and are shown in Table 3-4. For each European Site it was determined whether there is the potential for an interaction between the Proposed Works and the Primary and Qualifying Features i.e. whether there is a pressure-receptor pathway. This is determined by comparing information such as the extent of the ZOI with information regarding the Primary and Qualifying Feature e.g. species foraging distances, spatial extent of habitats etc. The interactions were defined as follows:

- **Yes:** A pathway between the Proposed Works and the Primary and Qualifying Feature can be identified that is likely to result in an effect; and
- **No:** Either a pathway between the Proposed Works and the Primary and Qualifying Features cannot be identified or a pathway exists but there is no physical overlap of the pressure and the Primary and Qualifying Feature.

For all Primary and Qualifying Features where it is determined that there is a possible interaction, the potential for likely significant effects is assessed in Section 3.3.

3.2.4 In-combination effects

A key requirement of the Habitats Directive is that the effects of any project on European sites should be considered in combination with other plans or projects. A search of marine licence applications for other activities which could interact with the Proposed Works was conducted using GIS and a review of marine licence applications on the NRW Public Register (NRW 2020). Table 3-3 lists all current and previous (Jan 2019 – June 2020) applications listed on the Public Register which may interact with the Proposed Works.

Table 3-3 Development applications near the Proposed Works

Name of development	Licence ref	Type of survey/activity	When planned to commence	Licence Status	Distance from Proposed Works (km)
Holyhead Breakwater Refurbishment	SC2002	Remedial Works	March 2021 – January 2023	Scoping Opinion	31
Holyhead Marina Re-build Project	SC1906	Construction	Unknown	Scoping Opinion	35
Enhancement of coastal defence at East Rhyl	CML1873	Remedial Works	July 2019 – July 2023	Granted	10.5
Morlais Tidal Array	ORML1938	Energy	Unknown	Scoping Opinion	27
Port of Mostyn	RML2027	Maintenance Dredging	Unknown	Pending	25

Name of development	Licence ref	Type of survey/activity	When planned to commence	Licence Status	Distance from Proposed Works (km)
NRW Grab Sampling Survey Programme	RML1903	Survey	2019 - 2021	Granted	12
Holyhead Harbour Maintenance Dredging	DML1935	Maintenance Dredging	December 2019 – December 2022	Granted	32
Holyhead Port Expansion	CML1931	Construction	Unknown	Unknown	35
Holyhead Waterfront Development	RML1937	Survey	February 2020 – October 2020	Granted	36
Deganway Marine Dredging Conwy	DML1942	Maintenance Dredging	May 2020 – May 2023	Granted	19
Awel y Môr Offshore Wind Farm	RML2023	Survey	July 2020 – June 2021	Granted	1

Table 3-4 below considers whether the Proposed Works has the potential for in-combination effects with other projects and plans identified within Table 3-3.

Figure 3-2 Summary of SAC's within Defined Search Areas of the Proposed Works

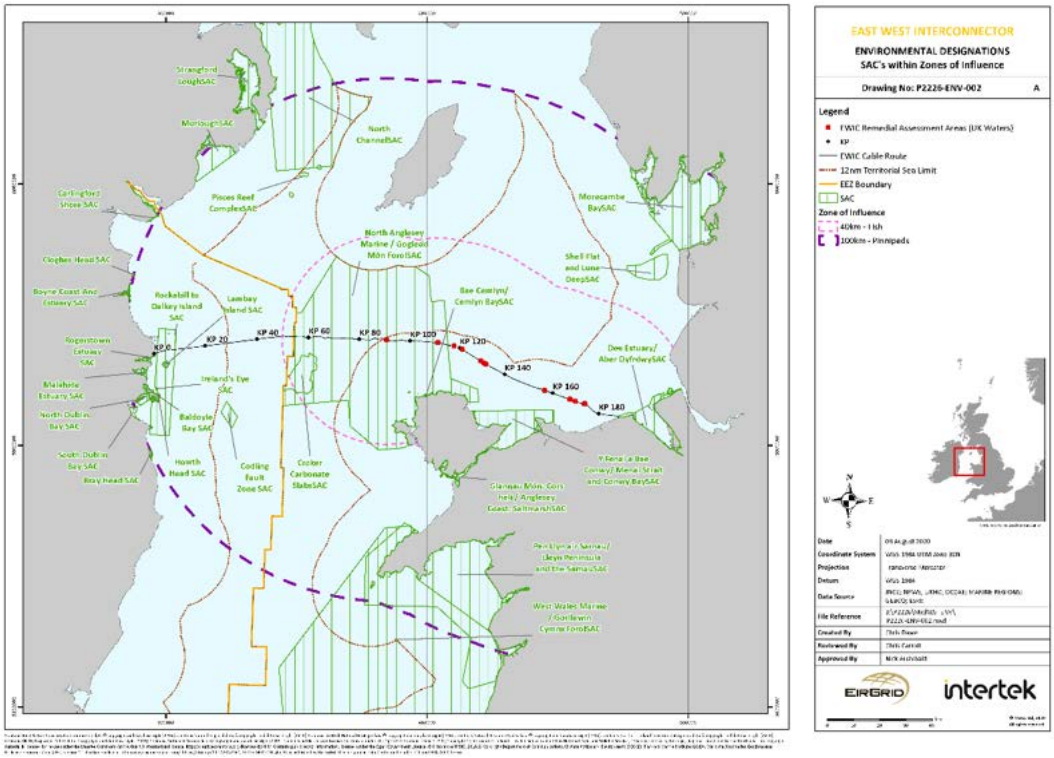


Figure 3-3 Summary of SPA's within 10km of the Proposed Works

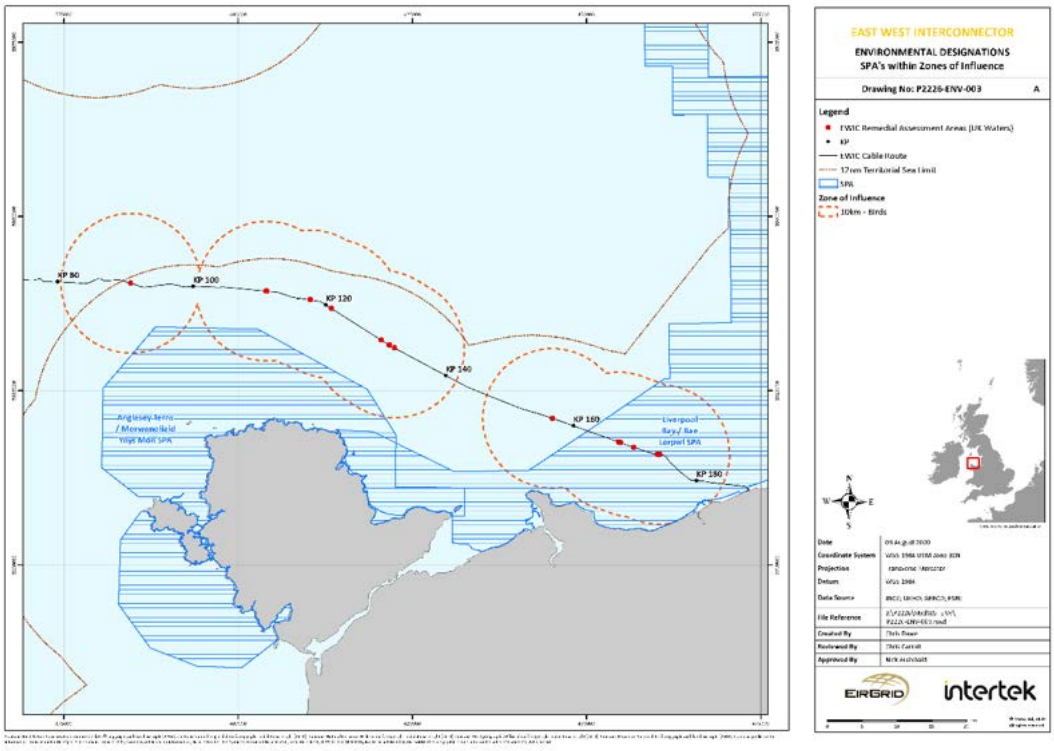


Table 3-4 European Sites and Screening Conclusions

Site Name and EU Code	Qualifying Feature(s)	Distance from Proposed Works	Potential Pressure	Connectivity between Proposed Works and Qualifying Feature(s)	Potential for In-combination effects	Screening Conclusion
North Anglesey Marine / Gogledd Môn Forol SAC (UK0030398)	Harbour porpoise (*Phocoena phocoena*)	Area 4 and 5 within SAC	Underwater sound changes	**Yes** – the Harbour porpoise is present within the SAC and individuals may be affected by underwater sound changes because of Project vessel(s) and trenching, external cable protection and geophysical survey activities.	**Yes** – there are three other projects located within the North Anglesey Marine SAC	**SCREENED IN**
Liverpool Bay SPA (UK9020294A)	Red throated diver (*Gavia stellata*) Little gull (*Hydrocoloeus minitus*) Little tern (*Sternula albifrons*) Common tern (*Sterna hirundo*) Common scoter (*Melanitta nigra*)	Area 11, 12 and 13 within SPA	Visual disturbance	**Yes** – the Proposed Works are near the coastline which is utilised by qualifying species for a range of activities.	**Yes –** there is one other project located within the Liverpool Bay SPA	**SCREENED IN**
			Changes to supporting habitat and prey availability	**Yes** – the Proposed Works will involve disturbance to the seabed which has the potential to affect preferred prey choice of diving species		**SCREENED IN**
Anglesey Terns / Morwenoliaid Ynys Môn SPA (UK9013061)	**Breeding:** Common tern Arctic tern (*Sterna paradisea*) Roseate tern (*Sterna dougalli*) Sandwich tern (*Sterna sandvicensis*)	7.2	Visual disturbance	**Yes –** the Proposed Works have the potential to cause visual disturbance to foraging terns	**Yes** – there are three other projects located within the Anglesey Terns / Morwenoliaid Ynys Môn SPA	**SCREENED IN**
			Changes to supporting habitat and prey availability	**Yes** – the Proposed Works will involve disturbance to the seabed which has the potential to affect preferred prey choice of tern		**SCREENED IN**
North Channel SAC (UK0030399)	Harbour porpoise	70	Underwater sound changes	**Yes –** the site is within the Irish and Celtic Sea Management Unit, therefor there is the potential that underwater sound could cause temporary injury or disturbance.	**No** – given the distance of the Proposed Works from the other projects there will be no in-combination effects	**SCREENED IN**

Site Name and EU Code	Qualifying Feature(s)	Distance from Proposed Works	Potential Pressure	Connectivity between Proposed Works and Qualifying Feature(s)	Potential for In-combination effects	Screening Conclusion
West Wales Marine / Gorllewin Cymru Forol SAC (UK0030397)	Harbour porpoise	72	Underwater sound changes	**Yes –** the site is within the Irish and Celtic Sea Management Unit, therefor there is the potential that underwater sound could cause temporary injury or disturbance.	**No** – given the distance of the Proposed Works from the other projects there will be no in-combination effects	**SCREENED IN**
Bristol Channel Approaches SAC (UK0030396)	Harbour porpoise	250	Underwater sound changes	**Yes –** the site is within the Irish and Celtic Sea Management Unit, therefor there is the potential that underwater sound could cause temporary injury or disturbance.	**No** – given the distance of the Proposed Works from the other projects there will be no in-combination effects	**SCREENED IN**
Cardigan Bay/ Bae Ceredigion SAC (UK0012712)	Sandbanks which are slightly covered by sea water all the time Reefs Submerged or partially submerged sea caves	145	No pressure-receptor pathway	**No** – these features are outside the search area for habitats	**No** – there is no potential for in-combination effects as there is no pressure-receptor pathway	**SCREENED OUT**
	Bottlenose dolphin		Underwater sound changes	**Yes –** the site is within the Irish and Celtic Sea Management Unit, therefor there is the potential that underwater sound could cause temporary injury or disturbance.	**No** – given the distance of the Proposed Works from the other projects there will be no in-combination effects	**SCREENED IN**
	Sea lamprey River lamprey		Underwater sound changes	**No** – these features are outside the search area for fish	**No** – there is no potential for in-combination effects as there is no pressure-receptor pathway	**SCREENED OUT**
	Grey seal		Underwater sound changes	**Yes** – while the Proposed Works is in excess of the typical foraging range for grey seal (100km), it is understood that this site forms part of the Wales seal management unit alongside Pen Llŷn a'r Sarnau/ Lleyn Peninsula and the Sarnau and Pembrokeshire Marine/ Sir Benfro Forol SAC. There is therefore the potential for grey seals moving	**No** – given the distance of the Proposed Works from the other projects there will be no in-combination effects	**SCREENED IN**

Site Name and EU Code	Qualifying Feature(s)	Distance from Proposed Works	Potential Pressure	Connectivity between Proposed Works and Qualifying Feature(s)	Potential for In-combination effects	Screening Conclusion
				between sites to be affected by underwater sound.		
Pen Llŷn a'r Sarnau/ Lleyn Peninsula and the Sarnau (UK0013117)	Sandbanks which are slightly covered by sea water all the time Estuaries Coastal lagoons Large shallow inlets and bays Reefs Mudflats and sandflats not covered by seawater at low tide Salicornia and other annuals colonising mud and sand Atlantic salt meadows (Glauco-Puccinellietalia maritimae) Submerged or partially submerged sea caves	71	No pressure-receptor pathway	**No** – these features are outside the search area for habitats	**No** – there is no potential for in-combination effects as there is no pressure-receptor pathway	**SCREENED OUT**
	Bottlenose dolphin		Underwater sound changes	**Yes –** the site is within the Irish and Celtic Sea Management Unit, therefor there is the potential that underwater sound could cause temporary injury or disturbance.	**No** – given the distance of the Proposed Works from the other projects there will be no in-combination effects	**SCREENED IN**
	Otter		No pressure-receptor pathway	**No** – the Proposed Works will not interact with this qualifying feature	**No** – there is no potential for in-combination effects as there is no pressure-receptor pathway	**SCREENED OUT**
	Grey seal		Underwater sound changes	**Yes –** the site is within the foraging range for grey seals; therefore, the potential exists for individuals to be	**No** – given the distance of the Proposed Works from the other projects	**SCREENED IN**

Site Name and EU Code	Qualifying Feature(s)	Distance from Proposed Works	Potential Pressure	Connectivity between Proposed Works and Qualifying Feature(s)	Potential for In-combination effects	Screening Conclusion
				affected by underwater sound from the Proposed Works	there will be no in-combination effects	
Pembrokeshire Marine/ Sir Benfro Forol SAC (UK0013116)	Estuaries Large shallow inlets and bays Reefs Sanbanks which are slightly covered by sea water all the time Mudlfats and sandflats not covered by seawater at low tide Coastal lagoons Atlantic salt meadows (Glauco-Puccinellietalia maritimae) Submerged or partially submerged sea caves	188	No pressure-receptor pathway	**No** – these features are outside the search area for habitats	**No** – there is no potential for in-combination effects as there is no pressure-receptor pathway	**SCREENED OUT**
	Grey seal		Underwater sound changes	**Yes** – while the Proposed Works is in excess of the typical foraging range for grey seal (100km), it is understood that this site forms part of the Wales seal management unit alongside Pen Llŷn a'r Sarnau/ Lleyn Peninsula and the Sarnau and Cardigan Bay/ Bae Ceredigion SAC. There is therefore the potential for grey seals moving between sites to be affected by underwater sound.	**No** – given the distance of the Proposed Works from the other projects there will be no in-combination effects	**SCREENED IN**
	Shore dock (*Rumex rupestris*)		No pressure-receptor pathway	**No** – this species grows on rocky, sandy, and raised beaches, shore platforms and the lower slopes of cliffs. The Proposed Works will not interact with this species based on	**No** – there is no potential for in-combination effects as there is no pressure-receptor pathway	**SCREENED OUT**

Site Name and EU Code	Qualifying Feature(s)	Distance from Proposed Works	Potential Pressure	Connectivity between Proposed Works and Qualifying Feature(s)	Potential for In-combination effects	Screening Conclusion
				the distance and habitat occurrence of this species.		
	Sea lamprey River lamprey Allis shad (*Alosa alosa*) Twaithe shad (*Alosa fallax*)		Underwater sound changes	**No** – these features are outside the search area for fish	**No** – there is no potential for in-combination effects as there is no pressure-receptor pathway	**SCREENED OUT**
	Otter		No pressure-receptor pathway	**No** – the Proposed Works will not interact with this qualifying feature	**No** – there is no potential for in-combination effects as there is no pressure-receptor pathway	**SCREENED OUT**
Rockabill to Dalkey Island SAC (IE0003000)	Reefs	81	No pressure-receptor pathway	**No** – this feature is outside the search area for habitats	**No** – there is no potential for in-combination effects as there is no pressure-receptor pathway	**SCREENED OUT**
	Harbour porpoise		Underwater sound changes	**Yes –** the site is within the Irish and Celtic Sea Management Unit, therefor there is the potential that underwater sound could cause temporary injury or disturbance.	**No** – given the distance of the Proposed Works from the other projects there will be no in-combination effects	**SCREENED IN**
Lambay Island SAC (IE000204)	Reefs Vegetated sea cliffs of the Atlantic and Baltic coasts	83	No pressure-receptor pathway	**No** – this feature is outside the search area for habitats	**No** – there is no potential for in-combination effects as there is no pressure-receptor pathway	**SCREENED OUT**
	Grey seal (*Halichoerus grypus*)		Underwater sound changes	**Yes** – the Proposed Works are within the 100km foraging range for grey seals, therefore there is the potential for individuals from this site to be affected.	**No** – given the distance of the Proposed Works from the other projects there will be no in-combination effects	**SCREENED IN**
	Harbour seal (*Phoca vitulina*)			**No** – The Proposed Works are beyond the typical foraging range of harbour seal; therefore, no	**No** – there is no potential for in-combination effects as	**SCREENED OUT**

