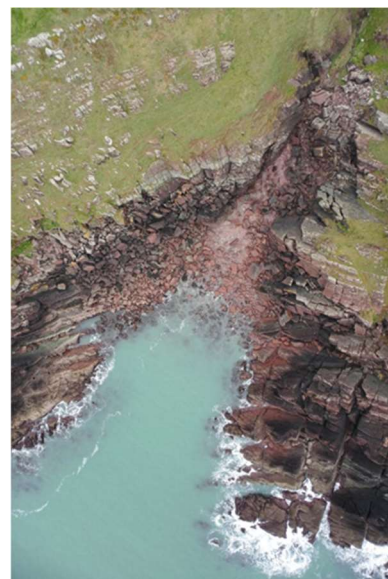




## mWave Marine Energy Device and Onshore Infrastructure

### ENVIRONMENTAL STATEMENT



June 2019

**APPENDIX 2.3: mWave draft Environmental Mitigation and Monitoring Plan**

# mWave Project Environmental Mitigation and Monitoring Plan - Draft

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## Abstract:

This document outlines the environmental mitigation and monitoring plan before and during the deployment of the mWave



Document Control Page

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## 1.0 PROJECT OVERVIEW

The mWave Project entails the testing of a full-scale wave energy prototype device which is to be deployed off East Pickard Bay on the south side of the Angle Peninsula. mWave will not be grid-connected, although a temporary communications cable and onshore control station will be required to enable testing. The testing of mWave will be for 6 - 12 months, with decommissioning thereafter. A Marine Licence is being sought for the marine element of the project and onshore planning permission is being sought for the onshore element. The consent period is for up to 18 months, to allow for weather windows during the installation and decommissioning of the project.

### 1.1 Project Site and Surrounding Area.

The marine element of the project will be located in the inshore waters of Pembrokeshire, south of the Angle Peninsula off East Pickard Bay. The site is some 2.5km south-east of Sheep Island, the southern extent of the Milford Haven Waterway, some 1.2km west of Freshwater West beach and is positioned offshore at approximately 750m below Mean High Water Spring (MHWS). The proposed deployment site off the Angle peninsula is exposed to a good wave resource benefiting from a significant fetch from the prevailing wind direction which is ideal for testing mWave.

The marine cable will make landfall at a rocky gully called East Pickard Bay before running in land to the control station. The control station site is situated on agricultural land which was formerly the south eastern extent of RAF Angle Airfield. It is approximately 500m from the B4320, 275m from the coastal footpath and 1.5km from the western extent of Freshwater West Beach. The nearest residential property is approximately 470m to the northeast. There is an existing gated access off the B4320 to a farm track which initially runs down between two fenced field boundaries to the site. The topography and existing vegetation provides some screening from all directions.

Part of the mWave Project lies within the Pembrokeshire Marine SAC and West Wales Marine SAC. The project is also near to Castlemartin Coast Special Protection Area (SPA) and the Limestone Coast of South West Wales SAC.

### 1.2 mWave design and how it works

The mWave is a submerged pressure-differential absorber with flexible membranes as the working interface. As such the mWave device will sit on the seabed, and it will comprise multiple seafloor-mounted, air-filled cells covered by flexible rubber membranes. As a wave passes overhead the device uses the change in water pressure to displace air in the membrane covered cells, the membranes inflate and deflate to move air within the device.

The full-scale prototype for deployment off East Pickard Bay will have four membrane covered cells. These membrane-covered cells convert wave pressure into internal cell air pressure. Wave peaks and troughs above the WEC cause differential pressure between cells. At any instant, those cells with a higher-pressure supply air to a high-pressure duct in the pneumatic circuit, via a set of non-return cell outlet valves. This high-pressure air flows through the enclosed turbine and returns to low pressure cells, via a low-pressure manifold and non-return inlet valves. The turbine is enclosed so that no water gets into the enclosed air system. With the air being pushed through the turbine by change in pressure, electricity can be generated by the turbine.

The physical size of the mWave structure is approximately 75m long (including the Power Take Off module (PTO)), 7m high and 15m wide at the base and approximately 17m wide across the largest width

### 1.3 Foundations

The mWave device has been designed with gravity foundations, so that installation will be relatively simple with no need for piles or anchoring points. It will have minimal impact on the seabed. The foundation of mWave comprises a keyed skirt that presses into the sand. The device is placed on the seabed and the penetration of the skirt into the sand up to 1m keeps the device in place throughout its deployment. The device contains ballast trays in the areas not occupied by cells and chain will be placed in the trays to add further weight to the device. Once the deployment period is complete, the chain ballast can be removed and the device can simply be lifted off the seabed. The sand will fall out of the skirt back onto the seabed.

