## Liverpool Bay CCS Ltd

# HYNET CARBON DIOXIDE TRANSPORTATION AND STORAGE PROJECT - OFFSHORE

## Environmental Statement
## Volume 3, appendix E: Enhancement, Mitigation and Monitoring Commitments

EHE7228B
Liverpool Bay CCS Limited
Final
February 2024
Offshore ES
Enhancement, Mitigation and Monitoring Commitments

rpsgroup.com

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| **RPS** | **Liverpool Bay CCS Limited** |

# Glossary

| Term | Meaning |
|---|---|
| The Applicant | This is Liverpool Bay CCS Ltd. |
| Environmental Impact Assessment | A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the EIA Directive and EIA Regulations, including the publication of an Environmental Statement (ES). |
| Environmental Statement | The document presenting the results of the Environmental Impact Assessment process for the Proposed Development. |
| Mitigation Measure (MM) | Measure which would avoid, reduce, or remediate an impact. |
| Primary mitigation | These include modifications to the location or design of the development made during the pre-application phase that are an inherent part of the Proposed Development and do not require additional action to be taken. This includes measures such as identifying an archaeological feature which should remain unaffected by the Proposed Development. |
| Project | The HyNet Carbon Dioxide Transportation and Storage Project. |
| Proposed Development | The offshore components of the Project which are subject of this Environmental Statement, as described in volume 1, chapter 3. |
| Secondary mitigation | These include actions that will require further activity in order to achieve the anticipated outcome. These may be imposed as part of the consents and licences, or through inclusion in the Offshore ES. This includes measures such as those required to restore a sensitive habitat. |
| Tertiary mitigation | Actions that would occur with or without input from the EIA feeding into the design process. These include actions that will be undertaken to meet other existing legislative requirements, or actions that are considered to be standard practices used to manage commonly occurring environmental effects. This includes measures such as the Environmental Management Plans (EMPs). |

# Acronyms and Initialisations

| Acronym/Initialisation | Description |
|---|---|
| ADD | Acoustic Deterrent Devices |
| AEZs | Archaeological Exclusion Zones |
| AtoN | Aid to Navigation |
| CAA | Civil Aviation Authority |
| CBRA | Cable Burial Risk Assessment |
| CCS | Carbon Capture Storage |
| CLV | Cable Lay Vessel |
| CMS | Construction Method Statement |
| $CO_2$ | Carbon Dioxide |
| COLREGs | International Regulations for Preventing Collisions at Sea |
| CSIP | Cable Specification and Installation Plan |
| EIA | Environmental Impact Assessment |
| EMP | Environmental Management Plan |
| ES | Environmental Statement |

| Acronym/Initialisation | Description |
|---|---|
| FIR | Fishing Industry Representative |
| FLCP | Fisheries Liaison and Coexistence Plan |
| FLO | Fisheries Liaison Officer |
| HDD | Horizontal Directional Drilling |
| ICPC | International Cable Protection Committee |
| IMO | International Maritime Organization |
| INNS | Invasive Non-Native Species |
| INNSMP | Invasive Non-Native Species Management Plan |
| LDAR | Leak Detection and Repair |
| LED | Light Emitting Diode |
| LMP | Lighting and Marking Plan |
| MARPOL | International Convention for the Prevention of Pollution from Ships |
| MCA | Maritime and Coastguard Agency |
| MCAA | Marine and Coastal Access Act |
| MM | Mitigation Measure |
| MMMP | Marine Mammal Mitigation Protocol |
| MMObs | Marine Mammal Observers |
| MPCP | Marine Pollution Contingency Plan |
| NAVTEX | Navigational Telex |
| NSP | Navigational Safety Plan |
| NtM | Notices to Mariners |
| OFLO | Offshore Fisheries Liaison Officer |
| OP | Offshore Platform |
| PAD | Protocol for Archaeological Discoveries |
| PAM | Passive Acoustic Monitoring |
| ROV | Remotely Operated Vehicle |
| TAEZ | Temporary Archaeological Exclusion Zones |
| SAC | Special Area of Conservation |
| SAR | Search and Rescue |
| SOLAS | the International Convention for the Safety of Life at Sea |
| SPA | Special Protection Areas |
| UXO | unexploded ordnance |
| VFDs | variable frequency drives |
| VMP | Vessel Management Plan |
| WSI | Written Scheme of Archaeological Investigation |

# Units

| Unit | Description |
|---|---|
| m | Metre (distance) |

# Contents



## Tables

# 1 INTRODUCTION

## 1.1 Purpose and scope

This chapter sets out a summary of the designed in measures, mitigation and monitoring commitments detailed within the Environmental Statement (ES) for the offshore components of the HyNet Carbon Dioxide Transportation and Storage Project (hereafter referred to as 'the Proposed Development'). For each commitment, the means of implementation is also specified.