Site Name and EU Code	Qualifying Feature(s)	Distance from Proposed Works	Potential Pressure	Connectivity between Proposed Works and Qualifying Feature(s)	Potential for In-combination effects	Screening Conclusion
				significant effects will occur, and this qualifying feature will not be assessed further.	there is no pressure-receptor pathway	
Dee Estuary/ Aber Dyfrdwy SAC (UK0030131)	Mudflats and sandflats not covered by seawater at low tide Salcornia and other annuals colonising mud and sand Atlantic salt meadows (Glauco-Puccinellietalia maritimae) Estuaries Annual vegetation of drift lines Vegetated sea cliffs of the Atlantic and Baltic Coasts Embryonic shifting dunes Shifting dunes along the shoreline with Ammophila Arenaria Fixed coastal dunes with herbaceous vegetation Humid dune stacks	13	No pressure-receptor pathway	**No** – this feature is outside the search area for habitats	**No** – there is no potential for in-combination effects as there is no pressure-receptor pathway	**SCREENED OUT**
	Sea lamprey (*Petromyzon marinus*) River lamprey (*Lampetra fluviatilis*)		Underwater sound changes	**Yes –** these species migrate to coastal waters in October therefore there is the potential to underwater sound changes to interrupt the migration of these species	**No** – given the distance of the Proposed Works from the other projects there will be no in-combination effects	**SCREENED IN**
	Petalwort		No pressure-receptor pathway	**No** – this species inhabits open, damp dune slacks and occasionally within coastal grassland. The Proposed Works will not interact	**No** – there is no potential for in-combination effects as	**SCREENED OUT**

Site Name and EU Code	Qualifying Feature(s)	Distance from Proposed Works	Potential Pressure	Connectivity between Proposed Works and Qualifying Feature(s)	Potential for In-combination effects	Screening Conclusion
				with this species based on the distance and habitat occurrence of this species.	there is no pressure-receptor pathway	
River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC (UK0030252)	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	40km	No pressure-receptor pathway	**No** – this feature is outside the search area for habitats	**No** – there is no potential for in-combination effects as there is no pressure-receptor pathway	**SCREENED OUT**
	Atlantic salmon (*Salmo salar*) Sea lamprey River lamprey		Underwater sound changes	Yes – all these species are migratory and could be present during the Proposed Works	**No** – given the distance of the Proposed Works from the other projects there will be no in-combination effects	**SCREENED IN**
	Bullhead (*Cottus gobio*) Brook lamprey (*Lampetra planeri*)		No pressure-receptor pathway	**No** – both species inhabit freshwater, there is no pressure-receptor pathway with these features.	**No** - there is no potential for in-combination effects as there is no pressure-receptor pathway	**SCREENED OUT**
	Floating water-plantain (*Luronium natans*)		No pressure-receptor pathway	**No** – this species inhabits freshwater, there is no pressure-receptor pathway with this feature.	**No** - there is no potential for in-combination effects as there is no pressure-receptor pathway	**SCREENED OUT**
	Otter		Underwater sound changes	**No** – while this species is known to forage in coastal waters these are typically in shallow areas restricted to 0-3m deep. Considering the distance of required shallow coastal waters from the Proposed Works, therefore no significant effects will occur, and this qualifying feature will not be assessed further.	**No** - there is no potential for in-combination effects as there is no pressure-receptor pathway	**SCREENED OUT**

3.3 Assessment of Likely Significant Effects

3.3.1 Underwater Sound Changes – Annex II Cetacean and Pinniped Species

Table 3-4 identified a pressure-receptor pathway for the pressure underwater sound changes between the Proposed Works and nine European sites where the Primary or Qualifying Features are Annex II cetacean or pinniped species.

One of the most important environmental considerations related to the Proposed Works is the potential effects of underwater sound. This pressure considers the potential for marine mammals to be affected by sound associated with activities undertaken during the Proposed Works, such as vessel movements, trenching and geophysical survey.

Both cetaceans and pinnipeds have evolved to use sound as an important aid in navigation, communication, and hunting (Richardson et al. 1995). It is generally accepted that exposure to anthropogenic sound can induce a range of behaviour effects and, in the extreme, to permanent injury in marine mammals. Loud and prolonged sound above background levels is noise and may influence marine life. This may mask communicative or hunting vocalisations, preventing social interactions and effective hunting.

High intensity noises can cause temporary or permanent changes to animals' hearing if the animal is exposed to the sound in proximity and, in some circumstances, can lead to the death of the animal (Richardson et al. 1995). Where the threshold of hearing is temporarily damaged, it is considered a temporary threshold shift (TTS), and the animal is expected to recover. If there is permanent damage (permanent threshold shift (PTS)) where the animal does not recover, social isolation and a restricted ability to locate food may occur, potentially leading to the death of the animal (Southall et al. 2007).

Behavioural disturbance from underwater sound sources is more difficult to assess than injury and is dependent upon many factors related to the circumstances of the exposure (Southall et al. 2007, NFMS 2018). An animal's ability to detect sounds produced by anthropogenic activities depends on its hearing sensitivity and the magnitude of the noise compared to the amount of natural ambient and background anthropogenic sound. In simple terms for a sound to be detected it must be louder than background and above the animal's hearing sensitivity at the relevant sound frequency.

For the purposes of this assessment, a qualitative approach has been taken using existing literature as this was considered proportionate to the Proposed Works being undertaken and their potential to generate underwater sound changes.

Continuous noise

Continuous sound, e.g. from shipping, is non-pulsed and can be broadband, narrowband, or tonal. Continuous sound can either be intermittent or continuous within a 24hr period (NMFS 2018). Of the activities to be undertaken during the proposed remedial works, the following produce continuous sound: trenching; the use of thrusters on the Project vessel(s) for dynamically positioning (DP); and the placement of deposits on the seabed i.e. (rock placement and potentially concrete mattresses). Continuous sound will be produced intermittently over a period of 24hrs (several hours at each location). Table 5-2 below outlines the parameters for the Proposed Works.

Table 3-5 Proposed Works Continuous Noise Sources

Activity	DP vessel (Genesis 2011)	Trenching (Nedwell *et al.* 2003)	Rock placement (Wyatt 2008)
SL: SPL RMS (dB re 1 µPa2 @ 1m)	184	178	188
SL: 24 hr SEL RMS (dB re 1 µPa2s @ 1m)	233	227	237
Frequency: Hz	63	125	10,000

The estimated unweighted source level for sound from the Project vessel(s) is 184dB re 1 µPa @ 1 m and 178dB re 1 µPa @ 1 m for trenching. There are no published guidelines on disturbance thresholds due to the complexity and variability of the responses of marine mammals to anthropogenic disturbance. For the purposes of this assessment the threshold for behavioural disturbance is considered 120dB re 1 µPa-2s (RMS) has been used for continuous sound for all cetacean species (Gomez et al. 2016, BOEM 2017, NMFS 2018).

It is important to note that the Project vessel(s), trenching and rock placement will not occur continuously during the Proposed Works. The Project vessel(s) will use thrusters sporadically, to maintain a position over the Proposed Works, therefore the source level will fluctuate throughout the duration of the Proposed Works and will only peak at the 184 dB re 1 µPa @ 1m for short periods. Trenching will only be operational in discrete areas corresponding to the Proposed Works and therefore will only reach a peak of 178dB re 1 µPa @ 1 m for short durations. In the worst-case, rock placement may be required at up to five locations, therefore sound generated by this activity will be at discrete points along the route and will be temporary, lasting several hours at each location.

It is assumed that all marine mammals will flee at a speed of 1.5m/s (Otani et al. 2000, Lepper et al. 2012) from a source level. This is considered conservative as there is data (McGarry et al. 2017, Kastelein et al. 2018, van Beest et al. 2018) to suggest that animals will flee at much higher speeds (e.g. harbour porpoise at 1.9m/s (Kastelein et al. 2018), at least initially. During the Proposed Works, the Project vessel(s) will be operating at slow speeds, therefore it is suggested that any individuals in proximity of the Project vessel(s) and the trenching tool will be able to flee the area affected to avoid injurious or disturbance sound levels. The likelihood of potential injury is therefore considered low and limited to discrete windows during the Proposed Works. The Proposed Works also need to be considered in the context of the existing noise environment. Shipping density in the area was considered as part of the CIRA which concluded there were four areas of high shipping density, between KP 20 to 45, KP 90 to 125, KP135 to KP140 and KP170, all orientated in an east-west orientation across the Proposed Works. The high shipping density in the region suggests individuals are already habituated to higher natural levels of underwater sound and therefore underwater sound from the Proposed Works will not be discernible above natural and anthropogenic noise in the region.

Impulsive noise

The geophysical survey following the trenching will produce impulsive noise of 235dB re 1 µPa @ 1m (SPL RMS). There are no published guidelines on disturbance thresholds due to the complexity and variability of the responses of marine mammals to anthropogenic disturbance. For the purposes of this assessment the threshold for behavioural disturbance has been assessed as 140dB re 1 µPa for impulsive noise. Prior modelling for similar geophysical surveys (Lurton 2016) has demonstrated the zone of influence for injurious effects from geophysical survey is within proximity to the equipment, therefore individuals would need to be present near the Project vessel(s) to experience injurious effects. It is suggested that cetacean and pinniped species can swim out of the spatially limited zone for injurious effects. The zone of influence relating to disturbance from geophysical survey is expected to be larger, however considering the temporary nature of the geophysical survey, individuals can return to the area immediately after the activity ceases.

It is noted in the JNCC guidelines for minimising the risk of injury and disturbance to marine mammals from seismic surveys (JNCC 2017) that JNCC advise that mitigation is not required for multi-beam echosounder surveys in shallower waters (<200m). This is because the higher frequencies used typically fall outside the hearing frequencies of cetaceans and the sounds produced are likely to attenuate more quickly than the lower frequencies used in deeper waters (JNCC 2017). Bristol Channel Approaches/Dynesfeydd Môr Hafren, West Wales Marine/ Gorllewin Cymru Forol, North Anglesey Marine/ Gogledd Môn Forol, North Channel and Rockabill to Dalkey Island SAC's – Harbour porpoise

Conservation objectives

The conservation objectives for the four sites (North Anglesey Marine / Gogledd Môn Forol , Bristol Channel Approaches, West Wales Marine / Gorllewin Cymru Forol and the North Channel) in UK waters are the same: To avoid deterioration of the habitats of the harbour porpoise or significant disturbance to the harbour porpoise, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to maintaining Favourable Conservation Status (FCS) for the UK harbour porpoise.

To ensure for harbour porpoise that, subject to natural change, the following attributes are maintained or restored in the long term:

1. The species is a viable component of the site.

2. There is no significant disturbance of the species.

3. The supporting habitats and processes relevant to harbour porpoises and their prey are maintained.

The conservation objectives for the Rockabill to Dalkey Island SAC are to maintain the favourable conservation condition of Harbour porpoise in Rockabill to Dalkey Island SAC, which is defined by the following list of attributes and targets:

- Access to suitable habitat – species range within the site should not be restricted by artificial barriers to site use.
- Disturbance - Human activities should occur at levels that do not adversely affect the harbour porpoise community at the site

Assessment against conservation objectives – harbour porpoise

It is likely that harbour porpoise will be observed in the proposed remedial works. The four UK European sites and Rockabill to Dalkey Island SAC are within same management unit (Celtic and Irish Sea MU), with harbour porpoise using the different European sites at different times of the year. For example, the Bristol Channel Approaches is a winter ground whilst, densities of harbour porpoise within the West Wales Marine SAC are higher during summer with only a small inshore area supporting winter populations.

Heinänen and Skov (2015) identified areas of persistent high porpoise density in UK waters. They concluded that winter densities of harbour porpoise off the North Anglesey coast ranged from less than 0.3 – 0.9 individuals per km^2. Densities of harbour porpoise within the West Wales Marine SAC range from less than 0.3 – 1.2 individuals per km^2 during the winter season. The North Channel SAC and Bristol Channel Approaches SAC both have harbour porpoise densities ranging from less than 0.3 – 3 individuals per km^2 during the winter season. There is no density information available for the Rockabill to Dalkey Island SAC, however a study by the Irish Whale and Dolphin Group estimated that the site supported 424 harbour porpoises (IWG Consulting 2016).

The North Anglesey Marine SAC is designated for summer densities (April to September) of harbour porpoise, however the Proposed Works are being undertaken outside of this period. Therefore, there will be lower densities of harbour porpoise that have the potential to be affected by underwater sound changes.

The thresholds for temporary and permanent injury from continuous noise in very high-frequency cetaceans are 153dB re 1 µPa (SEL) and 173dB re 1 µPa (SEL) respectively (Southall *et al*. 2019). . Continuous noise thresholds overlap with the sound levels for the Project vessel(s), trenching and rock placement. It should be noted that toothed whales such as harbour porpoise are not typically considered sensitive to ship noise due to their poor hear frequencies below 1kHz with the sensitivity of their hearing improving with frequency and at its best between 10 and 120kHz (Dyndo *et al*. 2015). As discussed in Section 3.3.1, the zone of influence for injurious effects is considered spatially limited and that harbour porpoise will be capable of moving away from the zone of influence for injurious effects.

Given the small scale of the injurious effects from these activities and the ability of individuals to move away from the sound source, there will be no likely significant effects on the species viability of harbour porpoise within any of the sites as a result of continuous noise sources from the proposed remedial works.

The thresholds for temporary and injurious effects to very high frequency cetaceans because of impulsive noise as outlined in Southall *et al*. 2019 is 196dB re 1 µPa and 202dB re 1 µPa, respectively. In relation to disturbance from geophysical survey, recent guidance (JNCC, DAERA and Natural England 2020) suggests that a precautionary 5km Effective Deterrent Range (EDR) for geophysical survey is applicable to harbour porpoise. This is because sub-bottom profilers and other electromagnetic sources used in geophysical surveys can be loud sources and there is no empirical evidence or measurements of sound propagated (JNCC, Natural England & DAERA 2020). The guidance for assessing the significance of noise disturbance against conservation objectives of harbour porpoise SAC's (JNCC, DAERA & Natural England 2020) defines what is considered significant in relation to noise disturbance and states:

"Noise disturbance within a SAC from a plan/project individually or in combination, is considered to be significant if it excludes harbour porpoises from more than:

1. *20% of the relevant area[3] of the site in any given day[4]*
2. *An average of 10% of the relevant site over a season[5]"*

Assuming an EDR of 5km for the geophysical survey, the maximum area that will experience noise levels at which the onset of disturbance may occur is 78.5km^2. The North Anglesey Marine SAC is designated for its summer (April to September) harbour porpoise densities, and the Proposed Works would be taking place outside of this.

With respect to Criteria 1, as the Proposed Works will take place outside of the relevant season for the site significant disturbance will not occur.

With respect to Criteria 2, North Anglesey Marine SAC covers an area of 3249.49km^2. Assuming a 5km EDR, there are five proposed remedial works locations (Area 3, 4, 5, 6 and 7) that will overlap with the North Anglesey Marine SAC. A 5km EDR from each of these locations does not overlap entirely within the North Anglesey Marine SAC, therefore the following assumptions have been made:

- Area 3 – 50% of the 5km EDR will propagate within the SAC which is equivalent to 39.27km
- Area 4 – 100% of the 5km EDR will propagate within the SAC, equivalent to 78.54km^2
- Area 5 – 75% of the 5km EDR will propagate within the SAC, equivalent to 59.91km^2

[3] The relevant area is defined as that part of the SAC that was designated on the basis of higher persistent densities for that season (summer defined as April to September inclusive, winter as October to March inclusive)
[4] To be considered within the Habitats Regulation Assessment and, if needed, licence conditions should ensure that daily thresholds are not exceeded. Day to day monitoring of compliance is not practicable and therefore retrospective compliance monitoring is required to test whether the licence conditions are being adhered to.
[5] Summer defined as April to September inclusive, winter as October to March inclusive

- Area 6 – 50% of the 5km EDR will propagate within the SAC, equivalent to 39.27km^2
- Area 7 – 25% of the 5km EDR will propagate within the SAC, equivalent to 19.64km^2

The above calculations represent a worst-case scenario, with actual noise propagation anticipated to affect a smaller area. Combining the above EDR areas from each works location that overlaps with the SAC, it is estimated a total of 235.63km^2 of the site will experience a change in underwater sound levels during the geophysical survey. This is equivalent to 7.3% of the North Anglesey Marine SAC, which is below the threshold for significant disturbance by the JNCC, DAERA and Natural England (2020) guidance. Geophysical survey activities will take a maximum of two days to complete across all proposed remedial works locations within the winter season. It is likely geophysical survey at each proposed remedial works location will be temporary and limited to a maximum of a few hours.

In conclusion, there will be no significant disturbance within the SAC.

If external cable protection is required, there will be the highly localised permanent loss of foraging habitat within the North Anglesey Marine SAC. Given the extent of available foraging habitat, this will not significantly affect prey items of the harbour porpoise.

The other European sites are more than 70km away from the Proposed Works and the zone of influence (i.e. the 5km EDR) will not overlap with the European sites. The Proposed Works will not result in significant disturbance to harbour porpoise from these European sites.

Considering the above, there will be no likely significant effects on harbour porpoise and they will remain viable components within the Bristol Channel Approaches/Dynesfeydd Môr Hafren, West Wales Marine/ Gorllewin Cymru Forol, North Anglesey Marine/ Gogledd Môn Forol, North Channel and Rockabill to Dalkey Island SACs.

Screening Conclusion: No likely significant effects.