### 1.4 Subsea Cable

In order gather data from the mWave device during testing a temporary communication cable and temporary onshore control station will be required. The communication cable will provide air for the device membrane covered cells, data communications and auxiliary power for periods when the electrical battery storage on the device is too low.

### 1.5 Device Location

As discussed previously the mWave sits on the seabed fully submerged with no infrastructure above the sea surface. The preferred depth of submergence of the device in most long-fetch wave climates will be in the range of 8-15m (from mean low water level to mWave base). The precise submergence required depends on the wave resource in the area, with deeper depths being appropriate for sites with larger wave resource. The location for mWave will be a minimum of 11m below Chart datum, which will provide a water clearance above the device of between 4.2m - 10.5m between MLWS and MHWS.

With the design of mWaves gravity foundation, the optimum position for the mWave device is on a sandy substrate. In this way the sand can be used to stabilise the device during testing. For the deployment site at East Pickard Bay, bathymetry data for the site (Titan 2018) has confirm that the seabed substrate is suitable, in that there is depth of 2m of sand on the seabed. The data also confirms that there will not be any requirement for geotechnical clearance (no rocks present) and that the device will be located on an area of relatively flat sandy seabed (no sand ripples present). The Acoustic Doppler Current Profiler (ADCP), which will monitor waves and currents in the area, will be positioned to the southeast of mWave.

### 1.6 Overview of mWave installation

Installation of mWave is relatively simple. Six moorings will be pre-installed on site in advance of installation. The moorings will span an area of approximately 200m by 200m. The proposed temporary spread is to be deployed a couple of days prior to the installation and removed once the installation is complete.

Using the membrane covered cells as buoyancy, mWave will be floated on the surface and towed by two vessels (50m with 6m draught) and accompanied by a guard boat, from the Port in the Waterway to the deployment site. Sufficient air will then be released from the cells for the device to be lowered to the seabed on a winch. One end will be lowered and touch the seabed before the other end is released. Once on the seabed, ballast in the form of chain placed within trays, will be used to maintain the device position on the seabed. After the initial mooring installation, it will take three vessels (one being a guard boat) 3 days to deploy mWave and 14 vessel trips over 5 days to install the chain ballast.

The communication cable will be laid on the surface of the seabed and held in position on the sandy area by four rock bags positioned at around 200m intervals. It will take one vessel up to 3 days to lay the cable and position the rock bags. The cable laying vessel will initially be moored off East Pickard Bay. A winch cable will be attached from the onshore winch point and the cable floated ashore. Once secured the floats will be cut so that the cable rests on the seabed and the cable laying vessel will move offshore to lay the remained of the cable.

### 1.7 Overview of mWave Operation and Maintenance

The WEC will be tested over a 6-12month period, functioning without intervention. During the testing period offshore O&M activities will be undertaken approximately once per month which will comprise routine inspection and scheduled maintenance. A specialist barge or module intervention tool (MIT) will be towed to site using a working class Multicat. It will be secured above the mWave device using a 4-point mooring system spanning an area of up to 200m by 200m. The MIT will be used for removal and replacement the membrane covered cells and PTO Unit on occasion. A guard boat will be present during O&M activities. In total it is predicted that there will be 76 vessel trips during a 12-month period, comprising 3 vessels visiting once a month for 2 days. There will be no O&M requirements for the cable. Data from the ADCP will be transmitted onshore via the communication cable.

Although not anticipated to be needed, there may be a requirement for the installation of scour protection during operation. If required rock bags would be used along the edge of mWave extending out about 2m. Deployment of scour protection would require 10 vessel trips over 5 days.

### 1.8 Overview of Decommissioning

Decommissioning of the offshore project elements will be undertaken after the short term deployment of up to 18 months with the decommissioning being roughly the reverse of the installation.

Similarly, the removal of the onshore cable and temporary onshore control station will also be the reverse of the installation process.

### 1.9 Onshore element of Project

As discussed above the temporary onshore elements of the project comprise the cable which will provide communication, air and auxiliary power to support testing and the control station.

