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MONA OFFSHORE WIND PROJECT

Mona Array Area – Site Characterisation Report

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Image of an offshore wind farm

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Glossary

Term	Meaning
Benthic ecology	Benthic ecology encompasses the study of the organisms living in and on the sea floor, the interactions between them and impacts on the surrounding environment.
Biotope	The combination of physical environment (habitat) and its distinctive assemblages of conspicuous species.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Project (NSIP).
Demersal	Fish living on or near the seabed.
Epibenthic	Organisms living specifically on the seabed.
Epifauna	Animals living on the seabed surface.
Habitat	The environment that a plant or animal lives in.
Infauna	Animals living in the seabed sediment.
Maximum design scenario	The Maximum Design Scenario (MDS) represents the parameters that make up the realistic worst case scenario. This is selected from a range of parameters and may be different for different receptors and activities.
Marine licence	The Marine and Coastal Access Act 2009 requires a marine licence to be obtained for licensable marine activities. Section 149A of the Planning Act 2008 allows an applicant for a DCO to apply for 'deemed marine licences' as part of the DCO process.
Mona Offshore Wind Project	The Mona Offshore Wind Project is comprised of both the generation assets and offshore and onshore transmission assets and associated activities.
Mona Array Area	The area within which the wind turbines, foundations, inter-array cables, interconnector cables and offshore substation platforms (OSPs) forming part of the Mona Generation Assets will be located.
Prehistoric Archaeology	In the British Isles the period from the earliest hominin occupation more than 780,000 years Before Present (BP) to the time of the Roman invasion of Britain in 43 AD.
Suspended Sediment Concentration	Mass of sediment in suspension per unit volume of water.

Acronyms

Acronym	Description
AEZ	Archaeological Exclusion Zone
AL	Action Level
Cefas	Centre for Environment, Fisheries and Aquaculture Science
Defra	Department for Environment Food and Rural Affairs
DML	Deemed Marine Licence
EIA	Environmental Impact Assessment
EU	European Union
HRA	Habitats Regulations Assessment

Acronym	Description
IEF	Important Ecological Feature
ISAA	Information to Support an Appropriate Assessment
MCZ	Marine Conservation Zone
MDS	Maximum Design Scenario
MHWS	Mean High Water Springs
MMO	Marine Management Organisation
NRW	Natural Resources Wales
OSI	Offshore Storage Installation
OSP	Offshore Substation Platform
OSPAR	Oslo-Paris (The Convention for the Protection of the Marine Environment of the North-East Atlantic)
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PEIR	Preliminary Environmental Information Report
PEL	Probable Effect Level
PSA	Particle Size Analysis
SAC	Special Area of Conservation
SPA	Special Protection Area
SSC	Suspended Sediment Concentration
TEL	Threshold Effect Level
UKHO	United Kingdom Hydrographic Office
UXO	Unexploded Ordnance
VMS	Vessel Monitoring System
WFD	Water Framework Directive

Units

Unit	Description
%	Percentage
km^2	Square kilometres
kv	Kilovolt
m	Metre
m^3	Cubic metres
$m^3/s/m$	Cubic metres per second per metre (total load)
mm	Millimetre

1 Mona Array Area – site characterisation report

1.1 Introduction

1.1.1.1 Mona Offshore Wind Limited (the Applicant), a joint venture of bp Alternative Energy investments (hereafter referred to as bp) and Energie Baden-Württemberg AG (hereafter referred to as EnBW) is developing the Mona Offshore Wind Project, a proposed offshore wind farm located in the east Irish Sea.

1.1.1.2 This document has been drafted to provide the licensing authority with the necessary information to permit disposal of material associated with the construction of the Mona Offshore Wind Project. This document represents the site characterisation for the proposed disposal site associated with the construction of the Mona Offshore Wind Project. It specifically outlines the disposal of material originating from dredging, drilling, and sand wave clearance activities associated with the Mona Offshore Wind Project within the Mona Array Area.

1.1.1.3 Site characterisation provides a description of the existing environment at the proposed marine disposal site for spoil material and drill arisings generated by construction activities , using all available data sources. This report has been prepared in the event a formally licenced disposal site is deemed necessary.