3.3.1.2 Cardigan Bay/ Bae Ceredigion and Pen Llŷn a'r Sarnau/ Lleyn Peninsula and the Sarnau – Bottlenose dolphin

Conservation objectives

The conservation objectives for these two European sites are the same:

- The population is maintaining itself on a long-term basis as a viable component of its natural habitat;
- The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future;
- The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance, and population dynamics of the species within the site and population beyond the site is stable or increasing.

Assessment against conservation objectives – bottlenose dolphin

It is possible that bottlenose dolphin from the two European sites may be observed in the proposed remedial works area given that the Proposed Works are in the same management unit as the Cardigan Bay / Bae Ceredigion and Pen Llŷn a'r Sarnau/ Lleyn Peninsula and the Sarnau SACs (i.e. the Irish Sea MU). Given the small zone of influence anticipated for injurious and disturbance effects (5km EDR) from underwater sound, combined with the distance to Cardigan Bay (145km) and Lleyn Peninsula and the Sarnau (71km) , the ZOI for underwater sound changes will not overlap with these sites. Therefore, the proposed remedial works will not reduce the natural range of this species within the sites and will not affect the long-term population viability or the natural range of bottlenose dolphin within these sites. Furthermore, the JNCC guidelines for minimising the risk of injury to marine mammals from geophysical survey (2017) states multi-beam surveys in shallow waters (<200m) use

frequencies that fall outside the hearing frequencies of cetaceans and the sounds produced are likely to attenuate more quickly than the lower frequencies used in deeper waters. While there are no protected sites with bottlenose dolphin as a primary or qualifying feature within proximity to the works, it is appreciated that the bottlenose dolphin is a far-ranging species, therefore the Proposed Works could affect prey availability for bottlenose dolphin within the MU. In the event that external cable protection is required, there will be the permanent loss of potential foraging habitat outside of the European sites, however this loss is considered highly localised relative to the surrounding habitat and therefore will not significantly affect the structure or the function of bottlenose dolphin habitat.

Screening Conclusion: No likely significant effects.

3.3.1.3 Cardigan Bay/ Bae Ceredigion, Pen Llŷn a'r Sarnau/ Lleyn Peninsula and the Sarnau, and Pembrokeshire Marine/ Sir Benfro Forol – grey seal

Conservation objectives
The conservation objectives for these three European sites are the same:

- The population is maintaining itself on a long-term basis as a viable component of its natural habitat;
- The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future;
- The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance, and population dynamics of the species within the site and population beyond the site is stable or increasing

Assessment against conservation objectives – grey seal
While Cardigan Bay/ Bae Ceredigion SAC and the Pembrokeshire Marine/ Sir Benfro Forol SAC are in excess of 140km from the Proposed Works, it is recognised that these sites alongside the Pen Llŷn a'r Sarnau/ Lleyn Peninsula and the Sarnau SAC are encompassed within the South West England and Wales MU. It is also recognised that the three European sites are likely to be connected in terms of grey seal populations. The Welsh 'population' of grey seals is estimated to form 3.3% of the UK and roughly 2.7% of the European population (NRW 2018). As the Lleyn Peninsula and the Sarnau SAC is within 100km of the Proposed Works, there is the potential for seals from the European site but also transient individuals from the two other European sites to be present in the area of the Proposed Works. Given the distance of the Proposed Works from all three European sites potential effects from underwater sound changes will be limited to foraging seals.

Grey seals are generalist feeders, foraging on the seabed consuming a wider variety of prey including sandeel, gadoids and flatfish (NRW 2018). Sandeel are typically the dominant prey species, but diet varies with region, with a study of seals in Pembrokeshire showing that whiting and sole dominated the grey seal diet (NRW 2018). Based on the seabed type and the location of the Proposed Works within spawning and nursery habitats for seal prey species, it is likely grey seals may forage in the area. Despite this, the temporary and localised nature of underwater sound changes associated with the Proposed Works will not significantly affect a grey seals ability to forage. Seals are likely to move away if vessels approach within several hundred metres (Britton 2015); suggesting that they will avoid the area before they encounter sound levels that will harm them. Grey seals foraging in the area may be interrupted, however this disturbance will be temporary (lasting a maximum of twelve days over two installation campaigns) and will not have a likely significant effect on the range or long-term population viability of grey seal. If external cable protection is required, there will be the permanent loss of potential foraging habitat. However, this loss is considered highly localised relative to the surrounding habitat and therefore will not significantly affect the structure or the function of grey seal habitat.

Screening Conclusion: No likely significant effects.

3.3.1.4 Lambay Island SAC – grey seal

Conservation objectives
The conservation objectives for grey seal are:

"*To maintain the favourable conservation condition of grey seal in Lambay Island SAC which is defined by the following list of attributes and targets*" including:

- Target 1 – Species range within the site is not restricted by artificial barriers to site use;
- Target 2 – Conserve the breeding sites in a natural condition;
- Target 3 – Conserve the moult haul-out sites in a natural condition;
- Target 4 – Conserve the resting haul-out sites in a natural condition
- Target 5 – Human activities should occur at levels that do not adversely affect the grey seal population at the site

Assessment against conservation objectives – grey seal
While the Lambay Island SAC grey seal population is outside of the UK seal MUs, based on the foraging range of grey seals there is potential for individual seals to be foraging within the area of the Proposed Works. Similarly, to the UK grey seal European sites, the temporary and localised nature of underwater sound will not significantly affect a grey seals ability to forage. Seals are likely to move away if vessels approach within several hundred metres (Britton 2015); suggesting that they will avoid the area before they encounter sound levels that will harm them. Grey seals foraging in the area may be interrupted, however this disturbance will be temporary. In relation to the targets, the Proposed Works will not create an artificial barrier to the European site and will not affect breeding, moulting or resting haul-out sites. The Proposed Works will not cause underwater sound effects that have adverse effects on the grey seal population of the Lambay Island SAC site.

Screening Conclusion: No likely significant effects.

3.3.2 Underwater Sound Changes – Annex II fish species

Table 3-4 identified a pressure-receptor pathway for the pressure underwater sound changes between the Proposed Works and two European 2000 sites for which the Qualifying Features are sea lamprey, river lamprey and Atlantic salmon. These sites are the Dee Estuary/ Aber Dyfrdwy SAC and the River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC.

It is recognised that fish are mobile species and therefore Annex II listed migratory species have the potential to cross the Proposed Works. In general, most fish hear well in the range within which most energy from anthropogenic noise sources is emitted, i.e. relatively low frequency sound below 1 kHz, with peak perception between approximately 100-400 Hz.

Several features of a fish's anatomy, life cycle and habitats will determine the potential effects of sound on fish. Popper et al. (2014) classified sensitivity of fish species to underwater sound based on the presence or absence of swim bladder; the otolith organ acts as a particle motion detector and where linked to the swim bladder, converts sound pressure into particle motion, which is detected by the inner ear. Specialist hearing species include species such as herring, sprat, twaite shad and allis shad. Swim bladder are used by certain fish species for buoyancy control, hearing, respiration etc. Pressure changes for fish with a swim bladder, from impulsive sound, can result in physiological trauma.

3.3.2.1 Dee Estuary/ Aber Dyfrdwy SAC and the River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC – sea and river lamprey

Conservation objectives
The conservation objectives for both sites are:

"*Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features by maintaining or restoring*:

- The extent and distribution of qualifying natural habitats and habitats of qualifying species
- The structure and function (including typical species) of qualifying natural habitats
- The structure and function of the habitats of qualifying species
- The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely
- The populations of qualifying species, and,
- The distribution of qualifying species within the site.

Assessment against conservation objectives – sea and river lamprey
The Dee Estuary SAC and River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC are designated for sea lamprey (*Petromyzon marinus*) and river lamprey (*Lampetra fluviatilis*) which use the estuary as part of a migratory route to the River Dee. Sea and river lamprey spend their adult life in the sea or estuaries but spawn and spend the juvenile part of their life cycle in rivers. Mature lamprey migrates into fresh water from the sea or primarily estuaries from October to December. During winter and early spring, they continue to migrate upstream at night where conditions are suitable, hiding under stones and vegetation during the day. Spawning typically starts once water temperatures reach 10-11^{o}C, typically between March and April (Natural England 2003). Based on the lifecycle of both lamprey species and the timing of the Proposed Works, there is the potential for underwater sound changes from the Proposed Works to influence the migration of lamprey to the Dee Estuary in October.

There is some limited research on the vestibular response of the lamprey ear however, there are no studies examining the response of the lamprey to sound or whether they exhibit a behavioural response to noise (Mickle *et al*. 2018). Given that lamprey species lack specialist hearing structures and their ear is simple (lacking a swim bladder or structure tuned to amplify sound signals), they are considered to be hearing generalists, with a maximum hearing range of up to several hundred Hz (Popper 2005). Behavioural and physiological effects on lamprey are only likely to occur if individuals are close to the noise source (Popper 2005; Popper and Hastings 2009). It is noted however that the assumption of lamprey being hearing generalists is based on limited data. A recent study attempting to address this gap looked at the behavioural response of lamprey. Mickle *et al*. (2018) found both adult and juvenile sea lamprey exhibited an increase in activity levels (swimming) when exposed to certain low frequency tones. The study suggests that the ear of a sea lamprey can respond to frequencies between 50-200Hz.

Table 3-5 above outlines the frequencies of each aspect of the Proposed Works. Based on these frequencies, noise from trenching, rock placement and geophysical survey is outside the suggested hearing range for lamprey species. Therefore, only low-frequency noise from the Project vessel(s) may influence lamprey migrating to the Dee Estuary SAC and River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC.

While the Project vessel(s) will produce sound within the frequency range to which lamprey could respond, the Project vessel(s) will only be present on location for a maximum of 12 days across two installation windows. The temporary addition of one vessel needs to be considered in the context of

the existing environment. Shipping density at the Remedial Works Areas 11, 12 and 13 range from 0.71 to 1.57 vessel hours per km^2 per month (EMODnet 2020). However, in the immediate areas surrounding the Remedial Works Areas, shipping density largely increases, ranging from 29.12 to 33.06 vessel hours per km^2 per month (EMODnet 2020). In addition, there is a high shipping density associated with the entrance to the River Mersey located to the north east and east of the Remedial Works. The temporary addition of the Project vessel(s) will be within the normal fluctuations experienced in the region in terms of underwater sound. In addition, the Proposed Works are occurring greater than 10km from the Dee Estuary SAC, therefore vessel noise will not cause significant injury or disturbance to lamprey migrating within the estuary.

Screening Conclusion: No likely significant effects.

Atlantic salmon

Salmon spend most of their lives out at sea but return to spawn in the same stretch of river or stream in which they hatched. They travel upstream in early summer and breed when the conditions are right in late autumn. Once hatched, juveniles will stay in freshwater for up to six years, after which they migrate back to the sea. Salmon are predators, feeding on invertebrates and small fish as juveniles, and squid and fish in the sea (Wildlife Trust Wales 2020). Atlantic salmon are known to detect low frequency acoustic stimuli below 380 Hz (Harding *et al*. 2016). Considering this, only noise emitted from the Project vessel(s) is likely to be detected by Atlantic salmon.

The zones of influence for injurious effects and disturbance will be limited to within a few hundred metres of the Project vessel(s) and the Project vessel(s) will not be operating continuously, with thrusters being used sporadically to maintain a position over the Proposed Works. Furthermore, the Proposed Works are temporary lasting a maximum of 12 days over two installation campaigns and are within a region that experiences high marine traffic. Atlantic salmon are already exposed to elevated sound levels and underwater sound changes from the Proposed Works will not be above the natural variation experienced by Atlantic salmon in the region. During the Proposed Works, some individuals may show avoidance behaviour in vicinity of the Proposed Works, however this will not affect the migration of Atlantic salmon into the Dee Estuary SAC and River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC. In relation to the conservation objectives, the Proposed Works will not affect the extent and distribution, the supporting habitats or the population and distribution of Atlantic salmon within both SACs.

Screening Conclusion: No likely significant effects.

3.3.3 Visual Disturbance and Changes to Supporting Habitat and Prey Availability

Table 3-4 identified a pressure-receptor pathway between the proposed survey and the Qualifying Features of the Liverpool Bay SPA and Anglesey Terns SPA for the pressure Visual Disturbance and Changes to Supporting Habitat and Prey Availability.

3.3.3.1 Liverpool Bay SPA (UK9020294A)

The SPA covers an area of 252,757.73 hectares, with three for the proposed locations for Remedial Works located within the European Site. The seabed of the SPA consists of a wide range of mobile sediments including large areas of muddy sand stretching from Rossall point to the Ribble Estuary with sand predominating the remaining areas with a concentrated area of gravelly sand off the Mersey Estuary and several sandbanks off the English and Welsh coasts (Natural England 2017). The tidal currents within the SPA are generally weak, when combined will the large tidal range results in the deposition of sediments. The SPA qualifies under Article 4.1 and 4.2 of the Birds Directive (79/409/EEC), with several qualifying overwintering and breeding birds (outlined in Table 3-6 below). The site also qualifies under SPA selection stage 1.3 as it is used regularly by over 20,000 waterbirds (as defined by the Ramsar Convention) in any season. In the non-breeding season, the site regularly supports 69,687 individual waterbirds (counts between 2004 – 2011). In addition, the main

components of the assemblage include all non-breeding qualifying features in Table 3-6 as well as two species present in numbers exceeding 1% of the Great Britain total, including: Red-breasted merganser (*Mergus serrator*) and Great cormorant (*Phalacrocorax carbo*).

Table 3-6 Liverpool SPA Population Estimate and Seasonality Presence

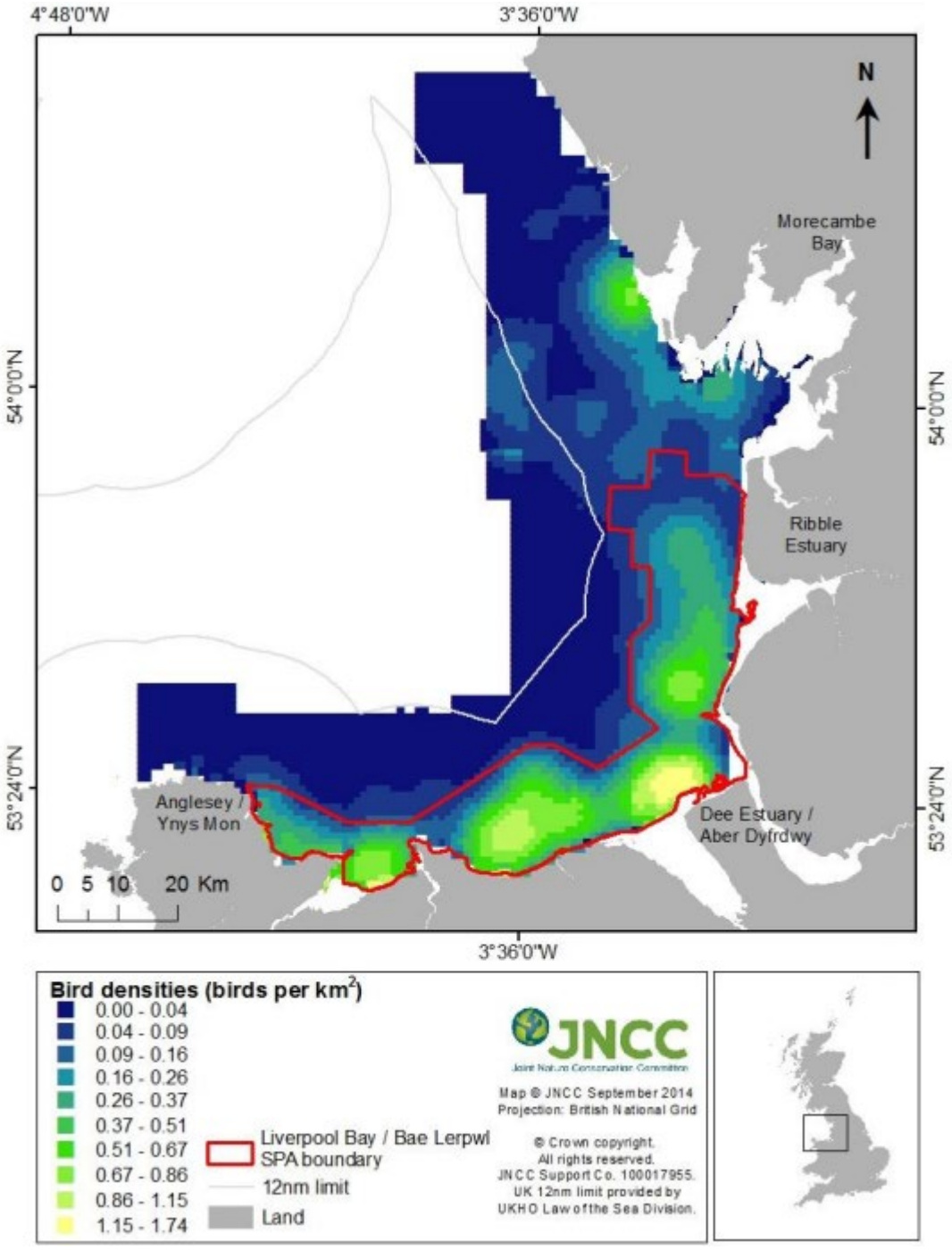
Bird species	Season	Interest Type	Estimated Population*	J	F	M	A	M	J	J	A	S	O	N	D
Red-throated diver (*Gavia stellata*)	Non-breeding	Annex I Species	1,171 individuals (2004/05 – 2010-11)												
Little gull (*Hydrocoloeus minitus*)	Non-breeding	Annex I Species	319 individuals (2004/05 – 2010/11)												
Little tern (*Sternula albifrons*)	Breeding	Annex I Species	260 individuals (2010 – 2014)												
Common tern (*Sterna hirundo*)	Breeding	Annex I Species	360 individuals (2011 – 2015)												
Common scoter (*Melanitta nigra*)	Non-breeding	Regularly occurring migrant	56,579 individuals (2004/05 – 2010/11)												
Internationally important waterbird assemblage of over 20,000 individuals	N/A	Assemblage													

*Source: Liverpool SPA Citation Document (Natural England 2017)

Red-throated diver

Higher densities of red-throated diver are typically found along the coastline and close inshore with the main aggregation of red-throated diver within the existing Liverpool Bay SPA, with a satellite aggregation evident to the north adjacent to the Duddon Estuary SPA and towards Morecambe Bay (Lawson *et al*. 2016). Figure 3-4 below illustrates the density of red-throated diver ranges from 0.04 – 1.15 individuals per km^2 at Remedial Works Areas 11, 12 and 13. The red throated diver has a disturbance susceptibility of five and a habitat specialisation of four meaning this species is sensitive to disturbance.

