Port of Mostyn

Mostyn Energy Park Extension

Environmental Statement:
Non-Technical Summary

December 2022





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Notice

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Non-Technical Summary

This Non-Technical Summary (NTS) is designed to act as a summary of the Environmental Statement (ES) that has been prepared to inform the Port of Mostyn's application to extend the Mostyn Energy Park (MEP). This proposed development is to be known as the Mostyn Energy Park Extension (MEPE) Project.

The MEPE Project is situated adjacent to the Port of Mostyn on the Welsh side of the Dee Estuary, approximately 0.5 km to the north of the village of Mostyn. The marine licence application boundary of the proposed development is shown in Figure NTS1.

This NTS provides a summary of each ES chapter. The full results of the assessments that have been undertaken, together with the detailed analyses and conclusions that have been used to underpin the environmental assessment of the proposed development, can be found in the individual ES chapters and supporting appendices.

Figure NTS1 Location of MEPE Project

1 Introduction (Chapter 1)

1.1 Project overview

The Port of Mostyn is proposing to extend the MEP so that the Port can continue to support and service current and anticipated future offshore wind development.

The proposed development will involve marine works and associated landside works.

Marine works – The marine works will comprise the construction of a new quay wall. A capital dredge will be required to create a new berth pocket along the new quay wall and the dredging of the existing berth pocket along the existing quay wall. The existing main navigation channel will also need to be deepened as is permitted under the Port's current maintenance dredge and disposal marine licence. A proportion of the suitable capital dredge arisings is proposed to be reused as infill material for the landside works (see below) and the remainder disposed of at the existing marine disposal site. A Roll-on Roll-off (Ro-Ro) pontoon linkspan may need to be constructed and two alignment options are being considered, one set within the new quay wall and one along the existing quay wall. In addition, four existing dolphins (piles) at the Port may need to be relocated and installed within the harbour area. Once the constructed quay is operational, a maintenance dredging and disposal programme will be put in place. The maintenance dredge material will be disposed of at the existing marine disposal sites and/or reused as is currently undertaken under the existing maintenance dredge and disposal licences.

Landside works – The landside works will involve an infill behind the newly created quay wall. The reclaimed area will comprise hardstanding that will be used as a storage/laydown area. There is no requirement for any other associated landside infrastructure.

1.2 The consenting process

The MEPE Project will require a marine licence from the marine licensing authority (Natural Resources Wales (NRW)) for works taking place below mean high water springs (MHWS). The Port of Mostyn has Permitted Development Rights to undertake the landside works associated with the proposed development and there is, therefore, no need for a planning application to be submitted to the local planning authority.

In accordance with the provisions of the Marine Works EIA Regulations 2007 (as amended), the Port of Mostyn's marine licence application for the MEPE Project must be accompanied by an Environmental Impact Assessment (EIA). As a consequence, an ES has been assembled which documents all of the relevant EIA information prescribed by the aforementioned Regulations.

ABPmer has led the preparation of the ES. The Port of Mostyn, Wessex Archaeology and Wardell Armstrong respectively have provided technical support on commercial and recreational navigation, flood risk and drainage, and cultural heritage and marine archaeology EIA topics.

2 Proposed Development (Chapter 2)

2.1 The need for the MEPE Project

The UK has the largest installed capacity of offshore wind in the world. The offshore wind sector predominance will have a significant part to play over the next few decades and beyond in helping to deliver the UK's transition to net zero carbon emissions through the provision of clean energy technologies. The Government's target is for 40 GW of offshore wind generating capacity to be installed by 2030. This equates to a quadrupling of the UK's current offshore wind capacity and to deliver this, there is a clear need for a considerable growth of the UK offshore wind sector.

Wales was an early adopter of offshore wind. Offshore wind currently provides the largest single contribution to marine renewable electricity in Wales. Meanwhile, floating wind technology offers potential for innovation, with the deeper waters of the Celtic Sea cited offering possible sites for deployment.

Of particular significance to meeting the UK's net zero targets is The Crown Estate's Offshore Wind Leasing Round 4 which is creating the opportunity for at least 7 GW of new offshore wind projects in the waters around England and Wales by the end of the decade. Round 4 has the potential to further strengthen the UK's world leading offshore wind sector, create jobs and investment, and deliver green, reliable, affordable energy to millions more homes. The North Wales and Irish Sea Bidding Area covers an area of approximately 8,500 km^2 with water depths that make it well suited to lower cost, fixed foundation offshore wind technologies.

As the offshore wind sector grows, so will the demand for the components and facilities that are required to build and then operate, maintain and service an offshore windfarm on a 24 hour/7 day a week basis. Due to the projected growth of this sector in the area, there is a self-evident need for additional operation and maintenance (O&M) facilities to be located in the area to service the sector.

The Port of Mostyn is in fact ideally placed to meet this need to support the offshore wind sector. The Port benefits from a number of physical attributes that make it an attractive site for the location of O&MS facilities including essential marine facilities infrastructure and transport connections. Further, the Welsh National Marine Plan (WNMP) recognises the significance of the Port of Mostyn in supporting offshore wind construction and services and identifies Mostyn as one of the ports in Wales that have the greatest competitive advantage in exploiting opportunities arising from low carbon and renewable energy generation. As a result of these attributes, the Port already provides O&M facilities for windfarms in the Irish Sea.

The WNMP identifies the significance of the offshore wind industry to the area and the importance of this industry to the growth and regeneration of Wales. In addition, the National Policy Statement for Ports (NPSfP) makes it clear that the need for future port capacity to support the development of offshore sources of renewable energy should be accepted by the decision maker. It is further made clear that, given the urgency of the need for such infrastructure, a decision maker should start its consideration of renewable energy port development proposals from a position of a presumption in favour of granting approval.

In conclusion, there is considered to be a clear need for the Port of Mostyn to support the current and future needs of the offshore energy industry off the northern coast of Wales and in the Irish and Celtic Seas. To achieve this, there is a need to expand and enhance the Port of Mostyn's current offering to

the offshore energy sector, in order to provide construction, decommissioning, operations, maintenance and support facilities to meet both existing and future customer demand at the Port.