1.1.1.4 Noting that all the information required for a site characterisation to support a disposal licence application is contained within the Mona Offshore Wind Project Environmental Statement, this document takes the form of a 'framework' document that provides a summary of the key points of relevance to site characterisation and refers to more detailed information and data presented within the relevant sections of the Environmental Statement at this stage.

1.1.1.5 This report covers the Mona Array Area and associated infrastructure (identified in section 1.1.2) only and will accompany the application for a deemed marine licence as part of the Development Consent Order (DCO) application. The disposal activities associated with the Mona Offshore Cable Corridor will be covered by a separate marine licence and are therefore considered in a separate document (Mona offshore cable corridor site characterisation report (Document Reference J.21)).

1.1.2 Project background and overview

1.1.2.1 The Mona Array Area (i.e. the area within which the offshore wind turbines will be located) is 300 km^2 in area and is located 28.8 km (15.6 nm) from the north coast of Wales, 46.9 km (25.3 nm) from the northwest coast of England and 46.6 km (25.2 nm) from the Isle of Man (when measured from Mean High Water Springs (MHWS)). The Mona Array Area is located in Welsh offshore waters (beyond 12 nm from the Welsh coast) (Figure 1.1).

1.1.2.2 The Mona Offshore Wind Project will consist of up to 96 wind turbines. The maximum proposed number of turbines has been reduced from 107 proposed in the Preliminary Environmental Information Report (PEIR). The proposed capacity of the Mona Offshore Wind Project is over 350 MW, therefore it is within the Planning Act 2008 thresholds for Welsh offshore schemes. The final capacity of the Mona Offshore Wind Project will be determined based on available technology and constrained by the design envelope of the wind turbines presented in Volume 1, Chapter 3: Project description of the Environmental Statement (Document reference F1.3). The offshore

infrastructure associated with the Mona Array Area will also include up to 50 km of interconnector cables and 325 km of inter-array cables.

1.1.2.3 As outlined in paragraph 1.1.1.5, this document considers the Mona Array Area only. The key components of the Mona Array Area include:

- Offshore wind turbines
- Foundations (for wind turbines and Offshore Substation Platforms (OSPs))
- Scour protection and cable protection
- Inter-array cables linking the wind turbines to the OSPs
- OSPs
- Interconnector cables
- Export cables (export cables are linked to the OSP(s) and therefore are partially within the Mona Array Area).

1.1.2.4 The wind turbines and OSPs will be attached to the seabed by foundation structures. The Applicant requires flexibility in foundation choice to ensure that anticipated changes in available technology can be accommodated within the Mona Offshore Wind Project final design. The foundations being considered are outlined in Table 1.1.

Table 1.1: Foundation options for wind turbines and OSPs

	Wind turbines	OSPs
Maximum number of structures	96	4
Pin piled three-legged Jacket	Yes	Yes
Pin piled four-legged Jacket	Yes	Yes
Pin piled six-legged Jacket	No	Yes
Suction bucket three-legged Jacket	Yes	Yes
Suction bucket four-legged Jacket	Yes	Yes
Suction bucket six-legged Jacket	No	Yes
Gravity base	Yes	Yes

1.1.3 Scope and purpose of document

1.1.3.1 This document is the site characterisation for the Mona Array Area which is required to apply for a permit for the disposal of seabed and sub-bottom geological material that may arise during the construction of the Mona Array Area.

1.1.3.2 This report draws on the findings of the technical reports and assessments produced for the Mona Offshore Wind Project Environmental Statement, to support the application for licensing of the Mona Array Area disposal site.

1.1.3.3 Site characterisation is the process whereby the existing environment for a proposed marine disposal site for spoil material and drill arisings generated by construction activities is described, using all available data sources. It is a requirement that a site characterisation report be submitted to Natural Resources Wales (NRW), to inform the decision-making process and to allow the licensing of the disposal site as well as facilitating the consideration of the need for any relevant conditions in relation to the

disposal activity within the Deemed Marine Licence (DML) for the Mona Offshore Wind Project.