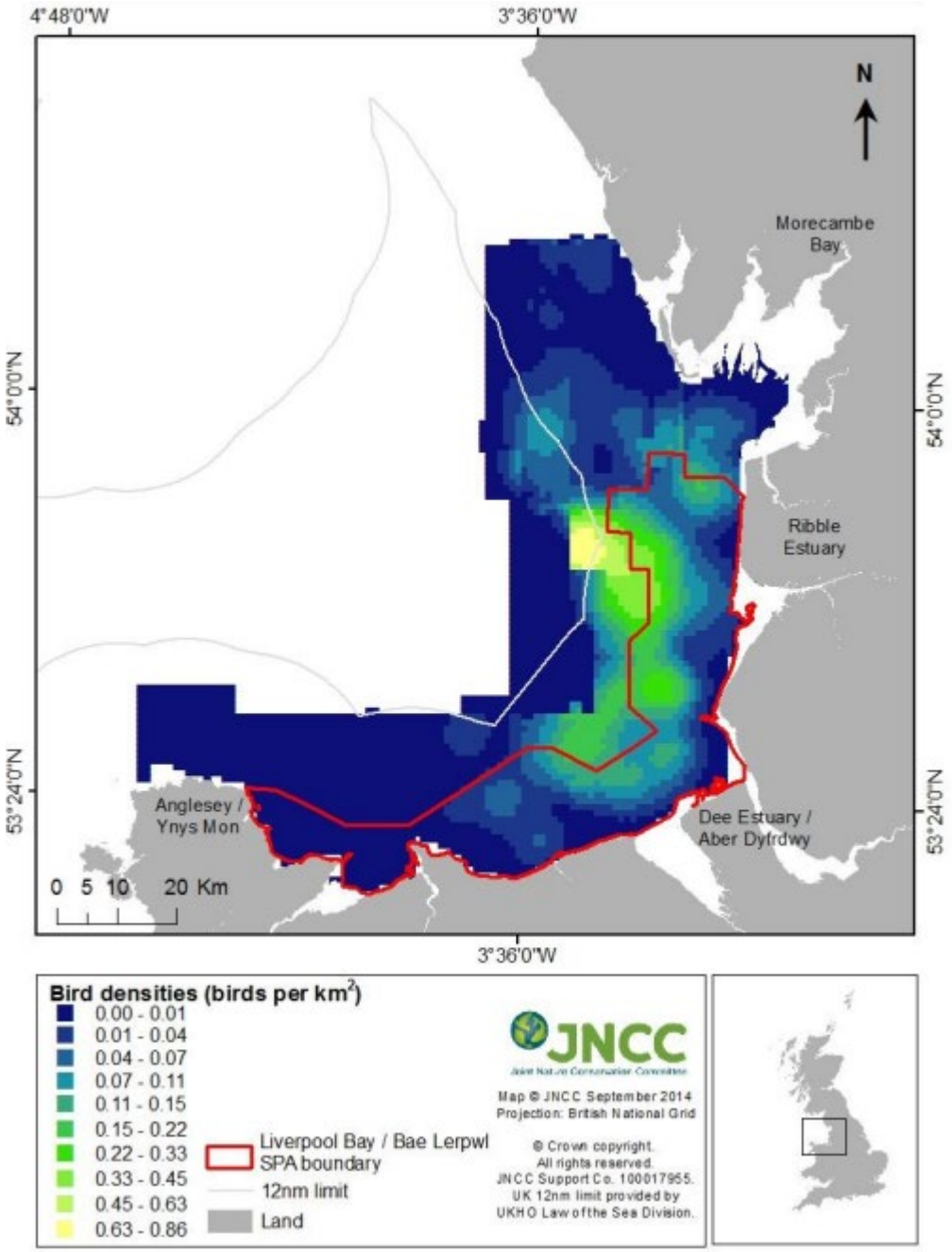
Figure 3-4 Red-throated diver densities and distribution



Little gull

The density and distribution of little gull within the Liverpool Bay SPA is concentrated off the coast of Blackpool near to the 12 nautical mile limit. Densities at the Remedial Works locations is comparatively low, ranging from 0 to 0.07 individuals per km^2 as shown in Figure 3-5 below.

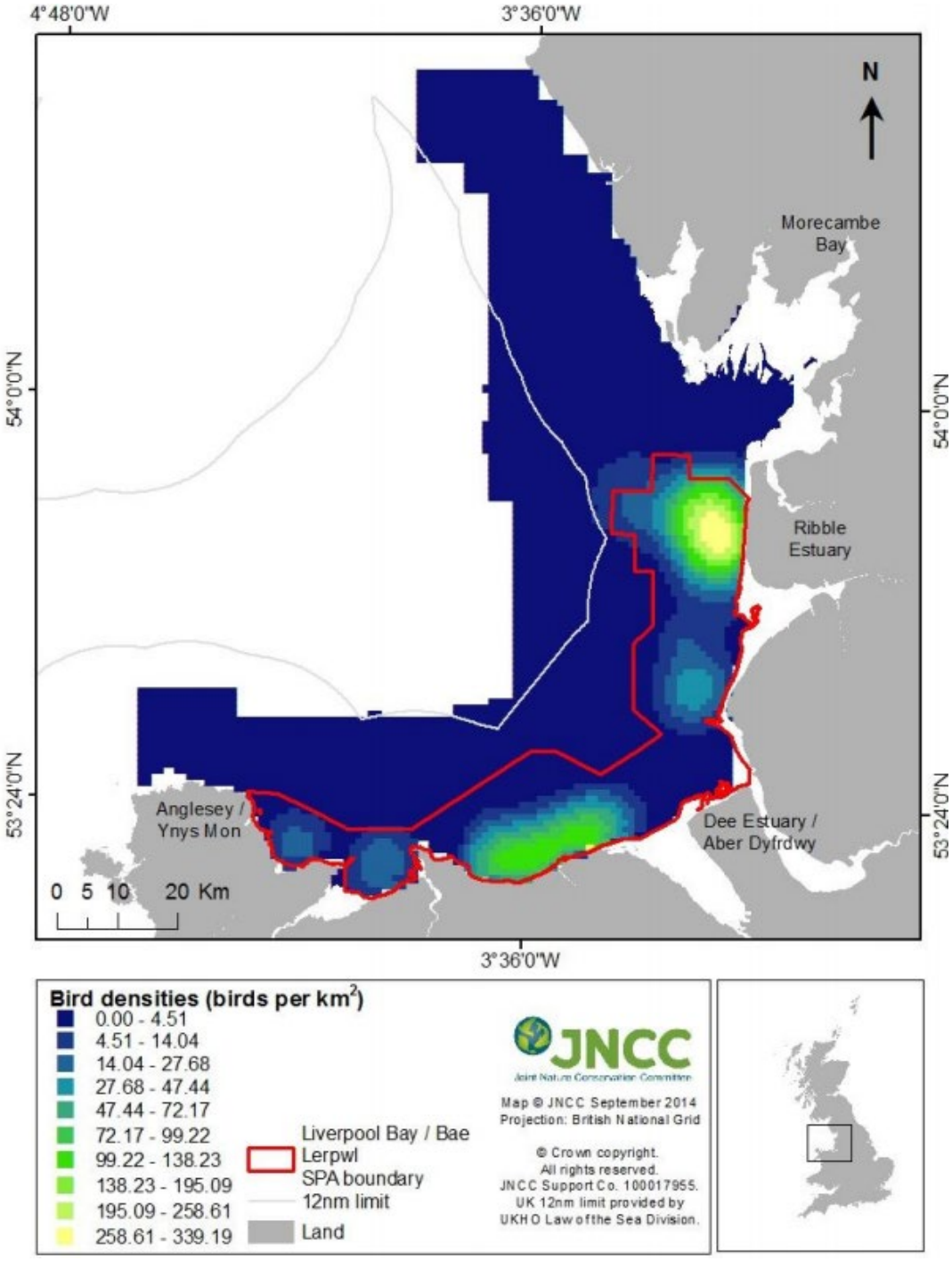
Figure 3-5 Little gull densities and distribution



Common scoter

There are two main aggregations of common scoter located to the to the north-west of the Dee Estuary and the Ribble Estuary (Figure 3-6). Both aggregations are restricted to the coastline and several miles out. Densities within Remedial Works Areas, 11, 12 and 13 range from 0 – 138.23 individuals per km^2 with increasing densities towards the coastline, where they reach 258.61 – 339.19 individuals per km^2 approximately 2km south of the Proposed Works.

Figure 3-6 Common scoter densities and distribution



Conservation objectives

The conservation objectives for the site are: "*Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring":*

- The extent and distribution of the habitats of the qualifying features;
- The structure and function of the habitats of the qualifying features;
- The supporting processes on which the habitats of the qualifying features rely;
- The population of each of the qualifying features; and
- The distribution of the qualifying features within the site.

Assessment against conservation objectives – visual disturbance

Disturbance can be defined as when a bird's normal behaviour is changed by anthropogenic activities. Individuals using a given area of sea for a range of activities including foraging, resting, and commuting could be disturbed by human activities. As a result, birds are likely to avoid sources of disturbance and return later once the disturbance source is no longer apparent. The level of disturbance can be affected by the duration of return times for individuals combined with the frequency of disturbance events which could combine in longer term effects (JNCC 2017b). The disturbance susceptibility and habitat specialisation scores feature within the Joint SNCB Interim Displacement Advice Note (JNCC 2017b) have been provided in Table 3-7 below.

Table 3-7 Liverpool Bay SPA Qualifying Features Disturbance Susceptibility and Habitat Specialisation

Species*	Disturbance Susceptibility (Out of 5)	Habitat Specialisation (Out of 5)
Red-throated diver	5	4
Little tern	2	4
Common tern**	2	3
Common scoter	5	4

* Little gull is not included in the Joint SNCB Interim Displacement Advice Note (2017b) assessment and there is limited information within literature pertaining to the disturbance susceptibility and habitat specialisation for this species. Therefore, this species has not been included in the above table.

**Common tern is not included in the Joint SNCB Interim Displacement Advice Note (2017) assessment therefore disturbance sensitivity and habitat specialism for other tern species has been used as a guide. Little tern, black tern, sandwich tern, roseate tern and Arctic tern are all classed as having a moderate habitat specialisation and low susceptibility to disturbance (score of 3 out of 5 for specialism and 2 out of 5 for disturbance) therefore it has been assumed that common tern is also likely to have low susceptibility to disturbance.

Remedial Works Areas 11, 12 and 13 are all within the Liverpool Bay SPA. Considering the aggregations and densities of qualifying features and disturbance susceptibility and habitat specialisation presented above, there is a high likelihood that the Proposed Works will interact with qualifying species of waterbirds. During the Remedial Works at these locations temporary visual disturbance from the Project vessel(s) has the potential to interrupt feeding activities of qualifying species within the SPA, in particular the red-throated diver and common scoter which have higher disturbance susceptibilities. Despite this, the Proposed Works will be temporary, taking up to a maximum of 12 days with the Project vessel(s) and activities occurring for a few hours at each Remedial Works Area. In addition, the Project vessel(s) will be slow moving and take place in the context of existing sources of disturbance. At such slow speeds, the Project vessel(s) is effectively stationary in terms of bird displacement. Studies have shown that slow moving vessels cause little disturbance to birds and birds may habituate to frequent and relatively benign events and noises (Hill et al 1997 in Natural England and Suffolk Coast and Heaths 2012). Shipping density at the Remedial Works Areas 11, 12 and 13 range from 0.71 to

1.57 vessel hours per km^2 per month (EMODnet 2020). However, in the immediate areas surrounding the Remedial Works Areas, shipping density largely increases, ranging from 29.12 to 33.06 vessel hours per km^2 per month (EMODnet 2020). In addition, there is a high shipping density associated with the entrance to the River Mersey located to the north east and east of the Remedial Works. The introduction of the Project vessel(s) will be within the normal weekly fluctuations of shipping activity experienced in the area. Therefore, qualifying bird species will be habituated to noise from vessel traffic and other activities going on in the area. Considering the above, the Proposed Works will not result in potential likely significant effects that will affect the distribution, structure, and function, supporting processes, the populations, or distributions of any of the qualifying features within the site.

Screening Conclusion: No likely significant effects.

Assessment against conservation objectives – changes to supporting habitat and prey availability

Red-throated diver is an opportunistic species primarily feeding on several species of small fish. The sandbanks of Liverpool Bay support the nursery and feeding grounds for many fish species that red-throated diver feed on including cod, herring, gobies, and sand eels (Natural England 2012). Common scoters feed by diving, usually synchronously in flocks and primarily feed on cockles, clams, other bivalves and a variety of other molluscs, crustaceans, and worms. Previous studies have shown the percentage occurrence of molluscs in their diet exceeded 90% and that for bivalves exceeded 88% (Kaiser *et al.* 2002).It is also noted that common scoter are opportunistic and will feed on whatever mollusc is locally abundant. Both common and little tern are plunge diving species with sandeel and cluepids being the primary food sources for colonies on the North Wales coast (RSPB 2017). Little gull typically feed by picking small fish, crustaceans, and other invertebrates of the surface of the sea.

Based on the above feeding methods and diets, the Proposed Works has the potential to affect the supporting habitats within the Liverpool Bay SPA which could influence prey availability. Furthermore, as shown in Table 3-6, most species have a high habitat specialisation making these species vulnerable to this pressure.

The use of trenching and external cable protection will disturb the surface of the seabed. Any fish, mollusc, or crustacean species within the direct footprint of the trenching or external cable protection are likely to be lost through mortality, injury, or disturbance. Despite this, the footprint of the seabed that the trenching will affect is relatively small compared to the availability of wider supporting habitat within the Liverpool Bay SPA. The total footprint anticipated to be affected by trenching is approximately 11,000m^2 based on 1,100m of EWIC requiring reburial and assuming a worst case 10m footprint for the trenching tool. It should be noted however that disturbance will only be limited to the direct footprint of trenching (1m) and the trenching tool tracks on the seabed and therefore will be less than 10m. When considering the width of the trench, the area affected is reduced to 1,100m^2. Disturbance of the seabed by trenching will be temporary, with the seabed available for use almost immediately following trenching, it is therefore suggested that there would be no significant or long-lasting effects to supporting habitat or prey availability. Unlike trenching, if external cable protection is required, this will result in a worst-case permanent loss of approximately 5,400m^2 of sedimentary seabed. Where there is a change to the seabed sediment, this could have localised effects on the benthic communities and suitability of the seabed for sensitive fish species with demersal life stages such as herring and sandeel. The permanent change of the seabed would make it no longer viable if used by demersal fish species, however the total footprint of external cable protection is relatively small compared to the wider supporting habitat. It should be noted that this footprint represents absolute worst case and reburial of the cable by trenching will be the primary aim. Based on the deposit of external cable protection, effects are considered greater than for trenching due to the permanent loss and change in seabed type, however this will not result in significant changes to supporting habitat and prey availability for qualifying species of the Liverpool Bay SPA.

Screening Conclusion: No likely significant effects.

3.3.3.2 Anglesey Terns / Morwenoliaid Ynys Môn SPA (UK9013061)

The SPA covers an area of 101,931 hectares and historically included Ynys Feurig, Cemlyn Bay and the Skerries SPA. These SPA's have recently been reclassified and extended to form the Anglesey Terns / Morwenoliaid Ynys Môn SPA. This site qualifies under Article 4.1 of the Birds Directive (79/409/EEC) by regularly supporting more than 1% of the Great Britain population of four species of tern as outlined in Table 3-8.