2.2 Consideration of potential alternatives

A staged approach was taken to the consideration of possible alternative solutions.

Stage 1- The first stage in the consideration of alternatives was to identify the broad alternative options that might be available to meet the need. This included considering the option of simply making use of the facilities already in existence within the Port of Mostyn - the 'do nothing' option. This option was, however, considered to be operationally impracticable in that existing facilities within the Port are either not capable of serving the future offshore wind energy sector in their current form, are in use for another port activity or contractually already committed to specific offshore wind energy or other customers.

It was concluded as a consequence that the do nothing option would mean that the identified operational need could not be met. This, in turn, would mean that the Port of Mostyn, going forward, would be unable to make a contribution to meeting the growing market demand for facilities to serve the offshore wind energy sector. It was also considered that to adopt the 'do nothing' option would effectively be to adopt an option that would run contrary to the underlying theme of national ports policy which recognises that port facilities operate in a market led industry where they need to be competitive, resilient and in locations able to efficiently and effectively serve the needs of the market.

In light of the above, whilst the development of offshore wind energy support facilities at locations elsewhere around the UK coast is clearly an option that will be open for consideration by the operators of those Ports, development at those ports would not, however, meet the very clear market need that has been identified at the Port of Mostyn. In addition, as noted above, relying on the development of an alternative location and adopting the 'do nothing' option would run counter to the consistent theme of national ports policy, namely that ports should be market led, competitive and resilient.

That is not to say, however, that facilities at other Port locations will not also be required to serve the overall future market demand. Future offshore energy market demand in and around the Irish and Celtic Seas area is likely to be significant and require various facilities to be provided at different ports.

On that basis, it follows that the only broad option available to the Port of Mostyn if it is to meet the identified need was to develop further offshore wind energy support facilities within the Port of Mostyn.

Stage 2 - The next stage in the consideration of alternatives was to undertake an initial identification of the alternative solutions potentially available within the Port of Mostyn. In order to be able to identify whether there were any potential solutions within the Port of Mostyn, the functional requirements which any potential solution should provide were identified at a high level.

Due to the extent of existing activities and operations within the Port of Mostyn, the only area where the functional requirements for the offshore wind sector could potentially be provided is within the existing harbour on the eastern and south-eastern side of the breakwater.

Preliminary engineering design work has considered the following alternative options for the proposed development:

- Option 1 – a complete new quay wall of 500 m length; and
- Option 2 – the replacement of the existing 200 m Roll-on Roll-off (Ro-Ro) berth with a new 360 m quay and retention of 200 m of existing quay.

The advantage of Option 1 is that the entire length of quay can be designed for deeper drafted vessels which would maximise operational flexibility. From an environmental perspective, however, it would involve a larger reclamation and area of habitat loss, and a greater volume of capital dredging and infill material. Furthermore, it would result in significant disruption to existing port operations during the construction works.

The 200 m length of existing quay that would be retained by Option 2 will not be as deep as the new quay and, therefore, limit operational flexibility compared to Option 1. However, it will involve a smaller reclamation and less dredging/infill material, thereby minimising the footprint and scale of the works and associated environmental impact. It will also be quicker to build and result in less disruption to the existing facility during the construction works. Option 2 is, therefore, the preferred option that is being taken forward for the MEPE Project.

2.3 Project description

The key elements of MEPE Project are shown in Figure NTS2 to Figure NTS4 and comprise the following:

- Construction of 360 m length of new quay, involving a reclamation (approximately 3.5 ha) to provide a continuous berthing frontage for the construction and O&M requirements of the offshore wind sector;
- Capital dredging to create a new berth pocket alongside new quay wall, dredge the berths along the existing quay and the main navigation channel;
- Reuse a selected proportion of the suitable capital dredge arisings as engineering fill material for the reclamation and dispose of the remainder at the existing Mostyn Deep disposal site (IS102);
- Potential relocation of four existing dolphins (piles) to create a berth for Service Operation Vessels (SOVs) to provide O&M requirements of the offshore wind sector;
- Potential construction of a Ro-Ro pontoon linkspan;
- Maintenance dredging for the new berth, existing berths, navigational channel and harbour area;
- Disposal of maintenance dredge material at the existing marine disposal sites at Mostyn Deep (IS102) and Mostyn Breakwater (IS103) and/or reused as is currently permitted under the existing maintenance dredge and disposal marine licences;
- Use of reclaimed area as a storage/laydown area; and
- Scraping back rubble from the toe of the breakwater structure along the western section of the dock estate to support natural mudflat restoration.