1.1.3.4 The Site Characterisation report is structured as follows:

- Section 1.1: Introduction
- Section 1.2: Predicted spoil sources and volumes
- Section 1.3: Consideration of alternative disposal options
- Section 1.4: Characteristics of the disposal site – physical, biological, human environment
- Section 1.5: Characteristics of material to be disposed – physical, chemical and toxicological, biological
- Section 1.6: Assessment of potential adverse effects on physical, biological, and human environment
- Section 1.7: Monitoring
- Section 1.8: Conclusions
- Section 1.9: References.

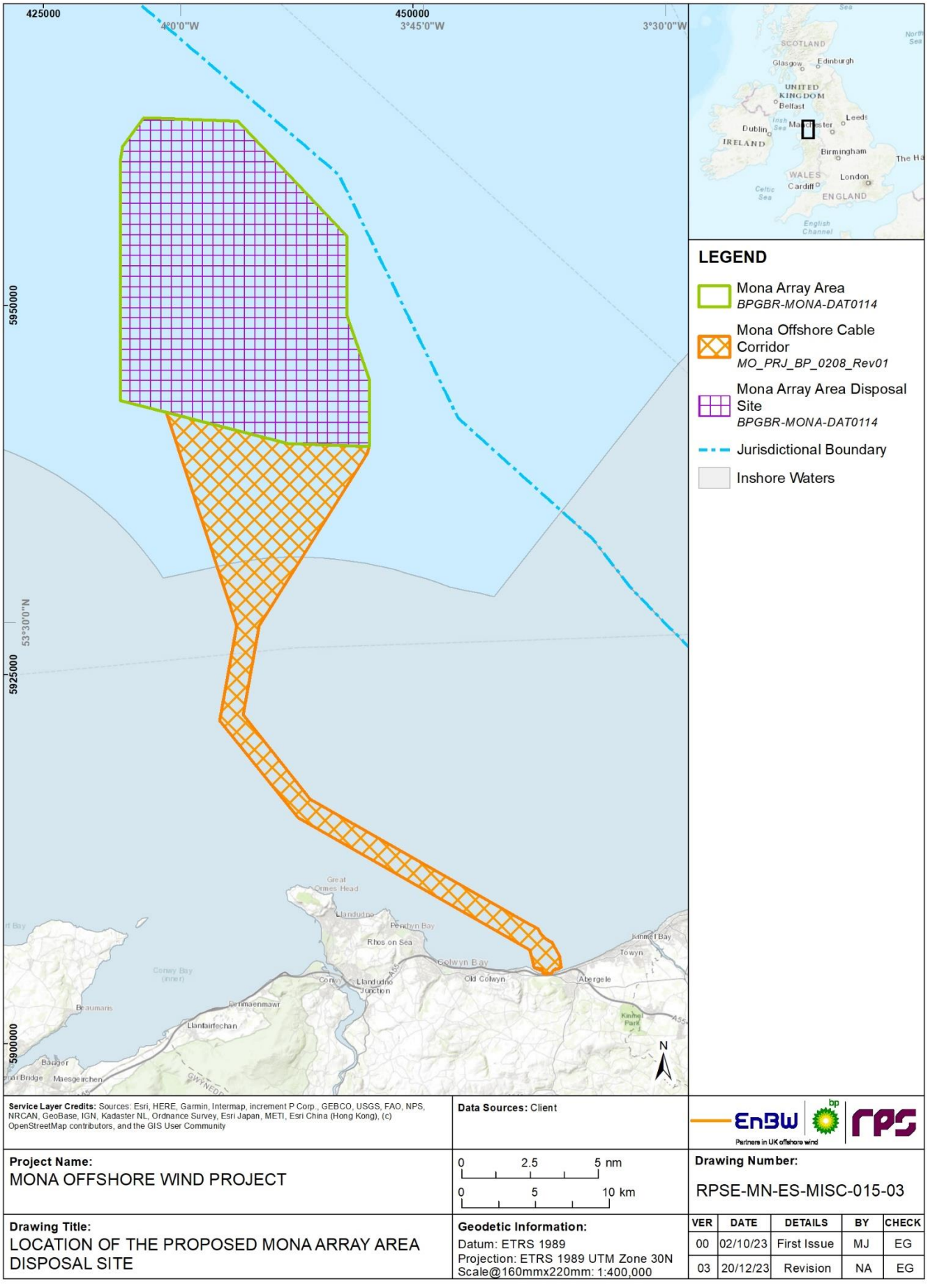

Figure 1.1: Location of proposed Mona Array Area disposal site.