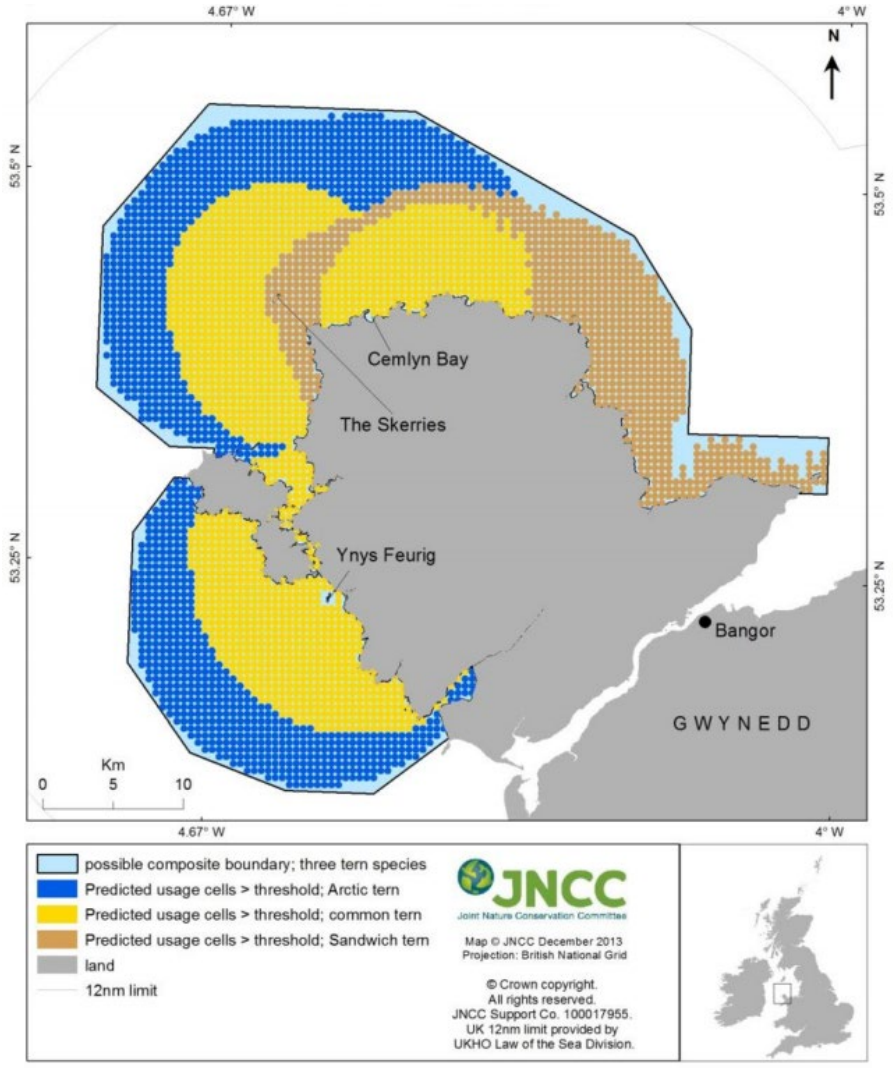
Table 3-8 Anglesey Terns / Morwenoliaid Ynys Môn SPA Tern Species Population Estimate

Bird species	Season	Interest Type	Estimated Population*	J	F	M	A	M	J	J	A	S	O	N	D
Common tern	Breeding	Annex I Species	189 pairs												
Arctic tern	Breeding	Annex I Species	1,290 pairs												
Roseate tern	Breeding	Annex I Species	3 pairs												
Sandwich tern	Breeding	Annex I Species	460 pairs												

*Source: Anglesey Terns SPA Advice to the Welsh Government 2016

Modelling of predicted usage of the extant Ynys Feurig, The Skerries and Cemlyn Bay sites demonstrates that the distribution of all tern species is primarily restricted to the coast. The highest densities of Arctic tern (between 8.08 – 20.98 individuals per km^2) are within 10km of the North Anglesey Coast. Densities of common tern are also their highest (between 10.12 – 55.22 individuals per km^2). The Sandwich tern has peak densities (15.31 – 29.48 individuals per km^2) within the immediate vicinity of the coastline, with densities reducing to 0 to 0.08 individuals per km^2 within 10km of the coastline. Figure 3-7 below, highlights the predicted usage for three of the four qualifying features within the SPA.

Figure 3-7 Predicted Usage for Arctic, Common and Sandwich Terns within the Angelsey Terns SPA



Source: Natural Resources Wales (2016)

Conservation objectives

The conservation objectives for each Qualifying Feature include:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term;
- The distribution of the population should be being maintained, or where appropriate increasing;
- There should be sufficient habitat, of sufficient quality, to support the population in the long term; and
- Factors affecting the population, or its habitat should be under appropriate control.

Assessment against conservation objectives – visual disturbance

There are no Remedial Works Areas within the SPA, with Remedial Works Area 5 being the closest, located 5.6km north of the SPA boundary. All other Remedial Works Areas within proximity to the SPA are a minimum of 7km from the SPA boundary. Breeding and nesting will be unaffected as the Proposed Works are outside the breeding season and based on the distance of the Proposed Works from nesting sites onshore. The presence of a Project vessel(s) therefore only has the potential to

disturb individuals foraging and loafing. Despite this, given the distance of the SPA to the Proposed Works disturbance effects will not occur. In addition, disturbance susceptibilities for terns provided in Table 3-9 demonstrates all species have a low susceptibility to disturbance.

Table 3-9 Anglesey Terns SPA Qualifying Features Disturbance Susceptibility and Habitat Specialisation

Species*	Disturbance Susceptibility (Out of 5)	Habitat Specialisation (Out of 5)
Arctic tern	2	3
Common tern*	2	3
Sandwich tern	2	3
Roseate tern	2	3

*Common tern is not included in the Joint SNCB Interim Displacement Advice Note (2017b) assessment therefore disturbance sensitivity and habitat specialism for other tern species has been used as a guide. Little tern, black tern, sandwich tern, roseate tern and Arctic tern are all classed as having a moderate habitat specialisation and low susceptibility to disturbance (score of 3 out of 5 for specialism and 2 out of 5 for disturbance) therefore it has been assumed that common tern is also likely to have low susceptibility to disturbance.

Based on predicted usage, the sea beyond the Anglesey Terns SPA boundary is unlikely to be used by qualifying species. There may be the potential for very small numbers of individuals to be disturbed if they venture beyond the predicted usage, however this is unlikely given that predicted usage accounts for such behaviour as foraging. In relation to the conservation objectives, it can be concluded that the Proposed Works will not have potential likely significant effects on the population, distribution and supporting habitat for Qualifying Features of the Anglesey Terns SPA.

Screening Conclusion: No likely significant effects.

Assessment against conservation objectives - Changes to supporting habitat and prey availability

As discussed above, the Proposed Works are located outside of the SPA boundary and outside of the main areas utilised by qualifying features for foraging. While any prey species within the direct footprint of the trenching or external cable protection are likely to be lost through mortality, injury or disturbance, the overall footprint is extremely small. There will be no changes to supporting habitat as the Proposed Works are outside the main areas utilise by qualifying features and while there may be a highly localised loss of prey species, this will not result In significant effects to prey availability for qualifying species of the Anglesey Terns SPA.

Screening Conclusion: No likely significant effects.

3.3.4 In-combination effects

Section 3.8 identified 11 projects within proximity and that have the potential to overlap with the Proposed Works. A high-level summary for each project is presented below.

Holyhead Breakwater Refurbishment

A screening and scoping opinion was provided by NRW on the 23rd July 2020 stating that the remedial works at Holyhead Breakwater will be subject to an EIA. According to the scoping report, the remedial works would involve fabrication and regrading works anticipated to take place between March 2021 to January 2023 depending on the construction programme selected. The other option is to begin works in March 2022 over three stages lasting until October 2027. There is the potential for the Proposed Works to overlap with the Holyhead Breakwater Refurbishment should a second installation campaign be required in 2021.

Holyhead Marina Re-build Project

On the 4th February 2020, a screening and scoping opinion was provided by NRW pertaining to the construction of a rubble mound breakwater, bridgehead, access, security, fuel pontoon, RNLI lifeboat, mooring and tethering and shore-side infrastructure associated within the re-building of the marina. NRW confirmed that the project should be subject to an EIA, specifically in relation to marine mammals within the North Anglesey Marine SAC and Holy Island SAC. While the dates of implementation are unknown, it is reasonable to assume that this project could overlap with the Proposed Works, this is only likely if a second installation campaign is required.

Enhancement of coastal defence at East Rhyl

On the 5th July 2019, NRW granted a marine licence in relation to the construction of rock revetment and replacement of the existing sea wall in East Rhyl. Construction works are set to take place between July 2020 and July 2022. Based on the dates of construction, there is the potential that the Proposed Works will overlap with the coastal defence works are East Rhyl.

Morlais Tidal Array

On the 17th September 2019, Menter Mon submitted a marine licence application to NRW relating to the Morlais Tidal Array. A consultation ran between 27th November 2019 and 8th January 2020, however following this NRW requested further information from Meter Mon regarding the environmental assessment of the project. Further information was received from Meter Mon on the 8th July 2020 which is undergoing consultation with final responses due by the 9th September 2020. While works on the Morlais Tidal Array are unlikely to occur alongside the Proposed Works in October, there is the potential for the second installation campaign to overlap with this project.

Port of Mostyn

On the 7th July 2020, a marine licence application was submitted to NRW relating to site investigation work in the Dee Estuary, including core penetration tests, vibrocores and boreholes. No information of program is available, however with the decision of the marine licence pending there is the potential for the Proposed Works to overlap with the Port of Mostyn site investigation.

NRW Grab Sampling Survey Programme

On the 1st March 2019, NRW granted a marine licence application to undertake benthic grab sampling and removal of sand, gravel and seabed sediment relating to NRW's ongoing grab sampling survey programme 2019 – 2021. While there is no information on specific timescales, the marine licence lasts until December 2021, therefore there is the potential for the Proposed Works to overlap with the survey programme.

Holyhead Harbour Maintenance Dredging

A marine licence was granted to Sterna Line Ports on the 25th October 2019 relating to maintenance dredging subsequent deposition of material within the inner and outer Holyhead harbour. There is no information of timescales, however the licence is valid until 22nd December 2022 and on this basis could overlap with the Proposed Works.

Holyhead Port Expansion

An environmental statement was submitted to NRW on the 19th July 2019 in relation to the Holyhead Port Expansion. The port expansion comprises the reclamation of two intertidal/subtidal areas and the dredging of an approach channel to 10m. The reclamation work is anticipated to begin in Spring 2020 and last 24 months. There is no status on this project, however following the proposed timescales outlined in the environmental statement, there is the potential to overlap with the Proposed Works.

Holyhead Waterfront Development

NRW granted a marine licence on the 26th February 2020 in relation to the Holyhead waterfront development. The works relate to ground investigation works at Holyhead harbour including

vibrocores and grab samples. The is no information of programme, however the marine licence application expires on the 24th October 2020. There is therefore the potential for the Proposed Works to overlap with the Holyhead ground investigation works.

Deganway Marine Dredging Conwy
On the 9th June 2020, NRW granted a marine licence to Lakeland Leisure Estates in relation to water injection dredging at Deganwy Marina, Conwy. There is no information on the programme available, however the marine licence expires on the 25th May 2023, therefore there is the potential for the Proposed Works to overlap with this project.

Awel y Môr Offshore Wind Farm
NRW granted a marine licence on the 22nd June 2020 relating to 33 sediment grab samples off the coast of North Wales for the Awel y Môr Offshore Wind Farm. The marine works are due to take place between 15th July and 30th August 2020, however the marine licence covers until 30 June 2021 for operational flexibility. There is therefore the potential for the Proposed Works to overlap with the benthic survey.

3.3.4.1 Underwater Sound Changes – In-combination effects assessment

Anglesey Marine SAC
The Holyhead Breakwater Refurbishment, Holyhead Marine Rebuild Project and Holyhead Port Expansion Scheme are all likely to result in underwater sound changes because of construction or remedial work activities within the North Anglesey Marine SAC. The Proposed Works is more than 30km from all other projects within the SAC, therefore the potential for spatial overlap within the SAC should activities take place concurrently is limited. Based on the Proposed Works alone, the North Anglesey Marine SAC could experience disturbance effects spanning 78.5km^2 which represents roughly 7.3% of the entire SAC, which is below the threshold considered significant by JNCC, DAERA and Natural England (2020). Noisy activities associated with construction have the potential to combine with the Proposed Works to cause disturbance effects within the SAC, however given the temporary nature of the works (five locations limited to a few hours at each location) the potential for in-combination effects will be limited. It should also be noted that the Proposed Works are being undertaken outside the summer season for which the SAC is designated, therefore the potential for significant in-combination effects to arise is unlikely.

Screening Conclusion: No likely significant effects.

Dee Estuary/ Aber Dyfrdwy SAC and the River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC
Of the other projects identified only the Port of Mostyn site investigation works are within the Dee Estuary. The Proposed Works are located 25km from the Port of Mostyn scheme, while no information is available on the works programme for this scheme, there will be no interaction given the separation from the Proposed Works. Therefore, no in-combination effects from underwater sound are anticipated on Annex II fish species designated in these sites.

Screening Conclusion: No likely significant effects.

North Anglesey Terns and Liverpool Bay SPA
The Holyhead Breakwater Refurbishment, Holyhead Marine Re-build Project, NRW Grab Sampling Programme, Holyhead Harbour Maintenance Dredging, Holyhead Port Expansion AND Holyhead Waterfront Development are all located within the Anglesey Terns SPA alongside the Proposed Works. Most of these other projects are likely to result in visual disturbance to terns because of vessel movements or the works themselves. Given that the Proposed Works are more than 30km from the other projects in Holyhead, the potential for in-combination visual disturbance effects is limited. Similarly, in-combination effects because of changes to supporting habitat or prey availability are

limited considering the distance of the Proposed Works from the other projects and the availability of wider supporting habitat.

The East Rhyl Coastal Defence Enhancement, NRW Grab Sampling Programme and Awel y Môr Offshore Wind Farm are within the Liverpool Bay SPA alongside the Proposed Works. Based on the shorter distance between the Proposed Works and the other projects and plans (<13km), there is the potential for in-combination visual disturbance effects on qualifying features of the SPA. The East Rhyl Coastal Defence Enhancement is restricted to the East Rhyl beach and intertidal. This project is 10.5km from the closest Remedial Works location and concluded minor indirect impacts to birds that may forage on the beach. Considering the distance and localised effects, potential significant in-combination visual disturbance effects will not arise. The NRW Grab Sampling Programme and Awel y Môr Offshore Wind Farm benthic sampling will involve the presence of vessels at sea. Given the distance of the Proposed Works, particularly from the Awel y Môr Offshore Wind Farm it is likely in-combination visual disturbance effects could occur. However, this is assuming the Proposed Works occur concurrently to the benthic sampling which is considered unlikely. In the event this does occur, disturbance effects will be temporary, given the short-term nature of the Proposed Works and benthic sampling and therefore will not result in significant in-combination effects.

Furthermore, the disturbance to the seabed resulting from the Proposed Works, NRW Grab Sampling Programme and Awel y Môr Offshore Wind Farm benthic sampling will not have significant effects on supporting habitat and prey availability. This is based on the temporary and highly localised nature of disturbance to the seabed and the reversible and swift recover of sedimentary habitats in the region.

Screening Conclusion: No likely significant effects.

3.3.5 Screening Statement and Conclusions

To determine whether the Proposed Works is likely to have a significant effect on any European sites, either individually or in-combination with other plans or projects, AA screening was carried out.

The screening assessed 13 European sites that were either within the direct zone of influence of the Proposed Works or contain mobile Qualifying Features which could potentially travel into the Proposed Works.

It was identified that the Proposed Works would induce the following pressures on Qualifying Features:

- Underwater sound changes;
- Visual disturbance; and
- Changes to supporting habitat and prey availability.

Other projects and plans in the area were identified and assessed to determine if they could interact with the Proposed Works to have an in-combination effect.

Initial screening of the 13 European sites identified there exists a pressure-receptor pathway between the Proposed Works and the Qualifying Features of all 13 sites (Table 3-3). It was concluded that potential likely significant effects resulting from the Proposed Works either alone or in-combination with other plans and projects could be ruled out for all thirteen sites

Table 3-10 summarises the conclusions of the assessment of likely significant effects.