Figure NTS2 Key construction elements comprising MEPE Project

Figure NTS3 Potential mudflat restoration areas

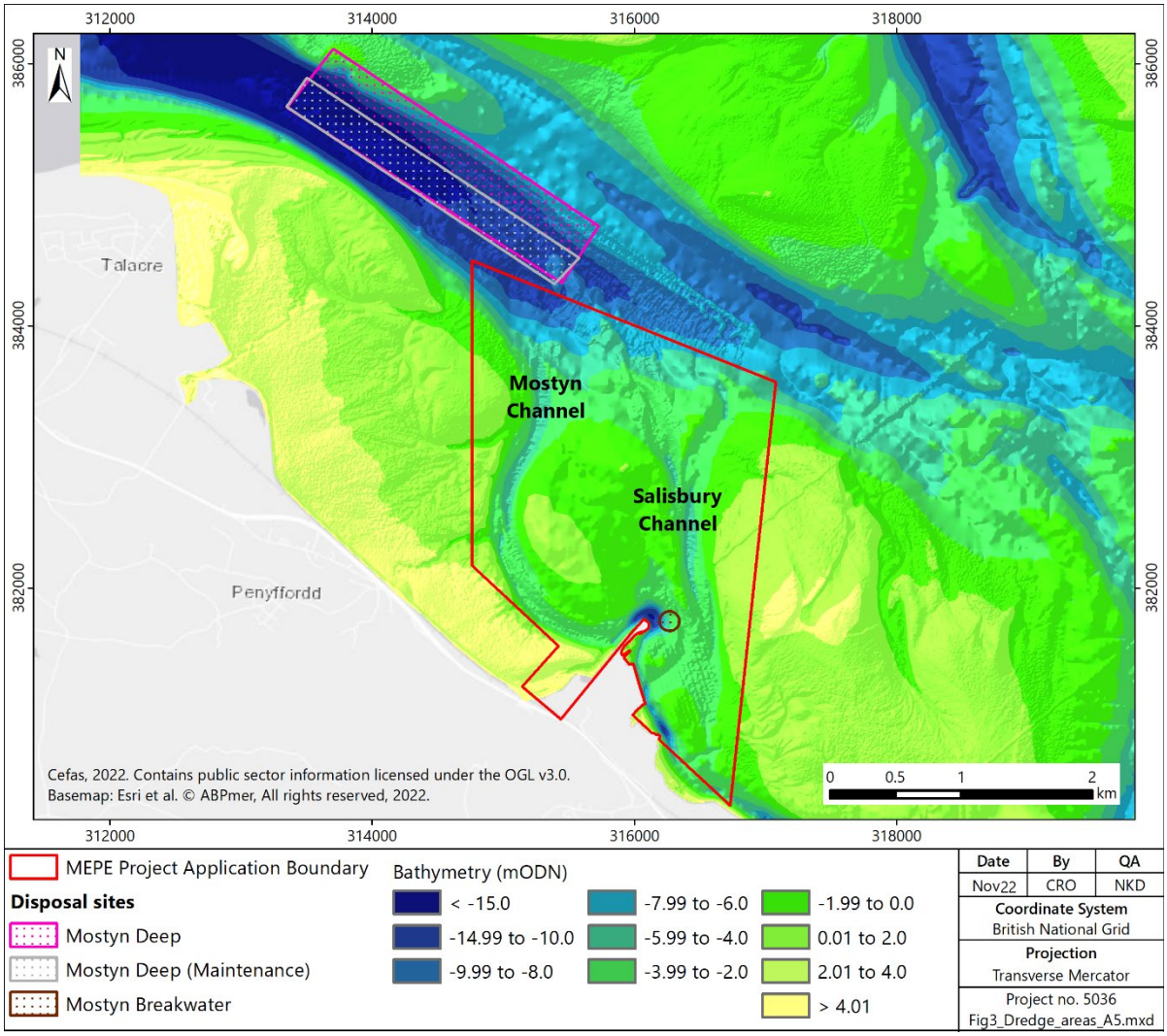

Figure NTS4 Proposed maintenance dredge area

3 Project Methodology (Chapter 3)

The project methodology described in this chapter comprises a reasonable worst-case project risk envelope to address any potential uncertainty in the scheme design and construction methodology at this stage. The design of the individual elements comprising the MEPE Project has taken into account the level of information currently available, along with outputs from the design process suitable to concept level. Final dimensions and methodology will be refined following the appointment of a contractor.

3.1 Construction phase

The proposed construction methods that will be used for the key elements of the proposed development are summarised as follows:

- **Quay wall construction**– the new quay wall will be constructed as a combination pile wall involving both impact (percussive) and vibratory piling methods to reach the required design depths. A new return wall tie-in will be constructed to the northern head of the existing breakwater and a southwestern connection with the existing quay (Figure NTS2). A short section of the existing quay wall at the interface between the new and existing quay walls will be excavated and partially demolished to enable the new quay wall structure and tie rods to be installed. A concrete capping beam will be provided to the top of the new quay wall to enable mooring bollards, fenders and other required marine fixtures (e.g. emergency ladders and grab chains) to be installed along the new quay;
- **Reclamation** – the area that is reclaimed behind the new quay wall will require approximately 600,000 m^3 of infill material to reach a final fill height of 12 m above CD. This infill requirement is proposed to be fully met by reusing a selected proportion of the suitable capital dredge arisings (see below). The dredge arisings will be pumped or rainbowed in over the top directly into the reclamation area by the dredger. The infill material is proposed to be vibro-compacted to improve its properties and minimise settlement, and distributed evenly across the reclamation area. Existing materials and structures within the footprint of the reclamation will be dismantled and/or re-used;
- **Capital dredging** – the new berth pocket along the new quay wall will be deepened to a depth of -11 m Chart Datum (CD) plus a 1 m overdredge allowance. The total volume of capital dredge material from the berth pocket is approximately 400,000 m^3, including side slopes and overdredge allowance. The existing berth pocket along the existing quay wall will be dredged to a design depth of -9 m CD. The total dredge volume is estimated to be approximately 100,000 m^3, including side slopes and overdredge allowance. The main navigation channel will need to be deepened to a depth of - 4 m CD as is already consented. The total volume of capital dredge material that needs to be removed from the main navigation channel is estimated to be up to 3 million m^3. The berth pockets are likely to be dredged by a cutter suction dredger and the main navigation channel is anticipated to be dredged by a trailer suction hopper dredger (TSHD);
- **Disposal and/or reuse of capital dredge material** – the material that is dredged during construction is proposed to be disposed of and/or reused as follows
  - Up to 600,000 m^3 to be pumped directly ashore into the reclamation area to be reused as fill (see above);
  - Up to 3 million m^3 to be transported and disposed of at the existing Mostyn Deep disposal site (IS102). This site is already characterised for the purpose of receiving the type of material that will be dredged and has been used for maintenance and capital dredge campaigns;