**Table 1.1: Summary Of Enhancement, Mitigation And Monitoring Commitments**

| Reference | Proposed Development Phase | | | Mitigation and monitoring commitment | Justification (specific) | Justification (Generic) | Outline plan commitment | Topics of Relevance | | | | | | | | | | Means of implementation | Mitigation category (primary (P), secondary (S) or tertiary (T)) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Construction | Operation and maintenance | Decommissioning | | | | | Physical processes | Marine Biodiversity | Underwater noise | Offshore ornithology | Shipping and navigation | Commercial fisheries | Marine archaeology | Infrastructure and Other Sea Users | Climate change | | |
| MM1 | | ✓ | | Scour protection (e.g. rock berms) will only be used at third-party cable crossings and monitored as per MM3. | To reduce the potential for scouring of seabed sediments to occur. | To reduce interactions between metocean regime (wave, sand and currents) and seabed structures. | | ✓ | | | | ✓ | | | | | | | P |
| MM2 | ✓ | ✓ | ✓ | Suitable implementation and monitoring of Cable Protection | Suitable implementation and monitoring of cable protection informed by a Cable Burial Risk Assessment (CBRA). Cables will be buried to a target depth of 2-3m and only be protected using external protection (e.g. rock berms) at third-party crossings. | Minimises the risk of underwater allision with cable protection, anchor or fishing gear interaction with subsea cables and interference with magnetic position fixing equipment. | | | | | | ✓ | ✓ | | | | | | T |
| MM3 | | ✓ | | Development and adherence to a Cable Specification and Installation Plan (CSIP) post consent which will include cable burial where possible (in accordance with the specific policies set out in the North West Inshore and North West Offshore Coast Marine Plans (HM Government, 2021)) and cable protection, as necessary. | The CSIP will set out appropriate cable burial depth in accordance with industry good practice, minimising the risk of cable exposure. The CSIP will also ensure that cable crossings are appropriately designed to mitigate environmental effects, these crossings will be agreed with relevant parties in advance of CSIP submission. The CSIP will include a detailed CBRA to enable informed judgements regarding burial depth to maximise the chance of cables remaining buried whilst limiting the amount of sediment disturbance to that which is necessary. Measures will seek to reduce the amount of EMF which benthic and fish and shellfish receptors are exposed to during the operations and maintenance phase by increasing the distance between the seabed surface and the surface of the cables. | There is a potential for cable exposure to occur due to interactions between Metocean regime (wave, sand and currents). The sediment transport can lead to exposure of cables and infrastructure, the use of a cable burial depth alongside the cable installation strategy should provide sufficient depth to avoid exposure. | | ✓ | ✓ | | | ✓ | ✓ | | ✓ | | The CSIP will be conditioned in the Marine Licence. | P |
| MM4 | | ✓ | | Cable protection to have a profiled cross section and height mitigated to < 1 m | To minimise changes to physical processes such as tidal current, wave regime and sediment transport pathways, particularly if located in shallow water. | | | ✓ | | | | | | | | | | | P |
| MM5 | ✓ | ✓ | ✓ | No external cable protection in the intertidal area. | To minimise potential impacts on intertidal habitats within the Dee Estuary Special Area of | Trenchless techniques (e.g. Horizontal Directional Drilling (HDD)) will be used for cable | | ✓ | ✓ | | | | | | | | | | P |