The cable will be 150mm diameter and there will be approximately 50m in the intertidal section and approximately 350m from Mean High Water Springs (MHWS) to the control station. From the landfall at East Pickard Bay a small section of lower intertidal area would be cross before the cable is taken up the vertical western side of the gully to the cliff top. The cable will be within a plastic conduit that is fixed to the rock surface using clamps. A termination box and an anchor point (to take the strain of any cable movement from the tides) will be located at the top of the cliff. The cable would then be laid on the ground (for about 350m) along field boundaries to the control station. The control station, which will be located on agricultural land, comprises three shipping containers, each 20-23ft by 8ft by 8ft, a 1m Wifi antenna (15cm<sup>2</sup>), a chemical toilet and bunded fuel tank. Parking for three cars will be provided.

#### 1.10 Overview of onshore installation

As discussed above the cable will be attached to the onshore winch system and brought onshore. The end of the cable then be pulled out of the gully to the termination box and anchor point, using two hand propelled winches and two temporary anchor points. The attachment of the clamps to the rock, which will take the conduit, and the installation of the permanent and temporary anchor points will be

undertaken using handheld tools only. In order to lay the cable between the termination box and the control station, a roll of cable will be brought to site on a trailer using a 4WD vehicle. The vehicle will position itself within agricultural fields as close to the gully as possible. One end of the cable will then be pulled off the drum down to the termination box. Once secured, the 4WD vehicle will works its way back up the agricultural fields to the control station allowing the cable to be laid along the required field boundaries. The cable will also need to cross the Wales Coast Path, which will be achieved close to an existing gate on the path (in consultation with Pembrokeshire Coast National Park Authority (PCNPA)).

At the control station site, limited ground preparation works using an wheeled digger and delivery of 2 lorries of stone, will be required prior to installation of the control station. Delivery and installation of control station units will require three trips by a lorry with HIAB which would occur over 2-3 days, depending on availability. The chemical toilet and bunded fuel store will also be delivered to site.

It is anticipated that it will take approximately 6 days for pre-cable pull works which includes installing the clamps/conduit and anchor points using up to four personnel with hand-held tools. It will take approximately three days to set up and pull the cable onshore across the intertidal area and connect to the termination box. Preparation and installation of the control station will take place over roughly a 2-week interval.

#### 1.11 Overview of Operation and Maintenance

During operation, it is anticipated that two generators and a compressor will be located at the control station. A low speed/noise 1500 rpm generator will be used to drive the compressor and it will operate approximately 3hrs in every 6hr periods, with timing linked to the tidal height. The generator and compressor will be secured in soundproof enclosures, where needed.

The mWave is designed to run autonomously with minimum human intervention so site visits will be kept to a minimum. Staff visits will be typically up to two vehicles once per week during the daytime, although initially visits will be more frequent, eg staff visits every working day for two months. A lorry will be required to deliver fuel for the operation of the generator and compressor approximately at fortnightly intervals and maintenance of the chemical toilet will be undertaken as required. All staff and delivery vehicles will use the farm track and will park by the control station, away from the main road. There will be no external lighting at the control station and there is no maintenance required for the cable.

#### 1.12 Overview of Decommissioning

Subsequent to completion of the project, the control station and cable will be removed. It is anticipated that decommissioning of the site will be similar to installation. An HGV with mounted crane would be used to remove the control station units. The cable from the termination box to the control station would be pulled landward and taken off site by road. The cable from the termination box out to sea would be pulled offshore by a cable vessel and taken off site

## 2.0 BACKGROUND, REQUIREMENT AND OBJECTIVES

In order to progress the project appropriate consents are required from the regulators. A marine licence application was submitted to Natural Resources Wales Permitting Services for the mWave project, which included the full scale WEC, marine communications cable up to MHWS, an ADCP, Subsea Umbilical Termination Unit (SUTU) and navigational markers (if needed). In addition to this a planning application was submitted to PCNPA for the onshore section of the communication cable (from MLW), the termination box, cable anchor points and onshore control station. The project consents will be for up to 18 months with the mWave device being tested offshore for between 6 - 12 months.