- **Potential construction of Ro-Ro linkspan pontoon** - there is a potential requirement for a Ro-Ro linkspan pontoon to be installed at the interface of the new quay wall with the existing quay wall, in the inner corner of the harbour. Two alignment options are being considered, one set within the new quay wall and the other along the existing quay (Figure NTS2). The potential linkspan pontoon may require guide piles to be installed. No additional dredging is anticipated to be required;
- **Potential relocation of existing dolphins** - there is a potential requirement for the existing Ro-Ro dolphins (piles) at the Port of Mostyn to be relocated in the south-eastern part the Port to create a berth for SOVs to provide O&M requirements of the offshore wind sector (Figure NTS2). No additional dredging is anticipated to be required. The Ro-Ro dolphins (piles) are anticipated to involve the same installation methods and equipment as the new quay wall construction;
- **Landside works** - the reclaimed area will comprise hardstanding that will be used primarily as a storage/laydown area for turbine components. It is anticipated that the infill material within the reclamation area that has been compacted will be topped with a capping layer of crushed graded rock fill to provide a finished surface that meets the requirements of the proposed operational activities. Specially loaded areas are likely to require a reinforced concrete foundation (potentially piled) to facilitate the spread of loads; and
- **Environmental enhancements** - approximately 1.5 ha of rubble is proposed to be scraped back from the toe of the breakwater structure along the western section of the dock estate to expose intertidal mudflat habitat on the Mostyn Bank (Figure NTS3). This approach will allow silt to settle in the areas where the rubble is scraped back, supporting natural mudflat restoration.

3.2 Construction programme

There is demand for an operational offshore energy facility at the Port of Mostyn by early 2025. In order to meet this demand, and based on the proposed design and methodology, an indicative programme for the MEPE Project is included in Table NTS1.

Table NTS1. Indicative programme for the proposed development

Project element	2021	2022				2023				2024				2025
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Submission and determination of licence applications					x	x	x							
Preliminary and detailed design	x	x	x	x	x	x	x							
Construction works							x	x	x	x	x	x	x	x
Quay wall construction								x	x	x	x			
Reclamation									x	x	x	x	x	
Capital dredging and reuse of capital dredge material									x	x	x	x	x	
Relocation of existing dolphins											x	x	x	
Landside works											x	x	x	
Site operational														x

3.3 Operational phase

The operation of the MEPE Project will comprise the following activities:

- **Maintenance dredging** – the maintenance dredge area is shown as the red line application boundary on Figure NTS4 and comprises a polygon that shows where maintenance dredging of the navigation channel may take place in response to the natural movement of the Salisbury and Mostyn channels. In reality, any dredging that is required will be limited to one main channel that is dominant at any given time and will not take place across the entire area of the polygon to minimise dredging requirements. The total volume of maintenance dredge material that needs to be removed from the new berth, harbour and navigation channel is estimated to be up to 600,000 m^3 per annum which remains within the cap set in the existing maintenance dredge and disposal marine licences. A range of dredging methods, including TSHD, plough and water injection dredging (WID) techniques are likely to be used for the maintenance dredge activities as per the existing licences;
- **Disposal and/or reuse of maintenance dredge material** – The maintenance dredge material is proposed to be disposed of and/or reused as is currently permitted under the existing maintenance dredge and disposal marine licences, specifically:
    - Up to 900,000 tonnes (approximately 600,000 m^3) per annum to be transported and disposed of at the existing Mostyn Deep disposal site (IS102);
    - Up to 99,990 tonnes (approximately 66,660 m^3) per annum to be pumped through a floating pipeline directly into the existing Mostyn Breakwater disposal site (IS103);
    - Up to 150,000 tonnes (approximately 75,000 m^3) per annum to be pumped ashore into a prepared site at the Port of Mostyn to be beneficially used in other projects; and
- **Berth and port operations** - The MEPE Project will accommodate offshore jack up installation vessels and delivery vessels used in the construction of wind farms as well as SOVs. SOVs involved in offshore wind activities, generally involve a technician crew of up to 60 people. In addition, the MEPE Project will provide quayside storage space for the engineering consumables and parts associated with the construction of the wind farms and SOV operations.

3.4 Environmental management best practice procedures

Best practice environmental management techniques will be implemented by contractors during construction.

Adherence to environmental management best practice will be controlled through a Construction Environmental Management Plan (CEMP) in accordance with guidance. The CEMP will be provided to NRW prior to works commencing and will set out the mitigation measures needed to manage environmental effects.

4 Legislative and Consenting Framework (Chapter 4)

The MEPE Project will require a range of consents and approvals under different enabling and authorising legislative provisions, supported by comprehensive technical and environmental investigations to inform the necessary environmental assessment work.

The UK is no longer a member of the European Union. EU legislation as it applied to the UK on 31 December 2020 is now a part of UK domestic legislation, under the control of the UK's Parliaments and Assemblies, and is published on legislation.gov.uk.

The principal consents/approvals that are likely to be required for the proposed development are as follows:

- Marine licence from NRW for works undertaken below mean high water springs (MHWS) and for the deposit of any dredge arisings at sea; and
- Seabed owner consent from NRW as the Statutory Harbour Authority (SHA) for the Dee Conservancy for any works taking place outside of the area of seabed owned by the Port of Mostyn (Figure NTS5).