| Reference | Proposed Development Phase | | | Mitigation and monitoring commitment | Justification (specific) | Justification (Generic) | Outline plan commitment | Topics of Relevance | | | | | | | | | | Means of implementation | Mitigation category (primary (P), secondary (S) or tertiary (T)) |
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| | | | | | Conservation (SAC) and Special Protection Areas (SPA). | installation which will not result in any direct habitat disturbance or scour to intertidal habitats | | | | | | | | | | | | | |
| MM6 | ✓ | ✓ | ✓ | The HDD exit pit will be 3 m below seafloor. | Embedded mitigation to ensure no materials are placed on the seafloor of the intertidal zone. | | | ✓ | ✓ | | | | | | | | | | P |
| MM7 | ✓ | ✓ | ✓ | Development of and adherence to an Environmental Management Plan (EMP) that will be prepared and implemented during the construction, operational and maintenance and decommissioning phases of the Proposed Development. The EMP will include appendices detailing actions to minimise INNS (the INNSMP), and a MPCP will be developed which will include planning for accidental spills, address all potential contaminant releases and include key emergency contact details | Measures will be adopted to ensure that the potential for release of pollutants from construction, operational and maintenance and decommissioning plant is minimised. These will likely include: designated areas for refuelling where spillages can be easily contained, storage of chemicals in secure designated areas in line with appropriate regulations and guidelines, double skinning of pipes and takes containing hazardous substances, and storage of these substances in impenetrable bunds. All vessels will be required to comply with the standards set out in the International Convention for the Prevention of Pollution from Ships (MARPOL). | Provides a means to ensure the efficient management and communication of commitments made for the management of the potential environmental impacts. | Outline EMP, with INNSMP | ✓ | ✓ | | | ✓ | | | | | | Secured within a Marine Licence condition. | P |
| MM8 | ✓ | ✓ | ✓ | Actions to minimise INNS, including a biosecurity plan to limit spread and introduction of INNS. | These measures will aim to manage and reduce the risk of potential introduction and spread of INNS so far as reasonably practicable to best protect the biological integrity of the local natural environment and communities. | Provides a means to ensure the efficient management and communication of commitments made for the management of the potential environmental impacts with respect to the potential introduction and spread of INNS. | | | ✓ | | | | | | | | | Secured within a Marine Licence condition. | T |
| MM9 | ✓ | | | Material arising from drilling and/or sandwave clearance will be deposited in close proximity to the works. | To retain material within sediment cell and maintain sediment transport regimes. | | | ✓ | | | | | | | | | | Secured within a Marine Licence condition. | T |
| MM10 | ✓ | | | Development of, and adherence, to a Construction Method Statement (CMS). | This measure will confirm the actual methodology, timing, and duration that will be employed to construct the Proposed Development, provide details on aspects of the methodology not known at the application stage and confirm that the methodology falls within the parameters assessed in the ES. | Provided as a means of controlling specific environmental, health and safety risks that have been identified and to secure the health and safety aspects of the development are secured. | | | ✓ | | ✓ | | | | | | | Secured within a Marine Licence condition. | T |

| Reference | Proposed Development Phase | | | Mitigation and monitoring commitment | Justification (specific) | Justification (Generic) | Outline plan commitment | Topics of Relevance | | | | | | | | | | Means of implementation | Mitigation category (primary (P), secondary (S) or tertiary (T)) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Construction | Operation and maintenance | Decommissioning | | | | | Physical processes | Marine Biodiversity | Underwater noise | Offshore ornithology | Shipping and navigation | Commercial fisheries | Marine archaeology | Infrastructure and Other Sea Users | Climate change | | |
| MM11 | | | ✓ | Development of, and adherence to, a Decommissioning Plan | The aim of this plan is to adhere to the relevant UK and international legislation and guidance in place at the time, with decommissioning industry practice applied to reduce the amount of long-term disturbance to the environment so far as reasonably practicable. | To minimise the potential for disturbance to the environment following the decommissioning phase. | | | ✓ | | | | | | | | | Secured within a Marine Licence condition. | T |
| MM12 | ✓ | ✓ | ✓ | Development of, and adherence to, an EMP, which will be issued to all vessel operators, requiring them to not deliberately approach marine mammals, marine turtles, and basking sharks; keep vessel speed to a minimum; and avoid abrupt changes in course or speed should marine mammals approach the vessel to bow-ride. | To minimise the potential for collision risk, or potential injury to, marine mammals and megafauna this code of conduct outlines in the EMP will be adhered to at all times. | | | | ✓ | | | ✓ | | | | | An EMP will be issued to all Project vessel operators. Proposed to be secured through a condition in the marine licence(s). | T |
| MM13 | ✓ | | | Implementation of piling initiation, soft-start, and ramp-up measures within the Marine Mammal Mitigation Protocol (MMMP).<br>An initiation stage and soft starts will be used during the installation of pin piles. This involves the implementation of an initial low hammer energy with a low number of strikes, followed by lower hammer energies at a higher strike rate at the beginning of the piling sequence before energy input is 'ramped up' (increased) over time to required higher levels. | This measure will minimise the risk of injury to some fish, marine mammal, and marine turtle species in the immediate vicinity of piling activities, allowing individuals to move away from the area before noise levels reach a level at which injury may occur. | The MMMP will set out the designed-in measures to apply in advance of and during piling activities. The implementation of an approved MMMP will mitigate for the risk of physical or permanent auditory injury to marine mammals. | Outline MMMP | | ✓ | | | | | | | | Proposed to be secured as a condition of the marine licence(s). | P |
| MM14 | ✓ | | | Inclusion of low order techniques as an unexploded ordnance (UXO) clearance option noting, however, that it is not possible to fully commit to this measure at this stage.<br>Low order techniques are not always possible and are dependent upon the individual situations surrounding each UXO. Given that high order detonation may be required, the MMMP will also include mitigation to reduce the risk of injury from UXO clearance. | Low order techniques generate less underwater noise than high order techniques and therefore present a lower risk to sound-sensitive receptors such as fish, marine mammals, and marine turtles during UXO clearance. | To mitigate injury and disturbance from underwater noise generated from UXO clearance. | | | ✓ | | | | | | | | | | P |
| MM15 | | | | Development of and adherence to a MMMP, based on a draft MMMP submitted alongside the ES. The MMMP will present measures for Piling UXO clearance and some types of geophysical activities. The MMMP will be developed on the basis of the most recent published statutory guidance and in consultation with key stakeholders. | **Piling:** for the purpose of developing the MMMP, a mitigation zone of 500 m will be applied, following the JNCC (2010a) guidance. The Draft MMMP will set out the measures to apply in advance of and during piling activity including the use of Marine Mammal Observers (MMObs), Passive Acoustic Monitoring (PAM), and Acoustic Deterrent Devices | The MMMP will present appropriate mitigation for activities that could potentially lead to injurious effects on marine mammals. | | | ✓ | ✓ | | | | | | | | | T |