An Environmental Statement has been prepared in support of the relevant consents. The Environmental Statement reports the findings of the Environmental Impact Assessment which was undertaken for the onshore and offshore element of the Project. A number of measures have been integrated into the design of the project (see section 3), and as a result significant environmental effects are avoided<sup>1</sup>, with all potential effects on relevant receptors being assessed as negligible to minor. Notwithstanding this, an Environmental Monitoring and Mitigation Plan (EMMP) and an Environmental Management Plan (EMP) have been identified as appropriate measures to further minimise any residual effects during the project's lifetime.

### 2.1 Contents and Application of EMMP

The aims of the EMMP are as follows:

- identification and support to the delivery of mitigation for ensuring that any residual impacts are further reduced where possible; and
- identification and support to the delivery of mitigation and monitoring that demonstrates best practice in management of environmental impacts at the test site; and
- increase understanding of environmental impacts of the mWave device.

## 2.2 Reference Documents

This document should be read alongside the Environmental Management Plan (EMP) which sets out the environmental framework within which the project will be delivered, and includes:

- Licences and legal requirements
- Communication, roles and responsibilities
- Onshore Works
  - Overview of proposed works and identification of sensitive receptors
  - Onshore pre-installation surveys
  - Procedures for works in vicinity of Wales Coast Path
- Offshore works
  - Overview of proposed works and identification of sensitive receptors
  - Marine Pollution Contingency Plan
  - Invasive Non-Native Species Risk Assessment
- Waste management

<sup>1</sup> An assessment of moderate impact was identified on visual amenity from the viewpoint on the Wales Coast Path. Whilst not significant in EIA terms, no mitigation is possible to reduce this temporary effect.

### 3.0 EMBEDDED MITIGATION

As discussed above a number of measures have been incorporated into the design of the mWave Project to reduce the potential effects during its installation and short-term deployment. Those which are integral to the project are outlined below. Further detail can be found in Chapter 2; Project Description and within relevant chapters of the ES:

- Onshore control station and cable route option selection process used to minimise potential impact of the project on a range of environmental receptors (Chapter 3, Needs and Alternatives, section 3.3.5)
- Minimal requirement for offshore vessels during all phases of project which will minimise disturbance (physical disturbance and noise) to marine ecology, marine birds and to other users and will reduce the potential for pollution incidents.
- All offshore works undertaken in good sea conditions, with good visibility thereby reducing potential for interaction with other users and the potential for pollution incidents.
- mWave placed on seabed, with good clearance for vessels which are likely to be in the area, with good water coverage, minimises the potential for interaction with the device and pollution incidents.
- The offshore deployment location selected is on sandy substrate away from sensitive habitats, such as Annex I Reef (Chapter 7: Benthic Subtidal and Intertidal Ecology, section 7.7.3).
- Drop-down video survey confirmed that for the cable landfall the habitats and communities across the bedrock reef at East Pickard Bay were relatively low in diversity (Chapter 7: Benthic Subtidal and Intertidal Ecology, section 7.7.3).
- Flat sandy seabed and no requirement for seabed preparation in advance of deployment (Chapter 2: Project Description, section 2.5.2).
- Gravity foundation, simple installation, requires no permanent moorings thereby minimising potential impacts on marine ecological receptors (Chapter 2: Project Description, Section 2.5.2).
- No external moving parts which may cause impact to marine life (only movement of air-filled membrane covered cells) (Chapter 2: Project Description, section 2.5.2).
- Deployment of mWave on seabed with limited vessel activity during operation, minimises visual effects during operation (Chapter 14 Seascape Landscape Assessment).
- Due to design (using membrane covered air filled cells) noise levels during operation are anticipated to be lower than conventional WEC (see Chapter 6, Underwater Noise).
- Cable laid on surface and not trenched either offshore or onshore (Chapter 2 Project Description, Section 2.5.3) thereby minimising impacts on marine ecology (reduced suspended sediment, reduced loss of habitat, reduced noise), terrestrial ecology, archaeology (marine and terrestrial).
- Cable route near coast avoids Geologically sensitive features.
- Minimal requirement for onshore vehicles during all phases of project minimises potential effect on ecological receptors and noise disturbance to nearby residents.
- Lorries delivering onshore control station units will avoid Pembroke Main Street thereby minimising impact on the town centre during installation and decommissioning phases.
- Control site on agricultural land with natural screening reducing visual impacts to the surrounding area (Chapter 2: Project Description, section 2.5.4).
- Control site distant from residential receptors (470m), coastal path (275m) and beaches (1.3km) minimising the potential for disturbance during the various stages of the project.
- Existing gates and access track available to control station site minimises potential effect on ecological receptors (Chapter 2: Project Description, section 2.5.4).
- Minimal site preparation works at control station minimises potential effect on ecological receptors and residential receptors (Chapter 2: Project Description, section 2.5.4).
- All soil material contained on site, thereby minimising risks in terms of previous site use (RAF WWII Airfield).
- Control station delivered to site as units reduces installation time and minimises potential effect on ecological receptors (Chapter 2: Project Description, section 2.5.4).
- Compressor and generator acoustically screened and operating about 50% of time minimises potential effects in terms of operational noise on residential receptors (Chapter 2: Project Description, section 2.5.4).
- No night-time external lighting of control station minimises potential effect on ecological receptors such as bats (Chapter 2: Project Description, section 2.5.4).