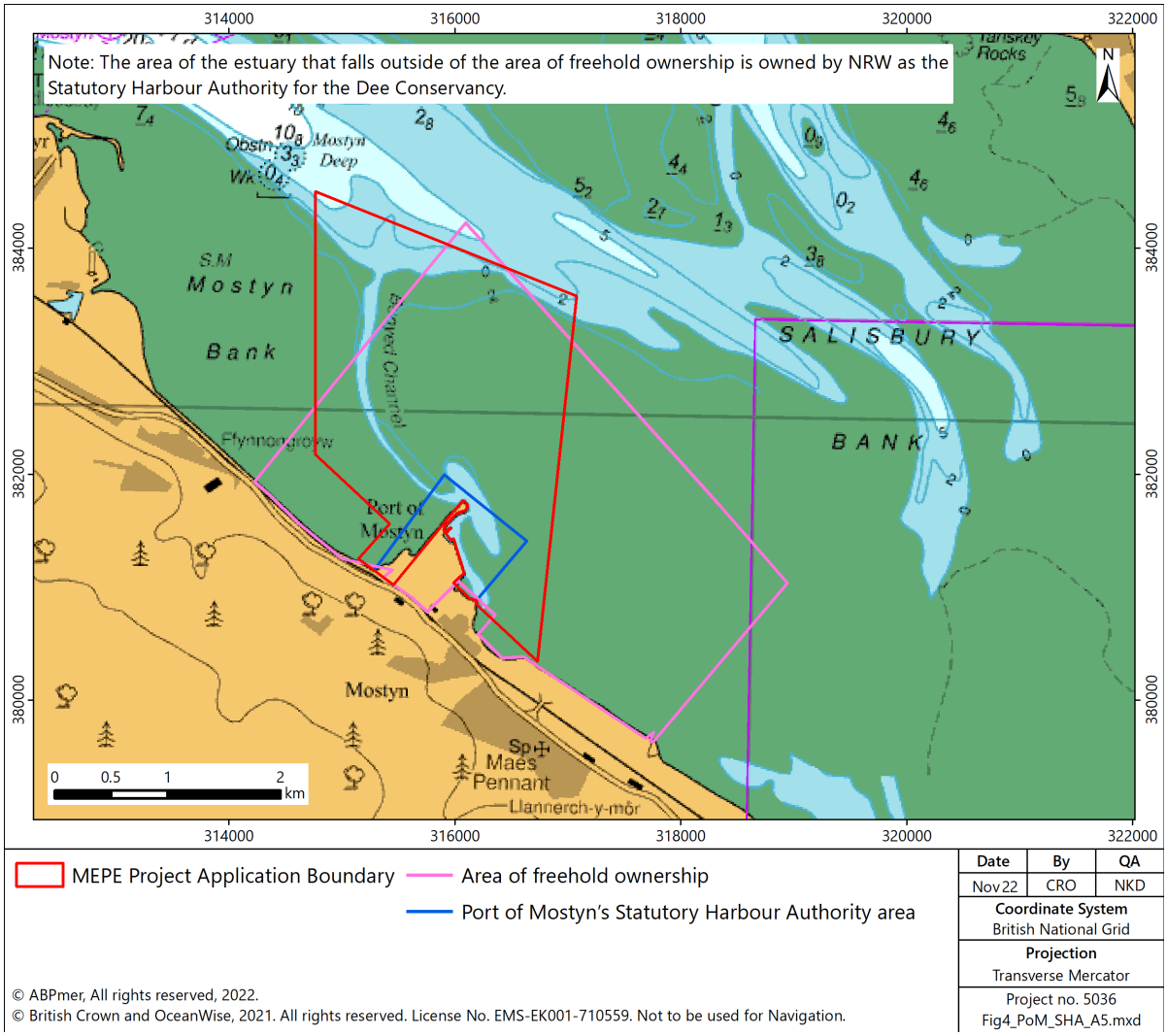

Figure NTS5. Port of Mostyn's freehold ownership and Statutory Harbour Authority area

Exclusions for a flood risk activity permit include circumstances when an application has been made for a marine licence. It is understood that NRW will incorporate the requirements of a flood risk activity in the marine licence if required.

As part of the approval process, NRW will take fully into account the environmental and project information accompanying the application as submitted by the Port of Mostyn. In this context, the key assessments that have been undertaken to support the required approvals and consents for the MEPE Project are as follows:

- EIA documented in an ES;
- Marine Plan Conformance Assessment;
- Habitats Regulations Assessment (HRA);
- Water Framework Directive (WFD) Assessment;
- Waste Hierarchy Assessment (WHA);
- Navigational Risk Assessment (NRA); and
- Flood Consequence Assessment (FCA).

The legislative and policy context for the MEPE Project includes the following:

- National Policy Statement for Ports (NPSfP);
- UK Marine Policy Statement (MPS);
- Welsh National Marine Plan (WNMP);
- Well-being of Future Generations (Wales) Act;
- Environment (Wales) Act;
- Climate Change Act 2008 (2050 Target Amendment) Order 2019;
- The Clean Growth Strategy – Leading the way to a low carbon future;
- Industrial Strategy: Offshore Wind Sector Deal;
- The Ten Point Plan for a Green Industrial Revolution;
- Energy White Paper – Power our Net Zero Future;
- Maritime 2050 – Navigating the future;
- Dee Estuary Marine Safety Management System (SMS);
- Flintshire Local Development Plan (FLDP); and
- North West Marine Plan.

5 Impact Assessment Approach (Chapter 5)

5.1 Scope of assessment

An application for a scoping opinion was made to NRW in October 2021 to confirm the scope of the EIA for the proposed development. Based on expert judgement and feedback provided by NRW in their scoping opinion, the following EIA topics/receptors have the potential to be affected by the proposed development and have been scoped into the EIA:

- Physical processes;
- Water and sediment quality;
- Nature conservation and marine ecology[1];
- Fisheries;
- Commercial and recreational navigation;
- Flood risk and drainage;
- Cultural heritage and marine archaeology; and
- Cumulative and in-combination effects

[1] Including otter given it has been recorded within the Dee Estuary.

The scoping opinion from NRW confirmed that the following EIA topics/receptors can be scoped out of further assessment as they will not be significantly affected by the proposed development:

- Terrestrial ecology;
- Traffic and transport;
- Air quality and greenhouse gas emissions;
- Airborne noise and vibration; and
- Landscape/seascape and visual impact.

5.2 Consultation

Consultation is a crucial part of the assessment process. This is being led by NRW to seek the views of statutory consultees and any other non-statutory consultees that NRW consider may be impacted by the proposed development.

The Port of Mostyn has held a number of meetings with NRW Marine Licensing Team and NRW Advisory. Additional consultation with key parties has also been undertaken to obtain baseline information and further advice on the environmental assessments where required.

In addition, the Port of Mostyn as the SHA will be consulting with stakeholders with a navigational interest as part of the NRA exercise during the marine licence consultation period.

5.3 Impact assessment methodology

In the context of the impact assessment methodology adopted for this ES, ABPmer operates an accredited quality management system and has extensive experience and technical competency in its field. ABPmer has also been awarded an EIA Quality Mark by the Institute of Environmental Management and Assessment (IEMA) for its service excellence in the co-ordination of EIAs and production of ESs.