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| | | | | | (ADD), thereby following the latest JNCC guidance (JNCC, 2010a).<br><br>**UXO Clearance:** Measures including visual and acoustic monitoring (MMObs and PAM), the use of an ADD, and soft start charges will be applied to deter animals from the mitigation zone as defined by sound modelling for the largest possible UXO following the latest JNCC (2010b) guidance.<br><br>**Geophysical and Seismic Surveys**: Mitigation for injury during high resolution geophysical and seismic site-investigation surveys using a sub-surface sensor from a conventional vessel will involve the use of MMObs and PAM to ensure that the risk of injury over the defined mitigation zone is reduced in line with JNCC (2017) guidance (500 m). Soft start is not possible for SBP equipment but will be applied for other high-resolution surveys where possible. It should be noted that some multi-beam surveys in shallow waters (<200m) are not subject to the requirements of mitigation. | | | | | | | | | | | | | |
| MM16 | ✓ | ✓ | | Where practicable, any requirements for cable protection will be compliant with Maritime and Coastguard Agency (MCA)'s methodology (Annex 1 of Marine Guidance Note (MGN) 654) (MCA, 2021). | Following further survey and detailed engineering, if areas are identified where external protection is required and the MCA condition of no more than 5% reduction in water depth is not achievable, a location specific review of impacts to shipping and consultation with the MCA will be carried out and additional mitigations agreed as required. | Ensures the final array layout is suitable for Search and Rescue (SAR) operations and that reductions in under keel clearance are acceptable. | | | | | ✓ | | | | | | | T |
| MM17 | ✓ | ✓ | ✓ | The Applicant is committed to marking and lighting the project in accordance with relevant industry guidance and as advised by relevant stakeholders including the MCA, Civil Aviation Authority (CAA) and Trinity House. This will include appropriate lighting and marking of Offshore Platforms (OPs). The Applicant will also ensure the project is adequately marked on nautical charts.<br><br>A lighting and marking plan will be secured. | The new Carbon Capture Storage (CCS) platform will exhibit lights, marks, sounds, signals and other aids to navigation as required by the Standard Marking Schedule, and in consultation with Trinity House. The platform and cables will be suitably marked on Admiralty Charts, with associated note. | Maximises awareness of the Proposed Development in both day and night conditions including in restricted visibility and assists with SAR operations. Measure will ensure other marine users are aware of operations and infrastructure associated | | | | | ✓ | | | ✓ | | Secured within a Marine Licence condition. | T |