#### 4.0 OVERVIEW OF RECEPTORS AND MITIGATION

The marine and terrestrial receptors in vicinity of the project have been well documented within the ES and are summarised in the table below. Baseline surveys and detailed literature review were undertaken to inform the Environmental Impact Assessment (EIA) process. The findings of the EIA process, reported in the Environmental Statement concluded, that with the mitigation embedded in the design and with additional pre-checks for some receptors, no significant impacts were identified. Notwithstanding this a range of measures were identified in the Environmental Statement which would further reduce the risk of potential effects on various receptors during the lifetime of the project.

For each receptor, Table below provides a summary of surveys and data which have been undertaken to inform the project along with additional measures which will be implemented to further reduce the potential effects during the project. Further detail of these measures will be provided in an updated version of this document.

Note: As mitigation has been embedded in the project design no further mitigation or monitoring is proposed for the following environmental subject areas:

Chapter 13 - Marine Archaeology

Chapter 14 - Seascape Landscape Assessment.

**Table 1: Summary of receptors, additional mitigation measures and monitoring**

| Receptor                                                  | Baseline Surveys/information                                                                                                                                                                                                                         |              | Additional Mitigation/Monitoring                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Chapter 5, Coastal processes receptors                    |                                                                                                                                                                                                                                                      |              |                                                                                                                                                                                                                                                                                                                                                                                               |
| Coastal processes receptors                               | Grab sampling – Particle Size Distribution of deployment area<br>3 month ADCP Current velocity collection<br>3 month ADCP Wave collection<br>Hydrographic Survey of deployment site (Multibeam Echosounder, Side Scan Sonar and Sub bottom Profiler) | Installation | Mitigation - An assessment of potential scour formation has been undertaken for the design of the foundations.                                                                                                                                                                                                                                                                                |
|                                                           |                                                                                                                                                                                                                                                      | Operation    | Monitoring - ADCP Current velocity data collection<br>Monitoring - ADCP Wave data collection:<br>Monitoring – Ambient water temperature around the PTO<br>Monitoring – Camera: photos of area adjacent to gauge to monitor sediment level adjacent to edge of device<br>Mitigation – Provision has been made for use of rock bags as scour protection if monitoring indicates it is required. |
| Chapter 6, Under water noise (Operation)                  |                                                                                                                                                                                                                                                      |              |                                                                                                                                                                                                                                                                                                                                                                                               |
| All underwater noise receptors                            | Literature review                                                                                                                                                                                                                                    | Operation    | Monitoring - Noise from the device – 1 No. Hydrophone on the environmental monitoring frame.                                                                                                                                                                                                                                                                                                  |
| Chapter 7, Benthic subtidal and intertidal (installation) |                                                                                                                                                                                                                                                      |              |                                                                                                                                                                                                                                                                                                                                                                                               |
| Benthic habitats and species                              | Drop down camera video survey, and baseline data collection.<br>Hydrographic Survey of deployment site (Multibeam Echosounder, Side Scan Sonar and Sub bottom Profiler)<br>As above                                                                  | Installation | Mitigation - Implementation of Marine Pollution Contingency Plan (MPCP) in order to manage the risk of accidental pollution in the marine environment.<br>Mitigation - Invasive species risk assessment                                                                                                                                                                                       |
|                                                           |                                                                                                                                                                                                                                                      | Operation    | Mitigation - Implementation of Marine Pollution Contingency Plan (MPCP) in order to manage the risk of accidental pollution in the marine environment.<br>Mitigation - Invasive species risk assessment                                                                                                                                                                                       |
| Chapter 8, Fish and shellfish (installation)              |                                                                                                                                                                                                                                                      |              |                                                                                                                                                                                                                                                                                                                                                                                               |