To facilitate the impact assessment process, therefore, a standard analysis methodology has been applied. For each environmental topic, this involved describing the current conditions (baseline), identifying all the potential pathways by which an impact could occur, assessing the significance of the potential impact and identifying ways in which any adverse effects can be reduced.

The significance of each potential impact has been assessed using a standard approach. The four key significance levels for either beneficial or adverse impacts are insignificant, minor, moderate or major. A definition of each of these is provided in the ES.

Any impacts that are found to be significant (i.e. moderate and/or major adverse) require mitigation measures to reduce residual impacts, as far as possible, to environmentally acceptable levels. Within the assessment procedure, the use of mitigation measures require significance to be re-assessed and the significance of the residual impact (i.e. with mitigation) identified.

It should be noted that the commercial and recreational navigation topic did not follow the same standard assessment methodology as the other EIA topics. Instead it followed a specific impact assessment methodology in accordance with published guidance and industry standards for undertaking NRAs.

6 Physical Processes (Chapter 6)

This chapter of the ES considers how the proposed development may influence physical processes, specifically flows, waves and sediments, and how they may potentially impact the estuary and dynamic bank and channel system.

Baseline reviews of the bathymetry, tides and water levels, flows, freshwater flows and salinity, waves, sediments and morphology are presented. The main data sources used to characterise the baseline conditions of the study area include a range of bathymetric and topographic datasets, dredging records, previous modelling, field measurements, monitoring reports, desk studies and environmental assessments, Shoreline Management Plan (SMP), and UK Climate Projections 2018 (UKCP18).

The assessment considers seven impact pathways, which address the potential for changes in physical processes as a result of the marine activities associated with the proposed development during construction and operation. These include changes to suspended sediment concentrations (SSC) and sedimentation, seabed bathymetry, hydrodynamic and wave regimes, and sediment transport pathways. The potential impacts on physical processes receptors, namely marine infrastructure and estuary banks and channels, are also assessed.

The exposure to change of all potential impact pathways related to physical processes are considered to be low to negligible. The impacts on physical processes receptors are assessed as **insignificant to minor adverse** and not significant in the near-field and **insignificant** in the far-field. This assessment takes account of the measures that will be undertaken to manage commonly occurring effects, namely targeting disposal loads in the central/deeper area of the Mostyn Deep disposal site (IS102) site to minimise depth reductions and environmental changes.

A review of the ongoing monitoring undertaken by the Port of Mostyn and the future monitoring schedule that is proposed based on the outcomes of the assessment is presented.

7 Water and Sediment Quality (Chapter 7)

This chapter considers how the proposed development may influence water and sediment quality, namely dissolved oxygen, contaminants and nutrients, within the marine environment.

Baseline reviews of the water quality (relevant WFD water bodies, bathing waters, Shellfish Water Protected Areas, Nitrate Vulnerable Zones (NVZs) and Sensitive Areas) and sediment quality (past and present sediment sampling) are presented. The main data sources used to characterise the baseline conditions of the study area include Environment Agency web resources and guidance, and available particle size analysis (PSA) and chemical contamination analysis data from site specific surveys.

The material within the proposed dredge area ranges from coarse sediments (sands and gravel), which are generally unlikely to comprise high contaminant levels due to the material characteristics, to muds, silts and clays which are more typically associated with sediment-bound contaminants. The majority of contaminants analysed from sediments samples from within the proposed dredge area are at low concentrations, and all results were well below the thresholds used to determine if material is suitable for disposal at sea. Therefore, it is considered that the dredge material is suitable for disposal at sea.

The assessment considers 10 impact pathways, which address the potential for impacts on water and sediment quality receptors as a result of the proposed development during construction and operation, specifically the potential changes to dissolved oxygen concentrations, changes to chemical water quality as a result of potential sediment-bound contaminants, and redistribution of sediment-bound contaminants. The potential changes to nutrient concentrations and changes in water quality as a result of microbiological contaminants are also assessed.

All of the potential impacts on water and sediment quality receptors were assessed as **insignificant to minor adverse** and not significant. This assessment takes account of the measures that will be undertaken to manage commonly occurring effects, namely the application of environmental best practice management measures to minimise the potential risk from accidents and spillages/leaks.

8 Nature Conservation and Marine Ecology (Chapter 8)

This chapter considers how the proposed development may impact on nature conservation and marine ecology receptors, specifically benthic habitats and species, fish and shellfish, marine mammals, coastal waterbirds and otters.

Baseline reviews of benthic habitats and species, fish and shellfish, marine mammals, coastal waterbirds and otters are presented. The main data sources used to characterise the baseline conditions include site specific benthic habitat surveys, Statutory Nature Conservation Body (SNCB) web resources, and available survey and monitoring data on benthic habitats and species, fish and shellfish, marine mammals, coastal waterbirds and otters in the study area.

The assessment considers 22 impact pathways in detail, which address the potential for impacts on nature conservation and marine ecology receptors as a result of the proposed development during construction and operation, specifically the direct loss of habitat, direct and indirect changes to habitats and species, changes in water and sediment quality, the potential introduction and spread of non-native species, underwater noise and vibration, and airborne noise and visual disturbance.

All the potential impacts on nature conservation and marine ecology receptors are assessed as **insignificant to minor adverse** and not significant apart from the impacts of underwater noise and vibration during percussive (impact) piling on migratory fish and marine mammals, and the disturbance of coastal waterbirds during construction which are assessed as **minor to moderate adverse**. In order to avoid and/or reduce these significant impacts to **insignificant to minor adverse**, a range of mitigation measures are proposed, namely the application of soft start procedures during piling, the use of vibro piling where possible, dedicating a marine mammal observer to follow the relevant measures outlined in the Joint Nature Conservation Committee (JNCC) protocol for minimising the risk of injury to marine mammals, use of a cold weather construction restriction during piling and the use of pile sleeves/shrouds and acoustic barrier/screening along the breakwater during construction to minimise disturbance to waterbirds.

This assessment takes account of the measures that will be undertaken to manage commonly occurring effects, namely targeting disposal loads in the central/deeper area of the Mostyn Deep disposal site (IS102) site to minimise depth reductions and environmental changes. In addition, potential biosecurity risks during construction are proposed to be managed by including biosecurity control measures within the CEMP. Environmental best practice management measures will also be followed to minimise the potential risk of spillages.