1.1.4 Consultation

1.1.4.1 A summary of the key issues raised during consultation activities undertaken to date specific to dredging and disposal site characterisation is presented in Table 1.2.

Table 1.2: Summary of key consultation topics raised during consultation activities undertaken for the Mona Offshore Wind Project relevant to Mona Array Area disposal site characterisation.

Date	Consultee	Type of consultation	Summary of consultation	Response
June 2023	The Marine Management Organisation (MMO)	S42 consultation	The MMO requested clarification regarding the number of stations sampled for sediment chemistry analysis for metals, Polycyclic Aromatic Hydrocarbons (PAHs) and Polychlorinated Biphenyls (PCBs). They also requested the full data set be presented and that the appropriate thresholds be checked and clarified.	The number of sample stations which have been analysed for sediment chemistry has been presented in sections 1.7.1 and 1.7.2 of Volume 2, Annex 2.1 Benthic subtidal and intertidal ecology of the Environmental Statement. The full sediment contamination data is presented in Appendix F.
			The MMO noted that Thomson Environmental Consultants are not validated by the MMO to undertake particle size analysis (PSA) in support of marine licences, and therefore these results cannot be considered for purposes of dredge and disposal operations.	The PSA analysis was conducted by Kenneth Pye Associates Ltd. and Ocean Ecology (both MMO validated laboratories).
			The MMO noted some inconsistencies regarding the presentation of the sediment contamination data.	Inconsistencies regarding the sediment chemistry analysis have been addressed. Analysis is presented in section 1.7.1 and 1.7.2 of Volume 2, Annex 2.1 Benthic subtidal and intertidal ecology of the Environmental Statement. The full sediment contamination data is presented in Appendix F.
June 2023	NRW	S42 consultation	NRW requested that the PAH data be checked as one station which seems to exceed a relevant threshold needs reporting.	The PAH assessment data has been checked and it can be confirmed that no relevant thresholds were exceeded (section 1.7.2 of Volume 2, Annex 2.1 Benthic subtidal and intertidal ecology of the Environmental Statement).

Date	Consultee	Type of consultation	Summary of consultation	Response
June 2023	JNCC	S42 consultation	Volume 1, Chapter 3: Project description 3.6.4.7 Sandwave clearance for cables, and sandwave clearance and/or seabed preparation for foundations JNCC note that "It is expected that material subject to seabed preparation activities will be deposited in the vicinity of where they were removed." JNCC would strongly recommend that any material from sandwave levelling or dredging be retained within the same sediment system from which it was removed. This could include, where appropriate, deposition upstream of the operations to allow natural backfill.	Material from sandwave clearance will be deposited in the vicinity of the clearance site. Additionally some of the sediment from the Mona Array Area may be removed from the system to be used as ballast for the gravity base foundations. Specifically, the dredging and site preparation associated with conical gravity base foundations may involve the use of up to 7,000 m^3 of this material per foundation as ballast within the structure. The remaining material will be sidecast to a location adjacent to the foundation.

1.2 Predicted spoil sources and volumes

1.2.1 Sources of spoil

1.2.1.1 In the context of this report for the Mona Array Area, the term 'spoil' covers all material (i.e. sediment) which is extracted from (e.g. by dredging or drilling), and subsequently deposited on, the seabed during the construction of the Mona Array Area.

1.2.1.2 Spoil will be generated from sandwave clearance activities within the Mona Array Area prior to cables and foundations being installed. Many of the cable installation tools require a stable, flat seabed surface in order to install cables as it may not be possible to install the cable up or down a slope over a certain angle. In addition, the cables must be buried to a depth where they can be expected to stay buried for the duration of the lifetime of the Mona Array Area. Sandwaves are generally mobile in nature therefore cables must be buried beneath the level where natural sandwave movement could uncover them. Wind turbine foundations need to be placed in level, pre-prepared areas of seabed. This can only be achieved by removing the mobile sediments before installation takes place. Unexploded Ordnance (UXO) and boulder clearance will also be required. Additional seabed preparation may be required prior to gravity base foundation installation, including dredging of the sediments.