| All fish and shellfish                                    | Baited remote underwater video: fish survey-<br>Baseline informed through data collection<br>Survey – Baited Remote Underwater Video deployment near the site<br>As above                                                                            | Installation | Mitigation - Implementation of Marine Pollution Contingency Plan (MPCP) in order to manage the risk of accidental pollution in the marine environment                                                                                                                                                                                                                                         |
|                                                           |                                                                                                                                                                                                                                                      | Operation    | Mitigation -Implementation of Marine Pollution Contingency Plan (MPCP) through the EMP, in order to manage the risk of accidental pollution in the marine environment.                                                                                                                                                                                                                        |
| Chapter 9, Marine mammals (Operation)                     |                                                                                                                                                                                                                                                      |              |                                                                                                                                                                                                                                                                                                                                                                                               |
| All marine mammals                                        | None, baseline informed through data collection (Chapter 9 Marine Mammals)                                                                                                                                                                           | Installation | Mitigation -Implementation of Marine Pollution Contingency Plan (MPCP) through the EMP, in order to manage the risk of accidental pollution in the marine environment.<br>Mitigation -Best practice measures to reduce disturbance and collision risk from vessels.                                                                                                                           |
|                                                           |                                                                                                                                                                                                                                                      | Operation    | Mitigation - Implementation of Marine Pollution Contingency Plan (MPCP) through the EMP, in order to manage the risk of accidental pollution in the marine environment.<br>Mitigation -Best practice measures to reduce disturbance and collision risk from vessels                                                                                                                           |
| Chapter 10, Ornithology (Installation)                    |                                                                                                                                                                                                                                                      |              |                                                                                                                                                                                                                                                                                                                                                                                               |
| Marine ornithology                                        | None, baseline informed through desktop study (Chapter 10 Marine Ornithology)                                                                                                                                                                        | Installation | Mitigation - Best practice measures to reduce disturbance from vessels and to reduce the potential for pollution incidents.<br>Mitigation - Implementation of Marine Pollution Contingency Plan (MPCP) through the EMP, in order to manage the risk of accidental pollution in the marine environment.                                                                                        |
|                                                           |                                                                                                                                                                                                                                                      | Operation    | Mitigation - Best practice measures to reduce disturbance from vessels and to reduce the potential for pollution incidents.<br>Mitigation - Implementation of Marine Pollution Contingency Plan (MPCP) through the EMP, in order to manage the risk of accidental pollution in the marine environment                                                                                         |
| Chapter 11, Commercial Fisheries (installation)           |                                                                                                                                                                                                                                                      |              |                                                                                                                                                                                                                                                                                                                                                                                               |
| All fish and shellfish                                    | Baited fish survey- Baseline informed through data collection<br>As above                                                                                                                                                                            | Installation | Mitigation -Implementation of Marine Pollution Contingency Plan (MPCP) in order to manage the risk of accidental pollution in the marine environment                                                                                                                                                                                                                                          |
|                                                           |                                                                                                                                                                                                                                                      | Operation    | Mitigation -Implementation of Marine Pollution Contingency Plan (MPCP) in order to manage the risk of accidental pollution in the marine environment                                                                                                                                                                                                                                          |