9 Fisheries (Chapter 9)

This chapter considers how the proposed development may impact on fisheries receptors, specifically the cockle fishery that operates in the vicinity of the MEPE Project, other commercial fisheries that may operate within the Dee Estuary and recreational angling.

Initially, a regional overview of fisheries and the fishing activity taking place within the relevant International Council for the Exploration of the Sea (ICES) rectangle that overlaps the proposed development is provided. Baseline reviews of the specific fisheries in the Dee Estuary, namely the cockle fishery and other fisheries in the estuary, as well as recreational angling are also presented. The main data sources used to characterise the baseline conditions include recent fish landings and fishing activity sighting data for the relevant ICES rectangle, Dee Estuary Shellfish and Sea Fisheries Byelaws, relevant fisheries management plans and/or reports. In addition, consultation with stakeholders was undertaken including NRW, North Western Inshore Fisheries and Conservation Authority (NWIFCA), the Welsh Government Marine and Fisheries Division (WGMFD), and the Welsh Fishermen's Association (WFA).

The assessment considers 10 impact pathways in detail, which address the potential for impacts on fisheries receptors as a result of the proposed development during construction and operation, specifically the interference with fishing activities during construction due to vessel movements obstructing navigation routes to fishing grounds and/or disrupting or obstructing fishing activities, the loss of or restricted access to fishing grounds, the potential indirect impacts on stocks of target finfish and shellfish species.

All the potential impacts on fisheries receptors are assessed as **insignificant to minor adverse** and not significant. This assessment takes account of the measures that will be undertaken to manage commonly occurring effects, namely following the existing Port of Mostyn's and Dee Conservancy's Marine Safety Management System (SMS), including issuing Local Notices to Mariners, which will manage any potential interference with fishing activities and loss of or restricted access to fishing grounds during construction.

10 Commercial and Recreational Navigation (Chapter 10)

This chapter considers whether, and if so, how the proposed development could impact upon the navigation and safe passage of commercial and recreational vessels at the Port of Mostyn in the context of both the construction and operational phases of the MEPE Project.

A review of the existing regulations and operational procedures, navigational route and conditions, and port usage and vessel movements is presented. The main data sources used to characterise the baseline conditions included Port of Mostyn vessel traffic data and statistics, and the relevant Admiralty Chart for the study area.

The assessment considers 10 impact pathways, which address the potential for impacts on commercial and recreational navigation as a result of the proposed development during construction and operation. This includes the risk of collision between vessels, the risk of collision during dredging operations, the risk of collision between a vessel and the development structure, interference with other harbour works,

grounding or stranding of a vessel, vessel wake wash effects, pollution of river or estuarine waters, ballast water discharge issues, and cumulative effects with ongoing marine operations.

All the potential risks to commercial and recreational navigation are assessed as **low** to **medium** and considered to be **tolerable** and As Low and Reasonably Practicable (ALARP) with the existing control measures in place and, therefore, there is no need for additional navigational measures beyond those already described. In order to comply with the Port Marine Safety Code, the Port of Mostyn is committed to a continuous review of all relevant risk assessments of marine related activities. Should these reviews indicate a need to introduce further navigation control measures to reflect the changes to the operational practices and/or to cover any additional operations, any new control measures will be implemented in the existing Marine SMS in agreement with the Dee Conservancy.

11 Flood Risk and Drainage (Chapter 11)

This chapter presents an assessment of the potential impacts of the MEPE Project on flood risk and drainage on and off the site of the proposed development. The receptors that have been considered are the Port of Mostyn, including the existing MEP, the MEPE construction site and the Dee Estuary.

Baseline reviews of the existing fluvial, tidal, surface water, ground water and sewer flood risk, and water quality are presented. The main data sources used to characterise the baseline conditions included Ordnance Survey (OS) mapping, NRW Flood Risk Assessment Wales Mapping, NRW Extreme Sea Level Information, British Geological Survey mapping and North West England and North Wales Shoreline Management Plan 2 (SMP2).

The assessment considers seven impact pathways, which address the potential for impacts on flood risk and drainage as a result of the proposed development during construction and operation. This includes the risk of surface water flooding within the existing port estate and the construction site, the risk of tidal flooding within the Dee Estuary, and the potential mobilisation of suspended solids and pollutants to the Dee Estuary.

The potential impacts on all receptors are assessed as **insignificant**. This assessment takes account of the measures that will be undertaken to manage commonly occurring effects, namely incorporating appropriate surface water management measures as required and following good working practices.

12 Cultural Heritage and Marine Archaeology (Chapter 12)

This chapter considers how the proposed development may impact on cultural heritage and marine archaeology up to MHWS. The receptors that have been considered are seabed prehistory, seabed features, including maritime and aviation sites, and intertidal heritage assets.

A baseline review of the cultural heritage and marine archaeological receptors in the study area is presented, including the seabed prehistory, maritime seabed features, aviation seabed features, intertidal archaeological receptors. The main data sources used to characterise the baseline conditions include the UK Hydrographic Office (HO) wreck database, the National Heritage List, the National Monuments Record of Wales (NMRW), Lle Geo-Portal, the Historic Environment Records (HER), Admiralty Charts, historic maps and OS maps, relevant primary and secondary sources in Wessex

Archaeology's own library and those available through the Archaeology Data Service and other websites, and Welsh Research Frameworks.

The assessment considers five impact pathways, which address the potential for impacts on cultural heritage and marine archaeological receptors as a result of the proposed development during construction and operation. This includes the direct impacts on known and potential marine heritage receptors from construction activities and capital dredging, the indirect impacts to marine heritage receptors due to altered sediment or hydrological processes during construction, the direct impacts on known and potential marine heritage receptors from maintenance dredging, and the indirect effects such as changes in local scouring and sedimentation patterns during operation.