1.2.1.3 Site-specific geophysical data from the Mona Array Area and bathymetry data were used to identify sandwaves, and it was determined that up to 50% of the total length of the inter-array cables and 60% of the inter-connector cables would require sandwave clearance. Site-specific geophysical data from the Mona Array Area and bathymetry data also identified that up to 50% of foundation locations may require sandwave clearance. If dredging is required, it would be carried out by dredging vessels using suction hoppers or similar.

1.2.1.4 Pin piles for the foundation are driven and/or drilled into the seabed. If drilling is required, spoil arising from the drilling will be disposed of within the vicinity of the source.

1.2.2 Volume of spoil for disposal

1.2.2.1 The total spoil volume for the Mona Array Area disposal site is calculated using the Maximum Design Scenario (MDS) for sandwave clearance associated with the relevant infrastructure within the Mona Array Area.

1.2.2.2 The maximum amount of spoil that is anticipated to arise within the Mona Array Area, which would require disposal within the Mona Array Area Disposal Site is 13,037,497 m^3 (Table 1.3). The source of this total volume of spoil could arise from the activities, such as sandwave clearance for installation of cables and foundations, dredging works for seabed preparation associated with installation of cables and foundations and/or drill arisings from jacket foundation installation. However, the MDS considers sandwave clearance only, as spoil arising from drilling and trenching would be much lower than the volumes presented in Table 1.3 for sandwave clearance. Trenching also generally places material either side of the trench allowing for backfill, thus no disposal site is considered necessary.

Table 1.3: Summary of MDS spoil volumes associated with seabed preparation in the Mona Array Area disposal site.

Source	Sandwave clearance (m^3)
Wind turbine foundations	7,681,206
OSPs	735,415
Inter-array cables	4,188,876
Inter-connector cables	432,000
Total	13,037,497

1.3 Consideration of alternative disposal options

1.3.1.1 Once drilled or dredged material has been produced, it is classified as a waste material, and is therefore considered to be part of a waste stream and strictly controlled.

1.3.1.2 The disposal of dredged and drilled material is under the London Convention 1972, the Oslo-Paris Commission (OSPAR) Convention 1992, the London Protocol 1996, and the European Union (EU) Waste Framework Directive 2008/98/EC, as well as the Welsh National Marine Plan 2019 that sets the safeguarding policy and policy principles for dredging and disposal activity (Policy SAF_01).

1.3.1.3 At the core of the Waste Framework Directive is the Waste Hierarchy (Department for Environment, Food & Rural Affairs (Defra) 2011) which comprises:

- Prevention
- Re-use
- Recycle

- Other recovery
- Disposal.

1.3.1.4 Where prevention or minimisation is not possible, management options for dealing with waste material must consider the alternative options in the order of priority indicated above (i.e. re-use, recycle, other recovery and then disposal).

1.3.1.5 The consideration of alternative solutions to the disposal of drilled and/or dredged material within the array is therefore an important part of the site characterisation process and is required in order to inform the decision-making process required of the relevant authority (NRW). The following sections of this document present information on potential alternative to the disposal of drilled and dredged material from the Mona Array Area.

1.3.2 Waste hierarchy

Prevention

1.3.2.1 The Waste Hierarchy places a strong emphasis on waste prevention or the minimisation of waste. Consent is being sought for Mona Offshore Wind Project for the use of a range of foundation options and cable installation methodologies. Further information is required before the design of the Mona Offshore Wind Project can be finalised and it is possible, for example, that more than one foundation type may be used across the project.

1.3.2.2 For piled foundations, if percussive piling alone does not achieve full pile penetration due to the presence of hard ground conditions, the material inside the pin piles may need to be drilled out before the pile can be driven to the required depth. If drilling is required, the generation of spoil arising from the drilling will be unavoidable.

1.3.2.3 If non-piled foundations are chosen, seabed preparation works including dredging and disposal will be unavoidable in order to achieve the flat and stable seabed that is required to seat these particular foundation types (e.g. pin piled three-legged jackets, pin piled four-legged jackets, pin piled six-legged jacket, suction bucket three-legged jackets, suction bucket four-legged jackets, suction bucket six-legged jackets and gravity bases), although the volumes of spoil generated will depend on the size of foundations needed and the seabed conditions at each installation location.