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| | | | | | | with the Proposed Development. | | | | | | | | | | | | | |
| MM18 | ✓ | ✓ | ✓ | Lighting and marking of project vessels. | Cable Lay Vessels (CLVs) and other vessels involved in cable installation will display appropriate marks and lights, and broadcast their status on AIS at all times, to indicate the nature of the work in progress, and highlight their restricted manoeuvrability. | Maximises awareness of the Proposed Development allowing vessels to passage plan in advance. | | | | | | ✓ | | | | | | Secured within a Marine Licence condition. | T |
| MM19 | ✓ | ✓ | ✓ | Promulgation of information advising on the nature, timing and location of activities, Safety Zones and advisory safe passing distances, including through Notices to Mariners. | Timely circulation of information via Notices to Mariners (NtM), Kingfisher/KIS-ORCA notifications, Radio Navigational Warnings, Navigational Telex (NAVTEX), and/or other navigational broadcast warnings as soon as reasonably practicable in advance of and during the works. | To ensure other marine users are aware of operations associated with the Proposed Development. | | | | | | ✓ | ✓ | | | | | Secured within a Marine Licence condition. | T |
| MM20 | ✓ | ✓ | ✓ | Advisory safe passing distances and safety zones. | Passing vessels will be requested to maintain an advisory safe passing distance around project vessels (e.g. cable installation vessels) restricted in manoeuvrability.<br>It is assumed that a 500 m Safety Zone for the new Douglas CCS platform will be applied for post-consent. | To minimise the likelihood of involvement in incidents. | | | | | | ✓ | | | | | | Secured within a Marine Licence condition. | T |
| MM21 | ✓ | ✓ | ✓ | A Vessel Management Plan (VMP) will be developed which will determine vessel routing to and from construction areas and ports to avoid areas of high risk to marine mammals. | The VMP will be issued to all vessel operators, requiring them to:<br>• not deliberately approach marine mammals, marine turtles, and basking sharks;<br>• keep vessel speed to a minimum; and<br>• avoid abrupt changes in course or speed should marine mammals approach the vessel to bow-ride. | Ensures project vessels are suitably managed to minimise the likelihood of involvement in incidents and maximise the ability to assist in the event of a third-party incident. | | | | ✓ | | | ✓ | | | | | Secured in the VMP | T |
| MM22 | ✓ | ✓ | ✓ | Compliance of all project vessels with international marine regulations as adopted by the Flag State, notably the International Regulations for Preventing Collisions at Sea (COLREGs) (IMO, 1972/78) and the International Convention for the Safety of Life at Sea (SOLAS) (IMO, 1974). | Compliance of project vessels with international marine regulations as adopted by the Flag State, including the COLREGs (International Maritime Organization (IMO), 1972/77) and SOLAS (IMO, 1974). | To minimise the risk introduced due to the presence of project vessels. | | | | | | ✓ | | | | | | | T |