All the potential impacts are assessed as **insignificant to minor adverse** and not significant apart from the direct impacts on potential marine heritage receptors from marine activities during construction and operation which were assessed as **moderate to major adverse**. In order to avoid and/or reduce these significant impacts, a number of mitigation measures are proposed, including offsetting by means of geoarchaeological assessment of geotechnical surveys, avoidance via the implementation of Archaeological Exclusion Zones (AEZs) as appropriate, the preparation of a Written Scheme of Investigation (WSI) which includes a Protocol for Archaeological Discoveries (PAD). This would reduce the potential impacts from the proposed development to **insignificant** with the potential for **minor to moderate beneficial** impacts associated with the geoarchaeological assessment of geotechnical surveys if it is undertaken by a qualified geoarchaeologist as it will enhance and share knowledge of any archaeological interest.

13 Cumulative and In-combination Effects (Chapter 17)

This chapter presents an assessment of the cumulative and in-combination effects of the proposed development. This assessment takes account of the total effects of all pressures from the proposed development alone acting upon all relevant receptors. Additionally, consideration is given to any other plans, projects or activities, including any impacts that do not directly overlap spatially but may indirectly result in a cumulative and/or in-combination impact.

13.1 Proposed works alone - intra-project effects

The impact pathways identified in each of the ES topic chapters as having residual adverse impacts (i.e. minor adverse or greater) and that have the potential to act on the same receptor are discussed and assessed.

The potential for **insignificant to minor adverse** residual impacts to cumulatively act on water and sediment quality receptors are identified, specifically changes to dissolved oxygen concentrations and nutrient concentrations as a result of dredging and disposal activities during construction and operation. These impacts, however, have limited potential to result in a significant cumulative / in-combination effect as the scale of the changes will be small, short-lived and intermittent.

The potential for **insignificant to minor adverse** residual impacts to cumulatively act on benthic habitats and species, and fish and shellfish, and **minor adverse** residual impacts on coastal waterbirds are identified. These impacts, however, have limited potential to result in a significant cumulative / in-combination effect as they will be managed through a package of mitigation measures.

The potential for **insignificant to minor adverse** residual impacts to cumulatively act on fisheries are identified. These impacts, however, have limited potential to result in a significant cumulative / in-combination effect as they will be managed through existing standard good practice, namely the Port of Mostyn's and Dee Conservancy's Marine SMS.

The potential for **insignificant to minor adverse** residual impacts to cumulatively act on people and/or assets are identified. These impacts, however, have limited potential to result in a significant cumulative / in-combination effect. Any cumulative/in-combination effects on humans will either be temporary or highly unlikely and managed through a package of existing control measures at the Port of Mostyn.

13.2 Other plans, projects and activities - inter-project effects

A desk-based review of the relevant plans, projects and activities that have the potential to result in cumulative and/or in-combination impacts with the proposed development is presented. In summary, the other plans, projects and activities that are considered to have the potential to result in cumulative and/or in-combination impacts are:

- Awel y Môr (AyM) Offshore Wind Farm (OWF);
- Holyhead Deep Project;
- Holyhead Port Expansion Project;
- Morlais Tidal Energy Project;
- Regional Maintenance activities for Royal National Lifeboat Institution (RNLI) stations cited around the coast of Wales (including Flint Lifeboat station and Connah's Quay on the Dee Estuary);
- Ports, navigation and shipping; and
- Commercial and recreational fishing.

The assessment considers the potential impacts of the above projects and activities on relevant topics/receptors. All the cumulative and/or in-combination effects are assessed as **insignificant to minor adverse** and not significant.

14 Summary of Impacts (Chapter 14)

This chapter summarises the key outcomes of the assessment of potential impacts associated with the construction and operation of the MEPE Project on all relevant (scoped-in) topics/receptors.

Standard best practice procedures and impact reduction measures are identified to avoid and/or minimise significant adverse impacts as far as practicable. With the adoption of appropriate mitigation, it is considered that all significant adverse impacts associated with the MEPE Project can be avoided and/or minimised to insignificant or minor adverse and not significant.

15 Abbreviations/Acronyms

AEZ	Archaeological Exclusion Zone
ALARP	As Low As Reasonably Practicable
AyM	Awel y Môr
CD	Chart Datum
CEMP	Construction Environment Management Plan

EIA	Environmental Impact Assessment
ES	Environmental Statement
EU	European Union
FCA	Flood Consequence Assessment
FLDP	Flintshire Local Development Plan
GW	Gigawatt
HER	Historic Environment Records
HO	Hydrographic Office
HRA	Habitats Regulations Assessment
ICES	International Council for the Exploration of the Sea
IEMA	Institute of Environmental Management and Assessment
JNCC	Joint Nature Conservation Committee
MEP	Mostyn Energy Park
MEPE	Mostyn Energy Park Extension
MHWS	Mean High Water Springs
MPS	Marine Policy Statement
NMRW	National Monuments Record of Wales
NPSfP	National Policy Statement for Ports
NRA	Navigational Risk Assessment
NRW	Natural Resources Wales
NTS	Non-Technical Summary
NVZ	Nitrate Vulnerable Zone
NWIFCA	North Western Inshore Fisheries and Conservation Authority
O&M	Operation and Maintenance
OS	Ordnance Survey
OWF	Offshore Wind Farm
PAD	Protocol for Archaeological Discoveries
PSA	Particle Size Analysis
Q	Quarter
RNLI	Royal National Lifeboat Institution
SHA	Statutory Harbour Authority
SMP	Shoreline Management Plan
SMS	Safety Management System
SNCB	Statutory Nature Conservation Body
SOV	Service Operation Vessel
SSC	Suspended Sediment Concentration
TSHD	Trailing Suction Hopper Dredger
UK	United Kingdom
UKCP	UK Climate Projections
WFA	Welsh Fishermen's Association
WFD	Water Framework Directive
WGMFD	Welsh Government Marine and Fisheries Division
WHA	Waste Hierarchy Assessment
WID	Water Injection Dredging
WNMP	Welsh National Marine Plan
WSI	Written Scheme of Investigation

Cardinal points/directions are used unless otherwise stated.

SI units are used unless otherwise stated.

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