1.3.2.4 Sandwave clearance is expected to be required in areas where sandwave gradients are in excess of the working limits for standard cable installation equipment, to avoid unnecessary strain on the cables through bending, and to maximise ploughing efficiency and reduce the chances of burial failure. Additionally, the cable must be buried to a depth where it may be expected to stay buried for the duration of the project lifetime. Sandwaves are generally mobile in nature therefore the cable must be buried beneath the level where natural sandwave movement would uncover it. Sometimes this can only be done by removing the mobile sediments before installation takes place. Therefore, to install the cables for the Mona Array Area, sandwave clearance and the associated dredging and disposal works will in some cases be unavoidable.

1.3.2.5 As a result, the safe and effective installation of the Mona Array Area infrastructure may involve installation techniques that give rise to spoil. Whilst volumes of spoil will be minimised to that necessary for safe and effective installation, it is not possible to prevent spoil generation completely.

Re-use

1.3.2.6 Where prevention is not possible, the re-use of dredged and drilled material is the preferred option. Potential options for the re-use of dredged and drilled material can include:

- Beach nourishment/replenishment schemes
- Land reclamation schemes
- Habitat enhancement schemes.

1.3.2.7 It should be noted that the dredging and site preparation associated with conical gravity base foundations may involve the use of up to 7,000 m^3 of this material, per foundation, as ballast within the structure, which would count as 're-use'. The remaining material will be sidecast to a location adjacent to the foundation.

1.3.2.8 The material for disposal within the Mona Array Area could potentially have alternative uses. Transfer of the volume of spoil material to another location where material could be re-used would consist of the movement of up to 13,037,497 m^3 from the Mona Array Area (see Table 1.3 for the detailed breakdown). Alternative uses are most likely to be based on land, which would require a total of up to approximately 1,185 dredging cycles for the Mona Array Area (assuming a hopper capacity of 11,000 m^3). Each cycle would form a round trip from the closest port (for example, Port of Liverpool).

1.3.2.9 Collection of drill arisings would be costly due to the need for suction dredging vessels in addition to drilling vessels and the limited material produced at each foundation site means collection would not be viable.

1.3.2.10 Dredger movements would lead to additional environmental impacts due to increased vessel emissions that could be avoided if dredged material were disposed of *in situ* (i.e. close to the source of production). Barges for transporting material away from the Mona Array Area may also require four-point anchoring systems at each loading point, which would also result in an additional environmental impact which the disposal of material *in situ* would preclude.

1.3.2.11 In conclusion, the assessments undertaken have not identified any significant adverse (in Environmental Impact Assessment (EIA) terms) impacts on receptors as a result of the proposed disposal activity. It is concluded that whilst potential alternative options for use of this material may exist in theory and at some point in the future, disposal *in situ* remains the most viable option. *In situ* disposal also has the advantage of retaining sediment within the local sedimentary system.

Recycle

1.3.2.12 Recycling of drilled and dredged material would involve transforming the material into a different form, for example to produce bricks or aggregate material. As outlined in the MMO guidance (MMO, 2011), these are generally land-based solutions with any material produced used in onshore construction projects. As such, the same issues with respect to vessel movements to transport the dredged material to land, as discussed above, would apply. The disposal of drilled and dredged spoil material *in situ* would preclude the additional environmental impacts that would arise.

Other recovery

1.3.2.13 There are currently very few examples of recovery from dredged and drilled material (MMO, 2011) and no such options have been identified for the spoil material from the Mona Array Area.

Disposal

1.3.2.14 With regards to the potential to dispose of the produced spoil at an existing marine disposal site, the closest open marine disposal site is for Walney Extension (3 and 4), located to the east of Mona Array Area.

1.3.2.15 Disposal sites are generally licensed to enable the disposal of material from specific locations and activities. It is not considered desirable to use an existing disposal site since the designation of a disposal site is based on an environmental assessment, and future additional use would need to be assessed in line with the original assessment.