Table 3-10 Summary - Potential for likely significant effects

Site Code & Name	Qualifying Interest Screened In for LSE	Potential pressure	Potential in-combination effects	Conclusion
North Anglesey Marine / Gogledd Môn Forol SAC (UK0030398)	Harbour porpoise	Underwater sound changes	**No LSE**	**No LSE**
Liverpool Bay SPA (UK9020294A)	Red throated diver Little gull Little tern Common tern Common scoter	Visual disturbance	**No LSE**	**No LSE**
		Changes to supporting habitat and prey availability	**No LSE**	**No LSE**
Anglesey Terns / Morwenoliaid Ynys Môn SPA (UK9013061)	Common tern Arctic tern Roseate tern Sandwich tern	Visual disturbance	**No LSE**	**No LSE**
		Changes to supporting habitat and prey availability	**No LSE**	**No LSE**
North Channel SAC (UK0030399)	Harbour porpoise	Underwater sound changes	**No LSE**	**No LSE**
West Wales Marine / Gorllewin Cymru Forol SAC (UK0030397)	Harbour porpoise	Underwater sound changes	**No LSE**	**No LSE**
Bristol Channel Approaches SAC (UK0030396)	Harbour porpoise	Underwater sound changes	**No LSE**	**No LSE**
Cardigan Bay/ Bae Ceredigion (UK0012712)	Bottlenose dolphin Grey seal	Underwater sound changes	**No LSE**	**No LSE**
Pen Llŷn a'r Sarnau/ Lleyn Peninsula and the Sarnau (UK0013117)	Bottlenose dolphin Grey seal	Underwater sound changes	**No LSE**	**No LSE**
Pembrokeshire Marine/ Sir Benfro Forol SAC (UK0013116)	Grey seal	Underwater sound changes	**No LSE**	**No LSE**
Rockabill to Dalkey Island SAC (IE0003000)	Harbour porpoise	Underwater sound changes	**No LSE**	**No LSE**
Lambay Island SAC (IE000204)	Grey seal	Underwater sound changes	**No LSE**	**No LSE**
Dee Estuary/ Aber Dyfrdwy SAC (UK0030131)	Sea lamprey River lamprey	Underwater sound changes	**No LSE**	**No LSE**
River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC (UK0030252)	Atlantic salmon Sea lamprey River lamprey	Underwater sound changes	**No LSE**	**No LSE**

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APPENDIX B

Water Framework Directive Assessment

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Appendix B: Water Framework Directive Assessment

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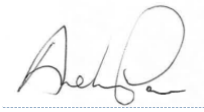
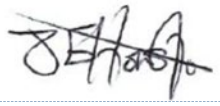
Appendix B: Water Framework Directive Assessment

Author/s

Nick Archibald

Project Manager	Authoriser
	
Andy Page	Eric Houston

Rev No	Date	Reason	Author	Checker	Authoriser
Rev 0	11/08/2020	Original	NA	EH	EH

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GLOSSARY

AL1
Cefas Action Level 1

BSP
Biosecurity Plan

CLV
Cable Lay Vessel

ESI
Environmental Supporting Information

EQSD
Environmental Quality Standards Directive

EWIC
East West Interconnector

HVDC
High Voltage Direct Current

HMWB
Heavily Modified Waterbody

HRA
Habitats Regulations Assessment

INNS
Invasive and Non-native Species

MBES
Multi-Beam Echosounder

NRW
Natural Resources Wales

NVZ
Nitrate Vulnerable Zones

RBMP
River Basin Management Plan

SAC
Special Area of Conservation

SPA
Special Protection Area

TraC
Transitional and Coastal Waters

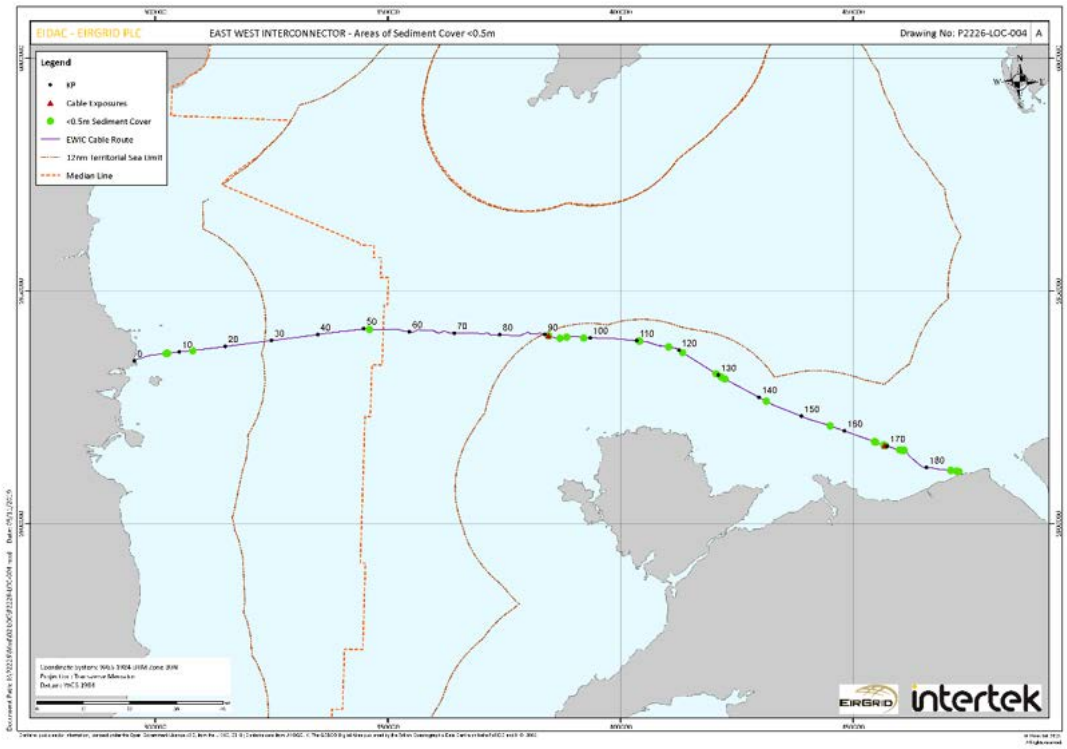
WFD
Water Framework Directive

1. INTRODUCTION

1.1 Project Background

EWIC is a 500 MW High Voltage Direct Current (HVDC) electricity interconnector linking the Irish and British electricity markets. Following post-installation inspections, incorporating a marine survey and geophysical condition survey, two cable exposures and several areas of low sediment cover (less than 0.5m) were identified along the EWIC cable route which need remedial works to reinstate the EWIC cable back to a level of acceptable risk. In addition to these areas, Intertek have undertaken a Cable Integrity Risk Assessment (CIRA) of the entire EWIC cable route and have identified the need for remedial works at seven other locations along the EWIC cable route. The remedial works will consist of a combination of reburial of the cable by trenching and where necessary placement of external cable protection in the form of rock berms and concrete mattresses. A detailed project description is provided in Section 2 and an overview of the proposed remedial works areas is provided in Figure 1-1.

Figure 1-1 Overview of the proposed remedial works areas



1.2 Requirement for WFD Assessment

This Water Framework Directive (WFD) assessment focuses on those aspects of the Proposed remedial works seaward of MHWS that are within a Transitional or Coastal (TraC) Waterbody, where there is a requirement to assess them against the objectives of the respective WFD water body.

Under the WFD, rivers, estuaries, coastal waters and anthropogenic docks and canals are separated into a series of water bodies, each of which have their own ecological and chemical objectives. The primary aim for the WFD was for all waterbodies to achieve 'good status' by 2015. This target was not met in 2015, therefore NRW are aiming to achieve 'good status' for all surface waters in Wales by 2021. Under all conditions, it requires that there should be no deterioration in status.

Using the Environment Agency's guidance[1] a WFD assessment has been carried out to determine whether the Proposed remedial works could have a significant effect on the achievement of the WFD objectives. This assessment has been based on the description of the Proposed remedial works provided in Section 2.

In addition to the above, this WFD assessment should be read alongside the EWIC Remedial Works ESI Report.

1.3 WFD Assessment Scope

Activities associated with the Proposed remedial works and that are within a Coastal or Transitional Waterbody have been considered within this WFD Assessment. Following the Environment Agency (2017) guidance, the WFD assessment process includes Screening, Scoping and Impact Assessment as summarised below:

- Screening
  - Identification of all potential risks and receptors linked with the Proposed Development;
  - Identification of receptors which may require further assessment;
- Scoping
  - Identification of receptors that can be scoped out of the WFD assessment;
- Impact Assessment
  - Undertaking an Impact Assessment on those receptors where a potential risk is identified.

[1] Environment Agency (2017) Water Framework Directive Assessment: Estuarine and Coastal Waters Guidance

2. METHODOLOGY

The WFD Assessment follows the staged approach outlined in the Environment Agency (2017) 'Clearing the Waters for All' guidance for assessing impacts in estuarine (transitional) and coastal waters. A WFD assessment comprises of three stages with the requirement to undertake latter stages of the WFD assessment dependant on the outcomes of the previous stages. These three stages are Screening, Scoping and Impact Assessment and are outlined below.

2.1 Stage 1 Screening

The Proposed remedial works will be assessed under the Environment Agency (2017) guidance as to whether the associated activities are low risk. Activities are considered low risk if they fall into any of the following categories:

- An activity that is exempt from the requirement of a Marine Licence or that meets specific conditions.
- Maintaining pumps at pumping stations – if you do it regularly, avoid low dissolved oxygen levels during maintenance and minimise silt movement when restarting the pumps.
- Removing blockages or obstacles like litter or debris within 10m of an existing structure to maintain flow.
- Replacing or removing existing pipes, cables or services crossing over a water body – but not including any new structure or supports, or new bed or bank reinforcement.
- 'Over water' replacement or repairs to, for example bridge, pier, and jetty surfaces – if you minimise bank or bed disturbance.

2.2 Stage 2 Scoping

The Scoping Stage is used to identify the receptors that are at risk from the Proposed remedial works and therefore need an Impact Assessment. The Scoping Stage will identify all potential risks to each receptor associated with proposed activities including:

- Hydromorphology
- Biology – habitats
- Biology – fish
- Water quality
- Protected areas
- Invasive non-native species (INNS)

The Environment Agency has provided an industry standard Scoping Template[2] for WFD Assessment in estuarine and coastal waters which has been used and incorporated within Section 4 of this WFD Assessment.

2.3 Stage 3 Impact Assessment

If it has been determined by the Scoping Stage that an Impact Assessment is required, then an Impact Assessment will be undertaken for each receptor that is at risk from Proposed remedial works activities. The primary aim of the Impact Assessment is to assess whether there is potential for the

[2] Environment Agency (2017) Water Framework Directive Assessment: Estuarine and Coastal Waters Guidance, Scoping template.

deterioration in the status of the water body receptor because of the Proposed remedial works. As defined by the Environment Agency guidance (2017), deterioration is when the status of a quality element reduces by one class (for example, biological quality elements) from good to moderate status. Where a quality element is at the lowest status, any reduction in its condition is considered a deterioration. Temporary effects due to short duration activities like construction or maintenance are not considered as a deterioration if the water body would recover in a short time without any restoration measures.

If an activity has the potential to cause deterioration, either of the quality element or supporting habitat, impacts must be assessed as to whether they are:

- Direct and immediate – the impact will happen at the same time and place as the activity
- Indirect – it will occur later or further away, including in other linked water bodies

Where deterioration is recognised, it will be explained whether the Proposed Development is the sole cause of the deterioration or whether other activities in the affected water bodies may together cause the deterioration.

Furthermore, if an activity may cause deterioration, ways to avoid and, if not possible and/or practical, ways to mitigate impacts will be identified.

3. STAGE 1 SCREENING

3.1 Screening of Proposed Remedial Works Activities

Based on Environment Agency (2017) guidance, the Proposed remedial works have been screened in for WFD assessment as they are not classed as a low risk, and it is not applicable to the self-service licensing procedure. This section outlines the specific activities of the Proposed remedial works that have been screened in or out of further assessment. The proposed activities which form the basis of this assessment are described in full within Chapter 2 of the ESI Report and summarised below.

3.1.1 Jet Trenching

Jet trenching is a cable installation technique which can be used to bury the cable in areas of loose non cohesive sediments such as sand and silt. It uses a powerful water-jetting tool to fluidise seabed, allowing pre-laid cables to sink to the required burial depth. Most jetting trenchers are a self-propelling ROV which is powered and controlled from the CLV or another support vessel. Some are towed rather than self-propelled. The jetting trencher will sit on the seabed and follow the pre-laid cables. High powered pumps inject sea-water into the seabed either side of the cables through jetting 'swords'. This fluidises the seabed beneath the cables allowing them to naturally sink to the required burial depth. The seabed sediments naturally re-form and 'back-fill' the trench covering the cables, only creating localised and temporary (less than one tidal cycle) turbidity plumes. If the required burial depth is not achieved, several passes can be made. The system does not remove any seabed sediments from the area.

3.1.2 External Cable Protection

If trenching is not successful in burying the cable, external cable protection in the form of concrete mattressing or rock placement would be deployed. There is the potential for external cable protection on the seabed to cause hydrodynamic changes. This aspect of the Proposed remedial works has been screened out of further assessment on the basis that none of the Proposed remedial works locations are within a WFD waterbody. Furthermore, any potential changes to hydromorphology will be highly localised. and have been assessed within the ESI Report and supporting Habitats Regulation Assessment (HRA) Screening along with the ecological effects of external cable protection measures.

3.1.3 Post Burial Geophysical Survey

Immediately following trenching or the deployment of external cable protection a multi-beam echosounder (MBES) geophysical survey will be undertaken to determine whether sufficient cable burial and sediment cover has been achieved. Given the nature of the survey, this aspect of the Proposed remedial works has been screened out of further consideration in the WFD assessment. The primary effect from geophysical survey relates to underwater noise which has been assessed within the EIS Report and HRA Screening.

3.2 Screening of Waterbodies and Protected Areas

The Proposed remedial works are not located within any WFD waterbodies, however as outlined above, trenching has the potential to generate a sediment plume that may interact with WFD waterbodies. A nominal 10km search area has been utilised to identify WFD waterbodies and Protected Areas, which is considered highly conservative.

3.2.1 WFD Waterbodies

Using Water Watch Wales (NRW 2020) the following WFD waterbodies have been identified within 10km of the proposed remedial works.

- North Wales (Coastal);
- Anglesey North (Coastal); and
- Clwyd (Transitional).

A summary of the status of each WFD waterbody identified is provided in Table 3-1 below.

Table 3-1 Current Status of WFD Waterbodies Screened into Stage 2 Scoping

ID	Name	Type[1]	Distance from PW[2]	Water Body Area (ha)	Overall Current Status	Ecological Status	Chemical Status	Is it a HMWB[3]?
GB641011650000	**North Wales**	C	6.8km	14,627.8	Moderate	Moderate	Fail	Yes
GB641010620000	**Anglesey North**	C	9.1km	12,600.4	Moderate	Good	Fail	No
GB541006608000	**Clwyd**	T	9.9km	64.4	Moderate	Moderate	Good	Yes

Notes:
1. T = Transitional C = Coastal
2. PD = Proposed Remedial Works
3. HMWB = Heavily Modified Waterbody

3.2.2 Protected Areas

Guidance stipulates that WFD Protected Areas located within 2km of the proposed remedial works must be identified (Environment Agency 2017). However, based on the highly conservative search area Protected Areas within 10km of the proposed remedial works have been screened in for assessment. Figure 3-1 presented at the end of this section shows SAC's and SPA's relative to the WFD waterbodies identified including the 10km search area. Figure 3-2 shows relevant bathing waters and shellfish waters in relation to the WFD waterbodies identified including the 10km search area.

3.2.2.1 European Designated Sites

SAC's and SPA's with connectivity to the proposed remedial works have been assessed within the Appendix A: HRA Screening of the ESI.

3.2.2.2 Bathing Waters

The waterbodies of North Wales, Anglesey North and Clwyd contain 12 designated bathing waters, 11 of which are located outside the 10km search area and have therefore been excluded from further assessment. The remaining Bathing Water is Rhyl Bathing Water which is located 8.6km south-east of the proposed remedial works and has a current quality status of 'Sufficient' (NRW 2018). The Rhyl Bathing Water has been screened in for further assessment and a summary of its classification status is provided in Table 3-2 below.

Table 3-2 Summary of Rhyl Bathing Water Profile 2016 – 2019 (NRW 2018)

Name	Type	Distance from proposed remedial works	2019 classification	2018 classification	2017 classification	2016 classification
Rhyl	Bathing Water	8.6km	Sufficient	Sufficient	Sufficient	Sufficient

3.2.2.3 Shellfish Waters

There is only one Shellfish water present within 10km of the proposed remedial works, Rhos-on-sea. The Rhos-on-sea shellfish waters are located within the North Wales waterbody and is designated for mussels which are harvested by hand. The Rhos-on-sea shellfish waters sometimes contain marketable sized stocks, but generally are only exploited for seed for which a classification is not required (Cefas 2014). As of 2014, there was no commercial harvesting of mussel beds within the Rhos-on-sea shellfish waters, with the waters being closed by Welsh Government Fisheries. All mussel harvesting within the area is currently regulated under the Cockles and Mussels (Specified Area) (Wales) Order 2011, under which only permit holders can take more than 5kg of mussels per day (Cefas 2014). Shellfish waters are classified and monitored based on levels of E.coli present within samples. There are three main classifications, Class A, Class B and Class C. Class A represents the best in terms of shellfish water quality with the lowest concentrations of E.coli within the flesh of shellfish (Food Standards Agency 2018). Table 3-3 below provides the hygiene classification of the Rhos-on-sea shellfish waters between 2011 and 2014 and shows it is considered as Class B. Where a Class B shellfish water has a stable compliance over a five-year period, a long-term classification can be awarded, which is indicated as B-LT. This demonstrates that water quality is more stable in the Rhos-on-sea shellfish waters. This shellfish water has been screened in for further assessment.

Table 3-3 Summary of Rhos-on-sea Shellfish Waters Classification (2011-2014)

Name	Type	Species	Distance from proposed remedial works	2014 classification	2013 classification	2012 classification	2011 classification
Rhos-on-sea	Shellfish Water	Mussels	9.5km	B-LT	B-LT	B-LT	B-LT

3.2.2.4 Nitrate Vulnerable Zones

Nitrate Vulnerable Zones (NVZ) have been screened out of the assessment as they are terrestrial, have no connectivity with the proposed remedial works and are outside the 10km search area.