| Reference | Proposed Development Phase | | | Mitigation and monitoring commitment | Justification (specific) | Justification (Generic) | Outline plan commitment | Topics of Relevance | | | | | | | | | | | Means of implementation | Mitigation category (primary (P), secondary (S) or tertiary (T)) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Construction | Operation and maintenance | Decommissioning | | | | | Physical processes | Marine Biodiversity | Underwater noise | Offshore ornithology | Shipping and navigation | Commercial fisheries | Marine archaeology | Infrastructure and Other Sea Users | Climate change | | |
| MM23 | ✓ | ✓ | ✓ | Where required, based on risk assessment, guard vessels and/or temporary Aids to Navigation (AtoNs) may be deployed to guide vessels around any areas of construction activity. | Where cable exposures exist that would result in significant risk (e.g. if cable burial is carried out post cable lay), guard vessels will be used where appropriate until the risk has been mitigated by burial and/or other protection methods. | To maximise awareness of temporary hazards. | | | | | | ✓ | | | | | | | T |
| MM24 | ✓ | ✓ | ✓ | Use of guard vessels at cable exposures | Where cable exposures exist that would result in significant risk (e.g. if cable burial is carried out post cable lay), guard vessels will be used where appropriate until the risk has been mitigated by burial and/or other protection methods. | | | | | | | | | | | | | | | |
| MM25 | ✓ | | ✓ | Liaison with local ports and harbours, particularly the Port of Mostyn, during the construction phase. | Maximises awareness of the Proposed Development through consultation and ensures project vessels are suitably managed. | Minimises the risk introduced due to the presence of project vessels. | | | | | | ✓ | | | | | | | | T |
| MM26 | ✓ | ✓ | ✓ | Ongoing liaison with fishing fleets will be maintained via an appointed Fisheries Liaison Officer (FLO) and Fishing Industry Representative (FIR). Prior to construction, a Fisheries Liaison and Coexistence Plan (FLCP) will be developed, setting out in detail the planned approach to fisheries liaison and means of delivering any other relevant mitigation measures. | To maintain effective communications between the project and fishermen and appropriate liaison with relevant fishing interests to ensure that they are fully informed of development planning and any offshore activities and works. To provide warnings to the fishing community and advance warning of project activities and associated Safety Zones and advisory safety distances. | The Applicant is committed to ongoing liaison with fishermen throughout all stages of the project.<br>To provide a point of contact to liaise and engage with the fishing industry | | | | | | ✓ | ✓ | | | | | | | P |
| MM27 | ✓ | ✓ | ✓ | A dropped objects plan will be developed for reporting and recovery of dropped objects where they pose a potential hazard to other marine users. | For the reporting and recovery of dropped objects. | Dropped objects could pose a potential hazard to other marine users. | | | | | | | ✓ | | | | | To be secured within a Marine Licence condition | P |
| MM28 | ✓ | ✓ | ✓ | The identification and implementation of Archaeological Exclusion Zones (AEZs) around those sites identified as having high and medium archaeological potential as identified in Table 11.14 of volume 2, chapter 11. | AEZs will ensure offshore infrastructure avoids any known wrecks. The size of the AEZ will be evidence based and established using the precautionary principle to ensure that it is of sufficient size to protect the site from the nature of impact. | To avoid direct impacts on sites of identified archaeological significance. | Outline Written Scheme of Investigation (WSI) | | | | | | | ✓ | | | | To be secured within a Marine Licence condition | P |
| MM29 | ✓ | | | Final cable routing, well drilling and platform construction to avoid any known archaeological constraints identified in pre-construction site investigation surveys through micro siting. | | To avoid direct impacts on sites of identified archaeological significance. | Outline WSI | | | | | | | ✓ | | | | To be secured within a Marine Licence condition | P |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Construction | Operation and maintenance | Decommissioning | | | | | Physical processes | Marine Biodiversity | Underwater noise | Offshore ornithology | Shipping and navigation | Commercial fisheries | Marine archaeology | Infrastructure and Other Sea Users | Climate change | | |
| MM30 | ✓ | ✓ | | The identification and implementation of Temporary Archaeological Exclusion Zones (TAEZs) based on all available information including the stated positional accuracy, the recorded size of the target and the potential archaeological significance around those records for wrecks, obstructions, debris and other sites of archaeological potential outside of the survey data coverage but within the Project boundary. | TAEZs are recommended in Table 11.15 of volume 2, chapter 11. Further details provided in the Outline WSI. | To avoid direct impacts on sites of identified archaeological significance. | Outline WSI | | | | | | | ✓ | | | To be secured within a Marine Licence condition | P |
| MM31 | ✓ | | | Archaeological input into specifications for, and archaeological analysis of, any further pre-construction geophysical and geotechnical surveys. | To identify any sites of archaeological importance that may require further investigation, avoidance or engagement with the archaeological curators. | To offset the impacts of the Project on sediments of geoarchaeological / palaeoenvironmental importance and enhance knowledge of the offshore marine archaeological resource. | WSI and Protocol for Archaeological Discoveries (PAD) | | | | | | | ✓ | | | To be secured within a Marine Licence condition | P |
| MM32 | ✓ | | | Project archaeologists to be consulted in the preparation of any pre-construction Remotely Operated Vehicle (ROV)/diver surveys and, if appropriate, in monitoring/ checking of data. Further details provided in the Outline WSI. | To identify any sites of archaeological importance that may require further investigation, avoidance or engagement with the archaeological curators. | To prevent damage occurring to unidentified archaeological finds. To record archaeological remains that may be affected by pre-construction clearance operation. | WSI and PAD | | | | | | | ✓ | | | To be secured within a Marine Licence condition. | P |
| MM33 | | ✓ | | Operational awareness of the location of those archaeological anomalies identified as having a low potential. Reporting through the agreed protocol (PAD) will be undertaken should material of potential archaeological interest be encountered. Further details provided in the Outline WSI. | To identify any sites of archaeological importance that may require further investigation, avoidance or engagement with the archaeological curators. | | WSI and PAD | | | | | | | ✓ | | | To be secured within a Marine Licence condition | P |
| MM34 | ✓ | ✓ | ✓ | Implementation of a protocol for recording finds of archaeological interest, following the guidance for the PAD. | To identify any currently unknown sites of archaeological importance that may require further investigation, avoidance or engagement with the archaeological curators. | | WSI and PAD | | | | | | | ✓ | | | To be secured within a Marine Licence condition | P |
| MM35 | ✓ | | | Archaeologists to be consulted in the preparation of pre-construction cable route clearance or other pre-construction operations and, if appropriate, to carry out archaeological monitoring of such work. Further details provided in the Outline WSI. | To record archaeological remains that may be affected by pre-construction clearance operation. | | WSI and PAD | | | | | | | ✓ | | | To be secured within a Marine Licence condition | P |
| MM36 | ✓ | ✓ | ✓ | Mitigation of unavoidable direct impacts on known sites of archaeological significance: Options include i) preservation by record; ii) stabilisation; iii) detailed analysis and safeguarding of otherwise comparable sites elsewhere. Options include preservation by | Further details provided in the Outline WSI. | To mitigate direct impacts on sites of identified archaeological significance. | WSI and PAD | | | | | | | ✓ | | | To be secured within a Marine Licence condition. | P |