|                                                        |                                                                                                                          |              |                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Chapter 12, Shipping (Installation)</b>             |                                                                                                                          |              |                                                                                                                                                                                                                                                                                                                                                          |
| All shipping receptors                                 |                                                                                                                          | Installation | Mitigation – Notice to Mariners and onshore signage, temporary 200m advisory clearance distance, appropriate navigational marking (to be agreed with MCA), use of guard boat.<br>Mitigation - Implementation of Marine Pollution Contingency Plan (MPCP) through the EMP, in order to manage the risk of accidental pollution in the marine environment  |
| All shipping receptors                                 |                                                                                                                          | Operation    | Mitigation – Notice to Mariners and onshore signage, temporary 200m advisory clearance distances, appropriate navigational marking, use of guard boat during major activities.<br>Mitigation - Implementation of Marine Pollution Contingency Plan (MPCP) through the EMP, in order to manage the risk of accidental pollution in the marine environment |
| <b>Chapter 15, Other User (Installation)</b>           |                                                                                                                          |              |                                                                                                                                                                                                                                                                                                                                                          |
| Maritime receptors                                     |                                                                                                                          | Installation | Mitigation – Notice to Mariners and onshore signage, temporary clearance distances, appropriate navigational marking, use of guard boat                                                                                                                                                                                                                  |
| Onshore receptors                                      |                                                                                                                          | Installation | Mitigation - Temporary diversion of Wales Coast Path where required.                                                                                                                                                                                                                                                                                     |
| Maritime receptors                                     |                                                                                                                          | Operation    | Mitigation – Notice to Mariners and onshore signage, temporary clearance distances, appropriate navigational marking, use of guard boat and 200m advisory clearance distance                                                                                                                                                                             |
| <b>Chapter 17, Geology, Land Quality and Hydrology</b> |                                                                                                                          |              |                                                                                                                                                                                                                                                                                                                                                          |
| Hydrology                                              | Desktop study                                                                                                            | Installation | Care and sensitivity during cable installation.<br>Standard pollution prevention measures including spill kits.                                                                                                                                                                                                                                          |
| Land quality                                           | Desktop study                                                                                                            | Installation | Mitigation - retain all soil on site.                                                                                                                                                                                                                                                                                                                    |
| <b>Chapter 17, Terrestrial Ecology</b>                 |                                                                                                                          |              |                                                                                                                                                                                                                                                                                                                                                          |
| Birds (Excluding Chough)                               | Breeding bird survey and West Wales Biodiversity Information Centre (WWBIC) data search and review of existing datasets. | Installation | Mitigation - Seasonal timing of installation or pre-installation checks prior to any scrub removal.                                                                                                                                                                                                                                                      |
| Chough                                                 | Overwintering chough surveys, walkover surveys and baseline data collection.                                             | All phases   | No further mitigation or monitoring required.                                                                                                                                                                                                                                                                                                            |
| Otter                                                  | Extended phase 1 habitat survey and WWBIC data search and review of existing datasets                                    | Installation | Pre-installation walkover survey to determine if species is present with site and cable route area.<br>Implementation of Marine Pollution Contingency Plan (MPCP) ) through the EMP, in order to manage the risk of accidental pollution in the marine environment<br>Best practice measures to reduce disturbance and collision risk from vessels       |
| Reptiles                                               | Extended phase 1 habitat survey and WWBIC data search and review of existing datasets                                    | Installation | Standard mitigation measures including phased vegetation removal at control station site.                                                                                                                                                                                                                                                                |
| Bats                                                   | None. WWBIC data search and review of existing datasets.                                                                 | Installation | Mitigation – Cable route selected away from sea caves to ensure no significant short- or long-term habitat loss.                                                                                                                                                                                                                                         |
|                                                        |                                                                                                                          | Operation    | Mitigation - Terrestrial elements of the project will not be illuminated at night.                                                                                                                                                                                                                                                                       |
| Amphibians                                             | Extended phase 1 habitat survey and WWBIC data search and review of existing datasets                                    | Installation | Mitigation - Standard mitigation measures including phased vegetation removal.                                                                                                                                                                                                                                                                           |
| Invertebrates                                          | Extended phase 1 habitat survey and WWBIC data search and review of existing datasets                                    | Installation | Mitigation - Care and sensitivity during cable installation.                                                                                                                                                                                                                                                                                             |
| Flowering plants                                       | Extended phase 1 habitat survey, botanical quadrat survey and WWBIC data search and review of existing datasets          | Installation | Mitigation - Care and sensitivity during cable installation.                                                                                                                                                                                                                                                                                             |
| Lichens and bryophytes                                 | Extended phase 1 habitat survey and WWBIC data search and review of existing datasets                                    | Installation | Mitigation - Care and sensitivity during cable installation.                                                                                                                                                                                                                                                                                             |
| Hedgerows, scrub and tree cover                        | Extended phase 1 habitat survey and WWBIC data search and review of existing datasets                                    | Installation | Mitigation - Seasonal timing to ensure absence of nesting birds or pre-check by ecologist.                                                                                                                                                                                                                                                               |
| Water courses                                          | Extended phase 1 habitat survey and WWBIC data search and review of existing datasets                                    | Installation | Mitigation - Care and sensitivity during cable installation.                                                                                                                                                                                                                                                                                             |
|                                                        |                                                                                                                          |              | Mitigation - Standard pollution prevention measures including spill kits.                                                                                                                                                                                                                                                                                |