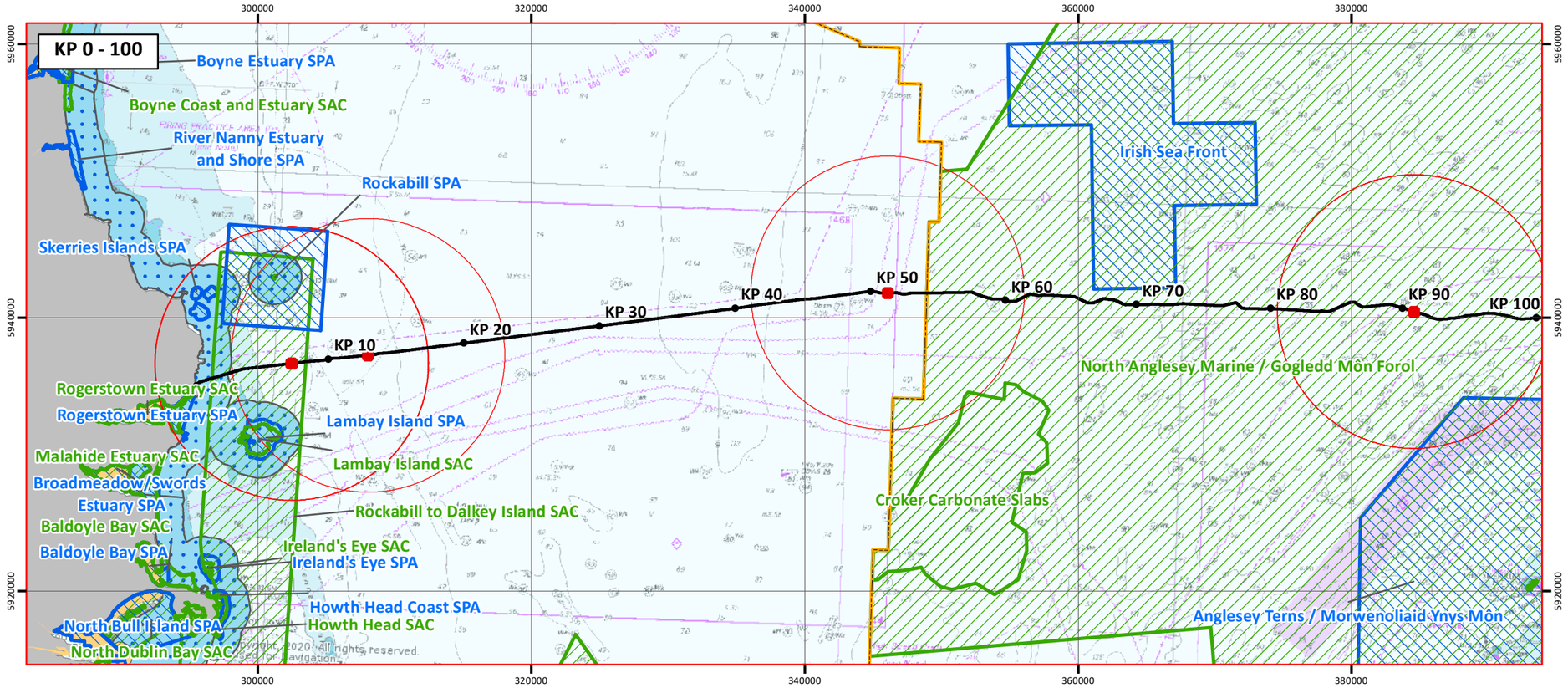
3.3 Screening Conclusion

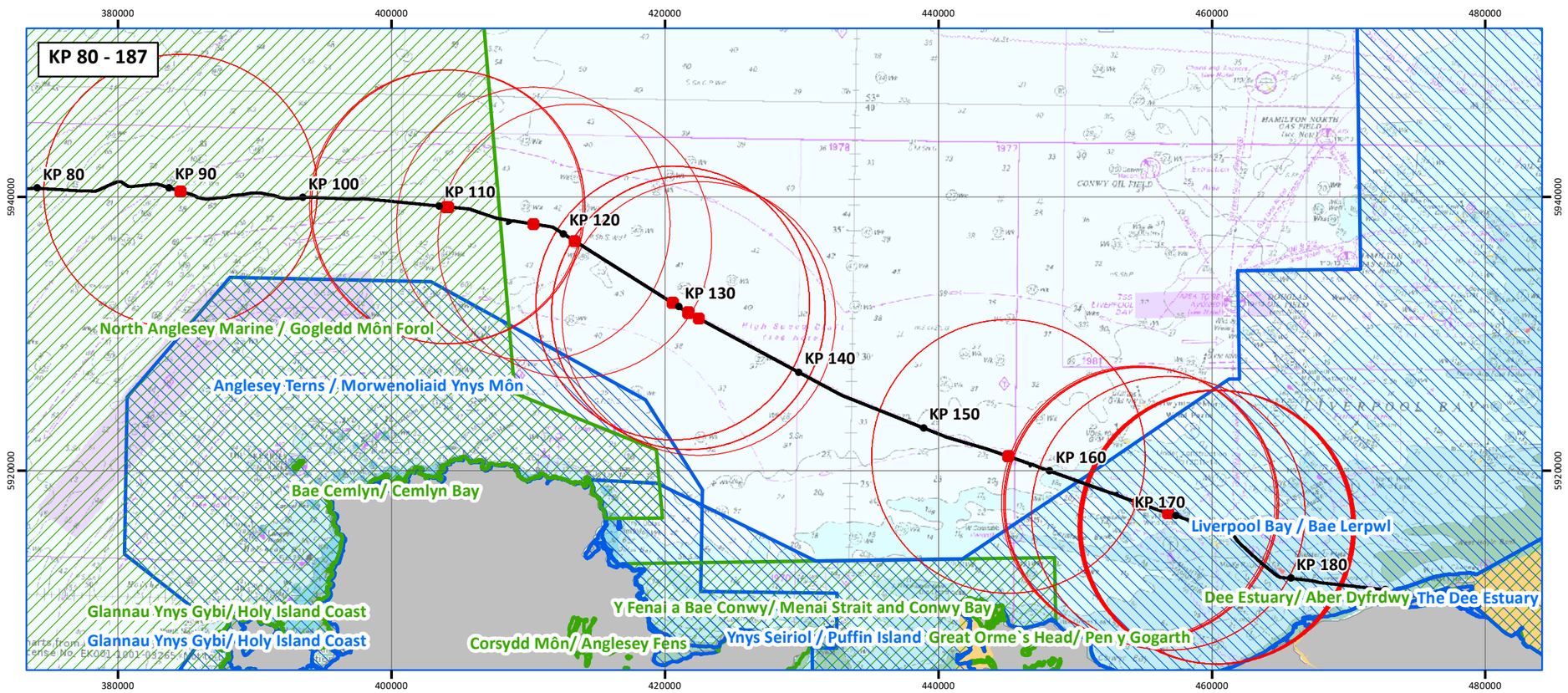
The proposed remedial works are not classed as a low risk and are not considered applicable for consideration under the self-service licensing procedure. The risks from post burial geophysical survey are however considered negligible and therefore have been scoped out from any further assessment in the WFD Assessment but are considered separately in the ESI Report and HRA Screening. Considering this and the presence of WFD waterbodies and protected areas within 10km, the proposed remedial works will progress to Stage 2 Scoping of the WFD Assessment.

EAST WEST INTERCONNECTOR

WATER FRAMEWORK DIRECTIVE
Natura 2000 Sites within 10km of Remedial Works

Drawing No: P2226-WFD-001	A



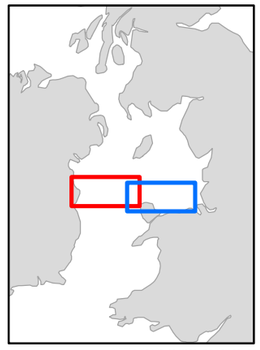


Legend

- EWIC Remedial Assessment Areas
- KP
- EWIC RPL Rev10
- EEZ Boundary
- Remedial Works 10km Buffer

Natura 2000 Site

- A - SPA (Birds Directive)
- B - SAC (Habitats Directive)
- Transitional Waterbody
- Coastal Waterbody



NOTE: Not to be used for Navigation

Date	28 July 2020
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Projection	Transverse Mercator
Datum	WGS 1984
Data Source	MarineRegions; MarineFind; EEA; EPA; ESRI; GEBCO;
File Reference	J:\P2226\Mxd\06_WFD\ P2226-WFD-001.mxd
Created By	Chris Dawe
Reviewed By	Emma Storey
Approved By	Andrew Page

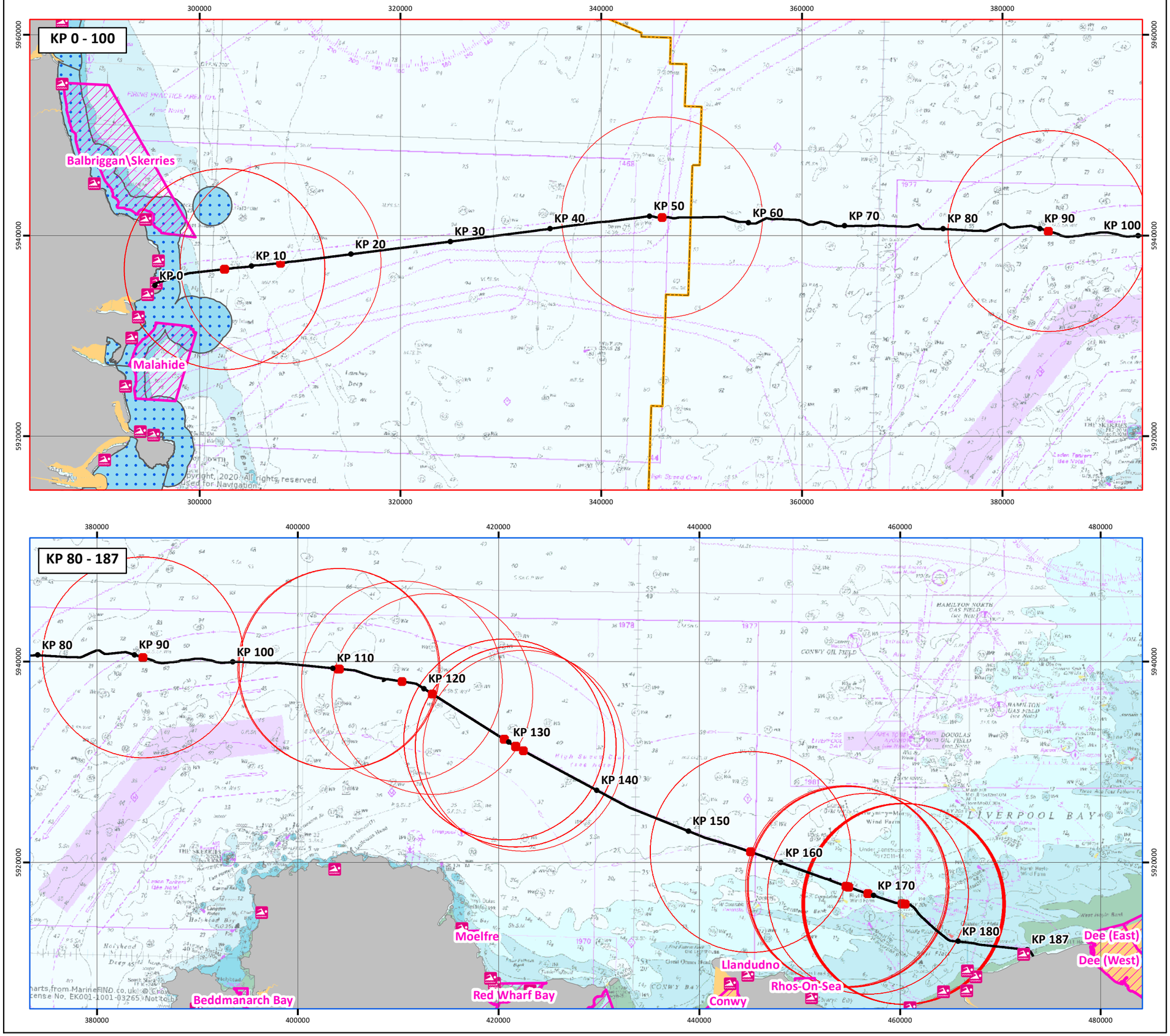
EIRGRID intertek

0 5 10 15 20 km

EAST WEST INTERCONNECTOR

WATER FRAMEWORK DIRECTIVE
Shellfish Waters within 10km of Remedial Works

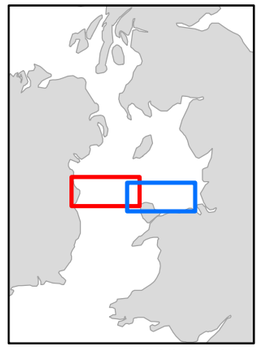
Drawing No: P2226-WFD-002 | **A**



Legend

- EWIC Remedial Assessment Areas
- KP
- EWIC RPL Rev10
- Bathing Water
- EEZ Boundary
- Remedial Works 10km Buffer
- Shellfish Water
- Transitional Waterbody
- Coastal Waterbody

N W E S



NOTE: Not to be used for Navigation

Date	28 July 2020
Coordinate System	WGS 1984 UTM Zone 30N
Projection	Transverse Mercator
Datum	WGS 1984
Data Source	MarineRegions; MarineFind; EEA; EPA; ESRI; GEBCO;
File Reference	J:\P2226\Mxd\06_WFD\ P2226-WFD-002.mxd
Created By	Chris Dawe
Reviewed By	Emma Storey
Approved By	Andrew Page

EIRGRID intertek

0 5 10 15 20 km

4. STAGE 2 SCOPING

The following Section presents the findings of Stage 2 Scoping of the WFD Assessment for the proposed remedial works. This Section follows the Environment Agency's (2017) "Clearing the Waters for All" guidance for assessing impacts on estuarine and coastal WFD bodies and follows the Scoping template provided by the Environment Agency.

4.1 North Wales (Coastal) Water Body (GB641011650000)

4.1.1 Hydromorhpology

Table 4-1 North Wales (Coastal) Water Body - Hydromorphology Risks

Consider if your activity:	Yes	No	Hydromorphology risk issue(s)
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status		No – Impact Assessment not required	No information was available as to whether this waterbody is of high status.
Could significantly impact the hydromorphology of any water body		No – Impact Assessment not required	While the proposed remedial works may introduce external cable protection on the seabed, these areas are not within the waterbody. Any potential effects to hydromorphology are highly localised and will not significantly impact the hydromorphology of the North Wales waterbody.
Is in a water body that is heavily modified for the same use as your activity		No – Impact Assessment not required	Information regarding the reason for the HMWB status is unavailable.

4.1.2 Biology

Table 4-2 provides the specific risk information for biology habitat receptors within the North Wales waterbody.

Table 4-2 North Wales (Coastal) Water Body - Biology Habitats Risks

Consider if the footprint of your activity is:	Yes	No	Biology habitats risk issue(s)
0.5km^2 or larger		No – Impact Assessment not required	The proposed remedial works will result in a worst-case footprint of 0.011km^2 for trenching and 0.005km^2 for external cable protection. Combined this is 0.016km^2 which is below the 0.5km^2 threshold. In addition, the proposed remedial works are not located within the North Wales waterbody.
1% or more of the water body's area		No – Impact Assessment not required	The proposed remedial works will not affect the North Wales water body
Within 500m of any higher sensitivity habitat		No – Impact Assessment not required	There are no higher sensitivity habitats within 500m of the proposed remedial works
1% or more of any lower sensitivity habitat		No – Impact Assessment not required	The proposed remedial works are within lower sensitivity habitat, however, do not represent 1% or more of their overall extent

4.1.3 Fish

Table 4-3 North Wales (Coastal) Water Body - Fish Risks

Consider if your activity:	Yes	No	Biology fish risk issue(s)
Is in an estuary and could affect fish in the estuary, outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary		No – Impact Assessment not required	The proposed remedial works are not within an estuary; however, it is recognised that fish are likely to migrate through the North Wales waterbody to enter the Dee Estuary and Clwyd Estuary. Given the temporary nature of the works and the distances from these estuaries (<10km), the proposed remedial works would not impact fish entering or migrating through the estuaries.
Could impact on normal fish behaviour like movement, migration, or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)		No – Impact Assessment not required	The proposed remedial works are located within spawning and nursery grounds for several species. Trenching and geophysical survey may cause temporary disturbance due to underwater noise. However, the brief and intermittent nature of this will not create a significant barrier to movement.
Could cause entrainment or impingement of fish		No – Impact Assessment not required	No solid barriers to fish movement will be created and the proposed remedial works does not have the potential to cause entrainment or impingement of fish.

4.1.4 Water Quality

Table 4-4 North Wales (Coastal) Water Body - Water Quality Risks

Consider if your activity:	Yes	No	Water quality risk issue(s)
Could affect water clarity, temperature, salinity, oxygen levels, nutrients, or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)		No – Impact Assessment not required	Water clarity is likely to be affected during construction activities. Sediments are mainly composed of sands and gravel with discrete areas of finer sediment. Any effects from trenching will be spatially limited and temporary in duration. While trenching is undertaken, discrete sediment plumes will be generated. The plume will disperse rapidly through strong tidal action in the region and will not be present for longer than a spring neap cycle.
Is in a water body with a phytoplankton status of moderate, poor, or bad		No – Impact Assessment not required	There is no information available relating the phytoplankton status of the North Wales waterbody. However, the proposed remedial works will not affect oxygen levels or levels of nutrients and therefore will not influence phytoplankton status.
Is in a water body with a history of harmful algae		No – Impact Assessment not required	There is no information available relating the history of harmful algae in the North Wales waterbody. However, the proposed activities will not cause any changes to the prevalence of harmful algal blooms based on the proposed remedial works not affecting oxygen levels or levels of nutrients

Table 4-5 North Wales (Coastal) Water Body - Water Quality Risks in relation to the Use or Release of Chemicals

If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if:	Yes	No	Water quality risk issue(s)
The chemicals are on the Environmental Quality Standards Directive (EQSD) list		No – Impact Assessment not required	The proposed remedial works will involve trenching over a previously trenched area which is likely to have disturbed or removed any EQSD contaminants. Furthermore, the mobile and coarse nature of seabed sediments means EQSD contaminants are unlikely to collect within the seabed in significant concentrations.
It disturbs sediment with contaminants above Cefas Action Level 1 (AL1)		No – Impact Assessment not required	As suggested above, the seabed was previously trenched, and the nature of the seabed means contaminants are unlikely to be present in concentrations above Cefas AL1

Table 4-6 North Wales (Coastal) Water Body - Water Quality Risks in relation to Mixing Zones

If your activity has a mixing zone (like a discharge pipeline or outfall) consider if:	Yes	No	Water quality risk issue(s)
The chemicals released are on the EQSD list		No – Impact Assessment not required	The proposed remedial works do not include a discharge pipeline or outfall, therefore there is no risk in relation to mixing zones.