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| | | | | record; stabilisation; and detailed analysis and safeguarding of otherwise comparable sites elsewhere. | | | | | | | | | | | | | | | |
| MM37 | ✓ | ✓ | ✓ | Development and adherence to a WSI and PAD. Commitment to implementation of the Offshore WSI which is submitted with this application, prior to any post-consent works within the Eni Development Area and Area of Physical Project Works. | The Outline WSI is submitted alongside the application and contains a method statement for pre-construction surveys and details of monitoring requirements. | To ensure the protection and, if necessary, recording of previously unknown sites/objects of archaeological significance affected by the development. | WSI and PAD | | | | | | | ✓ | | | To be secured within a Marine Licence condition. | T |
| MM38 | ✓ | ✓ | | Where the Proposed Development cables/ pipelines will be required to cross an active cable, it is intended that a commercial 'crossing agreement' will be entered into with the cable operator. A crossing agreement based upon the International Cable Protection Committee (ICPC) Recommendation 3-10C 'Telecommunications Cable and Oil Pipeline/Power Cables Crossing Criteria' (ICPC, 2014) will be used for any cable crossings. Where a cable is inactive, the Applicant will consult with the cable operator to ascertain if such a crossing agreement is required. | This is a formal arrangement that establishes the responsibilities and obligations of both parties and allows operations to be managed safely. | To reduce potential conflict at cable crossing locations.<br>This is a formal arrangement that establishes the responsibilities and obligations of both parties and allows operations to be managed safely. | | | | | | | | ✓ | | | In line with standard industry practice crossing agreements would be negotiated and agreed with operators as required. | T |
| MM39 | ✓ | ✓ | ✓ | Development of and adherence to a Navigational Safety Plan (NSP). The NSP will describe measures put in place by the Project related to navigational safety, including information on Safety Zones, charting, construction buoyage, temporary lighting and marking, and means of notification of Project activity to other sea users (e.g., via Notice to Mariners). | To ensure other marine users are aware of operations and infrastructure associated with the Proposed Development. | | | | | | | | | ✓ | | | Proposed to be secured within the marine licence. | T |
| MM40 | ✓ | ✓ | ✓ | Consultation with oil and gas operators and other energy infrastructure operators to promote and maximise cooperation between parties and minimise both spatial and temporal interactions between conflicting activities. | Licence blocks will be relinquished and acquired by different operators over the duration of the project life, and oil and gas operations will change according to the project phase. By continued consultation with the oil and gas operators both parties will keep informed of planned activities in order to minimise disruption to either party's operations and to maximise coexistence. | To promote and maximise cooperation between parties and minimise spatial and temporal interactions between conflicting activities. | | | | | | | | ✓ | | | Secured in the Marine Licence | T |
| MM41 | | ✓ | | Development and adherence to a Pipeline Specification and Installation Plan which will include pipeline burial where possible and pipeline protection as necessary. | To ensure that the pipeline remains secure, is not a hazard to other sea users. | To manage risk that the pipeline becomes exposed and damaged by tidal currents. | | | | | | | | ✓ | | | In line with standard industry practice. | T |