4.1.5 WFD Protected Areas

Table 4-7 North Wales (Coastal) Water Body - Protected Area Risks

Consider if your activity is:	Yes	No	Protected areas risk issue(s)
Within 2km of any WFD protected area	Yes – impact assessment required		The North Wales waterbody contains areas of the Liverpool Bay SPA and Menai Strait and Conway Bay SAC. Three areas of the Proposed Works are located within the Liverpool Bay SPA. An assessment of the potential likely significant effects has been provided in the supporting HRA Screening. During the proposed remedial works , sediment mobilised during trenching has the potential to affect the Rhyl bathing water and Rhos-on-sea shellfish water. However, when considering the distance from the Proposed Works (8.6km and 9.5km respectively) and the nature of seabed being trenched, any sediment suspension will be temporary and will rapidly resettle following disturbance. Therefore, the effects of sediment suspension will be spatially and temporally limited and will not have a significant effect on the Rhyl bathing waters or Rhos-on-sea shellfish waters.

4.1.6 Invasive Non-Native Species (INNS)

Table 4-8 North Wales (Coastal) Water Body- Invasive Species and Non-native Species Risks

Consider if your activity could:	Yes	No	INNS risk issue(s)
Introduce or spread INNS		No – Impact Assessment not required	The introduction of invasive non-native species (i.e. through discharge of ballast water from vessels) will be managed under the International Convention for the Control and Management of Ships Ballast Water and Sediments. The deposit of external cable protection has the potential to introduce INNS, however the risk is no higher than any other activities in the region. A biosecurity plan will be submitted as part of the marine licence application which will reduce the likelihood and impact of any INNS.

4.1.7 North Wales (Coastal) Water Body Scoping Summary

Table 4-9 North Wales (Coastal) Water Body - WFD Scoping Summary

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	No	Not Applicable
Biology: habitats	No	Not Applicable
Biology: fish	No	Not Applicable
Water quality	No	Not Applicable
Protected areas	Yes	An assessment of the potential likely significant effects has been provided in the supporting HRA Screening.
Invasive non-native species	No	Not Applicable

4.2 North Anglesey (GB641010620000)

4.2.1 Hydromorhpology

Table 4-10 provides the specific risk information for hydromorphology receptors in the North Anglesey waterbody

Table 4-10 North Anglesey (Coastal) Water Body - Hydromorphology Risks

Consider if your activity:	Yes	No	Hydromorphology risk issue(s)
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status		No – Impact Assessment not required	No information was available as to whether this waterbody is of high status.
Could significantly impact the hydromorphology of any water body		No – Impact Assessment not required	While the proposed remedial works may introduce external cable protection on the seabed, these areas are not within the waterbody. Any potential effects to hydromorphology are highly localised and will not

Consider if your activity:	Yes	No	Hydromorphology risk issue(s)
			significantly impact the hydromorphology of the North Anglesey waterbody.
Is in a water body that is heavily modified for the same use as your activity		No – Impact Assessment not required	The North Anglesey waterbody is not a HMWB

4.2.2 Biology

Table 4-11 provides the specific risk information for biology habitat receptors within the North Anglesey waterbody.

Table 4-11 North Anglesey (Coastal) Water Body - Biology Habitats Risks

Consider if the footprint of your activity is:	Yes	No	Biology habitats risk issue(s)
0.5km^2 or larger		No – Impact Assessment not required	The proposed remedial works will result in a worst-case footprint of 0.011km^2 for trenching and 0.005km^2 for external cable protection. Combined this is 0.016km^2 which is below the 0.5km^2 threshold. In addition, the proposed remedial works are not located within the North Anglesey waterbody.
1% or more of the water body's area		No – Impact Assessment not required	The proposed remedial works will not affect the North Anglesey water body
Within 500m of any higher sensitivity habitat		No – Impact Assessment not required	There are no higher sensitivity habitats within 500m of the Proposed Works
1% or more of any lower sensitivity habitat		No – Impact Assessment not required	The proposed remedial works are within lower sensitivity habitat; however, it does not represent 1% or more of their overall extent

4.2.3 Fish

Table 4-12 North Anglesey (Coastal) Water Body - Fish Risks

Consider if your activity:	Yes	No	Biology fish risk issue(s)
Is in an estuary and could affect fish in the estuary, outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary		No – Impact Assessment not required	The proposed remedial works are not within an estuary; however, it is recognised that fish are likely to migrate through the North Anglesey waterbody to enter the Conway Bay Estuary. However, given the temporary nature of the works and the distances from the Conway Bay Estuary (>15km), the Proposed Works would not impact fish entering or migrating through the estuary.
Could impact on normal fish behaviour like movement, migration, or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)		No – Impact Assessment not required	The proposed remedial works are located within spawning and nursery grounds for several species. Trenching and geophysical survey may cause temporary disturbance due to underwater noise. However, the brief and intermittent nature of this will not create a significant barrier to movement.

Consider if your activity:	Yes	No	Biology fish risk issue(s)
Could cause entrainment or impingement of fish		No – Impact Assessment not required	No solid barriers to fish movement will be created and the Proposed Works does not have the potential to cause entrainment or impingement of fish.

4.2.4 Water Quality

Table 4-13 North Anglesey (Coastal) Water Body - Water Quality Risks

Consider if your activity:	Yes	No	Water quality risk issue(s)
Could affect water clarity, temperature, salinity, oxygen levels, nutrients, or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)		No – Impact Assessment not required	Water clarity is likely to be affected during construction activities. Sediments are mainly composed of sands and gravel with discrete areas of finer sediment. Any effects from trenching will be spatially limited and temporary in duration. While trenching is undertaken, discrete sediment plumes will be generated. The plume will disperse rapidly through strong tidal action in the region and will not be present for longer than a spring neap cycle.
Is in a water body with a phytoplankton status of moderate, poor, or bad		No – Impact Assessment not required	There is no information available relating the phytoplankton status of the North Anglesey waterbody. However, the proposed remedial works will not affect oxygen levels or levels of nutrients and therefore will not influence phytoplankton status.
Is in a water body with a history of harmful algae		No – Impact Assessment not required	There is no information available relating the history of harmful algae in the North Anglesey waterbody. However, the Proposed Activities will not cause any changes to the prevalence of harmful algal blooms as the proposed remedial works will not affect oxygen levels or levels of nutrients

Table 4-14 North Anglesey (Coastal) Water Body - Water Quality Risks in relation to the Use or Release of Chemicals

If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if:	Yes	No	Water quality risk issue(s)
The chemicals are on the EQSD list		No – Impact Assessment not required	The proposed remedial works will involve trenching over a previously trenched area which is likely to have disturbed or removed any EQSD contaminants. Furthermore, the mobile and coarse nature of seabed sediments means EQSD contaminants are unlikely to collect within the seabed in significant concentrations.
It disturbs sediment with contaminants above Cefas AL1		No – Impact Assessment not required	As suggested above, the seabed was previously trenched, and the nature of the seabed means contaminants are unlikely to be present in concentrations above Cefas AL1

Table 4-15 North Anglesey (Coastal) Water Body - Water Quality Risks in relation to Mixing Zones

If your activity has a mixing zone (like a discharge pipeline or outfall) consider if:	Yes	No	Water quality risk issue(s)
The chemicals released are on the EQSD list		No – Impact Assessment not required	The proposed remedial works do not include a discharge pipeline or outfall

4.2.5 WFD Protected Areas

Table 4-16 North Anglesey (Coastal) Water Body - Protected Area Risks

Consider if your activity is:	Yes	No	Protected areas risk issue(s)
Within 2km of any WFD protected area	Yes – impact assessment required		The North Anglesey waterbody contains areas of the Liverpool Bay SPA, Menai Strait and Conway Bay SAC and North Anglesey Marine SAC. Two areas of the proposed remedial works are located within the North Anglesey Marine SAC. An assessment of the potential likely significant effects has been provided in the supporting HRA Screening.

4.2.6 Invasive Non-Native Species (INNS)

Table 4-17 North Anglesey (Coastal) Water Body - Invasive Species and Non-native Species Risks

Consider if your activity could:	Yes	No	INNS risk issue(s)
Introduce or spread INNS		No – Impact Assessment not required	The introduction of invasive non-native species (i.e. through discharge of ballast water from vessels) will be managed under the International Convention for the Control and Management of Ships Ballast Water and Sediments. The deposit of external cable protection has the potential to introduce INNS, however the risk is no higher than any other activities in the region. A biosecurity plan will be submitted as part of the marine licence application which will reduce the likelihood and impact of any INNS.

4.2.7 North Anglesey (Coastal) Water Body Scoping Summary

Table 4-18 North Anglesey (Coastal) Water Body - WFD Scoping Summary

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	No	Not Applicable
Biology: habitats	No	Not Applicable
Biology: fish	No	Not Applicable
Water quality	No	Not Applicable
Protected areas	Yes	An assessment of the potential likely significant effects has been provided in the supporting HRA Screening.
Invasive non-native species	No	Not Applicable

4.3 Clywd (Transitional) Water Body (GB541006608000)

4.3.1 Hydromorphology

Table 4-19 Clywd (Transitional) Water Body - Hydromorphology

Consider if your activity:	Yes	No	Hydromorphology risk issue(s)
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status		No – Impact Assessment not required	No information was available as to whether this waterbody is of high status.
Could significantly impact the hydromorphology of any water body		No – Impact Assessment not required	While the proposed remedial works may introduce external cable protection on the seabed, these areas are not within the waterbody. Any potential effects to hydromorphology are highly localised and will not significantly impact the hydromorphology of the North Wales waterbody.
Is in a water body that is heavily modified for the same use as your activity		No – Impact Assessment not required	Information regarding the reason for the HMWB status is unavailable.

4.3.2 Biology

Table 4-20 provides the specific risk information for biology habitat receptors within the Clwyd waterbody.

Table 4-20 Clywd (Transitional) Water Body - Biology Habitats Risks

Consider if the footprint[4] of your activity is:	Yes	No	Biology habitats risk issue(s)
0.5km^2 or larger		No – Impact Assessment not required	The proposed remedial works will result in a worst-case footprint of 0.011km^2 for trenching and 0.005km^2 for external cable protection. Combined this is 0.016km^2 which is below the 0.5km^2 threshold. In addition, the proposed remedial works are not located within the Clywd waterbody.
1% or more of the water body's area		No – Impact Assessment not required	The proposed remedial works will not affect the Clywd water body
Within 500m of any higher sensitivity habitat		No – Impact Assessment not required	There are no higher sensitivity habitats within 500m of the Proposed Works
1% or more of any lower sensitivity habitat		No – Impact Assessment not required	The Proposed Works are within lower sensitivity habitat, however, do not represent 1% or more of their overall extent

4.3.3 Fish

Table 4-21 Clywd (Transitional) Water Body - Fish Risks

Consider if your activity:	Yes	No	Biology fish risk issue(s)
Is in an estuary and could affect fish in the estuary, outside the estuary but could delay or prevent fish		No – Impact Assessment	The proposed remedial works are not within the Clywd Estuary. Given the temporary nature of the works and the distances from the Clywd Estuary

Consider if your activity:	Yes	No	Biology fish risk issue(s)
entering it or could affect fish migrating through the estuary		not required	(9.9km), the Proposed Works would not impact fish entering or migrating through the estuary.
Could impact on normal fish behaviour like movement, migration, or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)		No – Impact Assessment not required	The proposed remedial works are located within spawning and nursery grounds for several species. Trenching and geophysical survey may cause temporary disturbance due to underwater noise. However, the brief and intermittent nature of this will not create a significant barrier to movement.
Could cause entrainment or impingement of fish		No – Impact Assessment not required	No solid barriers to fish movement will be created and the Proposed Works does not have the potential to cause entrainment or impingement of fish.

4.3.4 Water Quality

Table 4-22 Clywd (Transitional) Water Body - Water Quality Risks

Consider if your activity:	Yes	No	Water quality risk issue(s)
Could affect water clarity, temperature, salinity, oxygen levels, nutrients, or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)		No – Impact Assessment not required	Water clarity is likely to be affected during construction activities. Sediments are mainly composed of sands and gravel with discrete areas of finer sediment. Any effects from trenching will be spatially limited and temporary in duration. While trenching is undertaken, discrete sediment plumes will be generated. The plume will disperse rapidly through strong tidal action in the region and will not be present for longer than a spring neap cycle.
Is in a water body with a phytoplankton status of moderate, poor, or bad		No – Impact Assessment not required	There is no information available relating the phytoplankton status of the North Anglesey waterbody. However, the Proposed Activities will not affect oxygen levels or levels of nutrients and therefore will not influence phytoplankton status.
Is in a water body with a history of harmful algae		No – Impact Assessment not required	There is no information available relating the history of harmful algae in the North Anglesey waterbody. However, the Proposed Activities will not cause any changes to the prevalence of harmful algal blooms based on the Proposed Works will not affect oxygen levels or levels of nutrients

Table 4-23 Clywd (Transitional) Water Body - Water Quality Risks in relation to the Use or Release of Chemicals

If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if:	Yes	No	Water quality risk issue(s)
The chemicals are on the EQSD list		No – Impact Assessment not required	The proposed remedial works will involve trenching over a previously trenched area which is likely to have disturbed or removed any EQSD contaminants. Furthermore, the mobile and coarse nature of seabed sediments means EQSD contaminants are unlikely to collect within the seabed in significant concentrations.

It disturbs sediment with contaminants above Cefas AL1		No – Impact Assessment not required	As suggested above, the seabed was previously trenched, and the nature of the seabed means contaminants are unlikely to be present in concentrations above Cefas AL1

Table 4-24 Clywd (Transitional) Water Body - Water Quality Risks in relation to Mixing Zones

If your activity has a mixing zone (like a discharge pipeline or outfall) consider if:	Yes	No	Water quality risk issue(s)
The chemicals released are on the EQSD list		No – Impact Assessment not required	The proposed remedial works do not include a discharge pipeline or outfall

4.3.5 WFD Protected Areas

Table 4-25 Clywd (Transitional) Water Body - Protected Area Risks

Consider if your activity is:	Yes	No	Protected areas risk issue(s)
Within 2km of any WFD protected area	Yes – impact assessment required		The Clywd waterbody contains areas of the Liverpool Bay SPA and Menai Strait and Conway Bay SAC . The Proposed Works are not located within either of these protected areas. An assessment of the potential likely significant effects has been provided in the supporting HRA Screening.

4.3.6 Invasive Non-Native Species (INNS)

Table 4-26 Clywd (Transitional) Water Body - Invasive Species and Non-native Species Risks

Consider if your activity could:	Yes	No	INNS risk issue(s)
Introduce or spread INNS		No – Impact Assessment not required	The introduction of invasive non-native species (i.e. through discharge of ballast water from vessels) will be managed under the International Convention for the Control and Management of Ships Ballast Water and Sediments. The deposit of external cable protection has the potential to introduce INNS, however the risk is no higher than any other activities in the region. A biosecurity plan will be submitted as part of the marine licence application which will reduce the likelihood and impact of any INNS.

4.3.7 Clywd Scoping Summary

Table 4-27 Clywd (Transitional) Water Body - WFD Scoping Summary

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	No	Not Applicable
Biology: habitats	No	Not Applicable
Biology: fish	No	Not Applicable

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Water quality	No	Not Applicable
Protected areas	Yes	An assessment of the potential likely significant effects has been provided in the supporting HRA Screening.
Invasive non-native species	No	Not Applicable

5. CONCLUSIONS

Table 5-1 below provides a summary of the Stage 2 Scoping Assessment. As shown, the risks to WFD waterbodies because of the proposed remedial works are limited based on the brief, temporary and localised nature of effects. There is the potential for effects on protected areas, particularly within the Liverpool Bay SPA and North Anglesey SAC, which have both been considered alongside others as part of the HRA Screening submitted separately in support of the marine licence application.

Table 5-1 Summary of Stage 2 Scoping Stage

WFD Waterbody	Hydro-morphology	Biology – Habitats	Biology – Fish	Water Quality	Protected Areas	INNS
North Wales	No	No	No	No	Yes	No
North Anglesey	No	No	No	No	Yes	No
Clywd	No	No	No	No	Yes	No

Based on the results of Stage 2: Scoping, there is no potential for deterioration of WFD quality receptors because of the proposed remedial works. As outlined in the Environment Agency guidance, temporary effects due to short-duration activities such as construction or maintenance do not count as deterioration if the water body in question would recover in a short time without any restoration measures.

It is therefore concluded that activities resulting from the proposed remedial works will not prevent the relevant waterbodies from achieving the environmental objectives and will not affect the current status of respective waterbodies or hinder the achievement of target status in the future.

REFERENCES

1 Environment Agency. (2017). Water Framework Directive assessment: estuarine and coastal waters guidance – Clearing the Waters for All. [Online]. Available at: https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters (Accessed June 2020)

2 Cefas. (2014). Classification of Bivalve Mollusc Production Areas in England and Wales: Sanitary Survey Report – Colwyn Bay. [Online]. Available at: https://www.cefas.co.uk/media/uwjftxdg/colwyn-bay-sanitary-survey-report-final.pdf (Accessed July 2020)

3 Environment Agency (2020). 2020 Bathing Water Profile for Sheerness. [Online]. Available at: https://environment.data.gov.uk/bwq/profiles/profile.html?_search=sheer&site=ukj4209-11950 (Accessed April 2020)

4 Food Standards Agency (2018). Protocol for Classification of Shellfish Production Areas, England and Wales. [Online]. Available at: https://www.food.gov.uk/sites/default/files/media/document/protocol-for-classification-of-shellfish-production-areas-in-england-and-wales.pdf (Accessed April 2020)

5 NRW. (2018). 2020 Bathing Water Profile for Rhyl. [Online]. Available at: https://environment.data.gov.uk/wales/bathing-waters/profiles/profile.html?site=ukl1302-40600 (Accessed July 2020)

6 NRW. (2020). Water Watch Wales Map Gallery. [Online]. Available at: https://waterwatchwales.naturalresourceswales.gov.uk/en/ (Accessed July 2020)