| Reference | Proposed Development Phase | | | Mitigation and monitoring commitment | Justification (specific) | Justification (Generic) | Outline plan commitment | Topics of Relevance | | | | | | | | | | Means of implementation | Mitigation category (primary (P), secondary (S) or tertiary (T)) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Construction | Operation and maintenance | Decommissioning | | | | | Physical processes | Marine Biodiversity | Underwater noise | Offshore ornithology | Shipping and navigation | Commercial fisheries | Marine archaeology | Infrastructure and Other Sea Users | Climate change | | |
| MM42 | ✓ | | | Installation of infrastructure over or adjacent to existing cables or pipelines will be subject to crossing or proximity agreements between the two parties, prior to the start of the construction phase. | To reduce potential conflict at crossing locations. Cable and pipeline crossing/ proximity agreements will be based on previously referenced guidance from the ICPC and Oil and Gas UK. | | | | | | | | | | | ✓ | | In line with standard industry practice crossing/proximity agreements would be negotiated and agreed with operators as required. | T |
| MM43 | | | ✓ | At the end of the Proposed Development's lifetime, materials removed during decommissioning will be recycled where practicable. | The recycling of materials at the end of the Proposed Development's lifetime not only prevents materials from being sent to landfills, but also reduces the need for the extraction of primary materials, thereby reducing emissions associated with such processes. | To manage decommissioning, disassembly and waste. | | | | | | | | | | ✓ | | P |
| MM44 | | ✓ | | During the operational phase fugitive emissions will be monitored through a Leak Detection and Repair (LDAR) programme as part of the preventative maintenance activities, to avoid or minimise their presence as low as reasonably practicable. | Fugitive emissions, such gas release. would result in the increased concentration of GHGs in the atmosphere, further contributing to the effects of climate change. | To manage fugitive emissions that may take place during the operational phase of the Proposed Development. | | | | | | | | | | ✓ | | T |
| MM45 | ✓ | ✓ | | During the construction and operational phases vessel fuel consumption will be minimised by optimising vessel scheduling, with consideration given to the co-ordination of activities and material delivery. Activities will be limited on the speed of vessels, and fuel used will have a low sulphur component (0.1%). Vessels older than 20 years will not be used. | During the construction and operational phase emissions resultant from fuel consumption by vessel movements will be minimised by ensuring the use of lower sulphur content fuel, providing an efficient and optimised vessel schedule to reduce the number of journeys, and avoiding the use of older vessels. | | | | | | | | | | | ✓ | | T |
| MM46 | | ✓ | | During the operational phase, energy demand associated with the OPs will be reduced through energy efficiency opportunities. These include the use of efficient low loss transformers, variable frequency drives (VFDs) on $CO_2$ compressors, LED light bulbs, low voltage electrical installations, compressor efficiency specification and optimisation, efficient air coolers, energy monitoring systems (to comply with ISO 50001 certification), and Real Time Monitoring and Advanced Process Control (a computer-based algorithm that automatically optimises the process parameters and promotes a reduction in energy consumption from approximately 3% to 7%). | The implementation of energy efficiency opportunities on the OPs results in the reduced consumption of energy during the operation of the Proposed Development, thereby reducing emissions of GHGs to the atmosphere associated with such energy consumption. | | | | | | | | | | | ✓ | | T |
| MM47 | ✓ | | | Where operationally practical, nearshore works will be undertaken outside of the Bathing Season (15th | To reduce the risk to bathers from contaminant release. | | | | | | | | | | ✓ | | | S |

| Reference | Proposed Development Phase | | | Mitigation and monitoring commitment | Justification (specific) | Justification (Generic) | Outline plan commitment | Topics of Relevance | | | | | | | | | | | Means of implementation | Mitigation category (primary (P), secondary (S) or tertiary (T)) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Construction | Operation and maintenance | Decommissioning | | | | | Physical processes | Marine Biodiversity | Underwater noise | Offshore ornithology | Shipping and navigation | Commercial fisheries | Marine archaeology | Infrastructure and Other Sea Users | Climate change | | |
| | | | | May to 30th September) to reduce risks to bathers associated with contaminant releases. | | | | | | | | | | | | | | | | |
| MM48 | ✓ | | | Development and adherence to a Waste Management Plan (WMP). | A WMP is required by all Contractors and Subcontractors setting out details of all waste management procedures for their activities, details of expected waste arisings and procedures for waste management. The following aspects are expected to be a minimum requirement for the WMP:<br>• analysis of the waste arisings/material surpluses;<br>• specific waste management objectives for the Proposed Development;<br>• methods proposed for prevention, reuse and recycling of wastes;<br>• material handling procedures; and<br>• proposals for education of workforce and plan dissemination programme. | | | | | ✓ | | | | ✓ | | | ✓ | | | | T |
| MM49 | | ✓ | | Geophysical surveys undertaken during the operational and maintenance phase will adopt similar measures as for piling operations, including the implementation of an approved MMMP and Vessel Code of Conduct. Measures include the use of a mitigation zone around operations, within which MMObs and PAM will ensure that no marine megafauna are present in the vicinity of the geophysical survey vessel, and the use of a soft-start to survey operation, where possible | The implementation of an approved MMMP will mitigate for the risk of physical or permanent auditory injury to marine mammals within a 500 m radial mitigation zone as determined by JNCC guidance (JNCC, 2017). The soft-start will use a lower-energy output, increasing over a 20-minute period to the maximum data-acquisition energy output to provide an audible cue to allow marine mammals and megafauna to flee the area before geophysical surveying commences. | The MMMP will present appropriate mitigation for activities that could potentially lead to injurious effects on marine mammals. | | | ✓ | | | | | | | | | | S |

## 1.2 References

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