1.3.2.16 In addition, the use of another site, such as the Walney Extension (3 and 4) licensed disposal site, would require the transport of the Mona Array Area spoil material away from Mona Array Area, resulting in additional vessel movements. Disposal of the spoil material in situ within the Mona Array Area project boundary, and close to the point of production, ensures that the spoil will be returned into a broadly similar sedimentary environment (and in the case of drill arisings, ensures that the spread of material away from the point of production is minimised). Disposal of material at another disposal site may also require hydrodynamic and sediment transport modelling studies to determine the capacity of the site to accommodate the additional spoil type and volumes.

1.3.2.17 Therefore, it is concluded that disposal at an existing marine disposal site does not represent the most efficient or environmentally acceptable approach to disposal of material from Mona Array Area.

1.4 Characteristics of the disposal site

1.4.1 Physical characteristics

1.4.1.1 This section provides a summary of the physical characteristics of the Mona Array Area. Further details on the physical environment are set out in Volume 6, Annex 6.1: Physical processes technical report of the Environmental Statement and Volume 2, Chapter 6: Marine Processes of the Environmental Statement.

Tidal and wave regime

1.4.1.2 The Mona Array Area has an average tidal range of 5.4 m as published by Admiralty (United Kingdom Hydrographic Office (UKHO)) at Llandudno. Across the Mona Array Area, the tidal current floods to the east and ebbs to the west. The flows are relatively strong during spring tides with tidal current speeds typically between 1.0 – 1.1 m/s during flood and ebb currents between 0.8 – 0.9 m/s.

1.4.1.3 Semi-diurnal tides are the dominant physical process in the Irish Sea coming from the Atlantic Ocean through both the North Channel and St Georges Channel. The tidal range in the Irish Sea is highly variable with a range greater than 10 m on the largest spring tides, the second largest in Britain.

1.4.1.4 At the centre of the Mona Array Area, the largest proportion of waves approach from the westerly sectors, typically combined wind and swell for the Irish Sea. However, a

wave field can also develop from the east of the Mona Array Area as there is a sufficient fetch length.

1.4.1.5 The highest mean annual significant wave height of 1.39 m was recorded between the Isle of Man and Anglesey with the significant wave height reducing closer to the coast with a low of 0.73 m recorded to the west of the Dee Estuary (ABPmer, 2008).

1.4.1.6 Within the Mona Offshore Wind Project mean annual wave height ranges from 1.1 m to 1.3 m. Over 40% of waves arise from the southwest and all significant wave heights greater than 4 m originate from the southwest or west (ABPmer, 2018).

Seabed geology

1.4.1.7 Across the Mona Array Area, the underlying geology consists of bedrock lithologies in the region are Triassic and Carboniferous sandstone and mudstone (Mellett *et al*., 2015). The bedrock of sandstone and mudstone are covered by sediments from the Quaternary age with small areas exposed (Mellett *et al.,* 2015).

1.4.1.8 Across the Mona Array Area, the north section is described as mainly flat and featureless however the presence of sandwaves and megaripples was observed on the south section (Gardline, 2022).

Bedforms and sediment transport

1.4.1.9 In the Mona Array Area, sediment transport rates are highest during springs, peak flood tide with total sediment loads of up to 0.001 $m^3/s/m$ and 0.0005 $m^3/s/m$ on the peak of the ebb tide. Net sediment transport rates are circa 0.2 - 1.0 $m^3/s/m$ within the Mona Array Area.

Suspended sediments

1.4.1.10 Suspended Sediment Concentration (SSC) levels have a seasonal pattern due to the seasonality of storm events. Offshore monitoring to the north of Mona Array Area recorded typical SSC levels of <5 mg/l, however as expected during storm events this increased to circa 20 mg/l corresponding with increased wave heights *(*Fugro, 2022*)*.

1.4.2 Biological characteristics

1.4.2.1 This section provides a summary of the biological characteristics of the Mona Array Area. Details for further information on each receptor are outlined in Table 1.4 below.

Table 1.4: Chapter information for further information on biological characteristics.

Receptor	Chapter reference
Benthic subtidal and intertidal ecology	• Volume 2, Chapter 2: Benthic subtidal and intertidal ecology of the Environmental Statement • Volume 6, Annex 2.1: Benthic subtidal and intertidal ecology technical report of the Environmental Statement.
Fish and shellfish ecology	• Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement • Volume 6, Annex 3.1: Fish and shellfish ecology technical report of the Environmental Statement.

Receptor	Chapter reference
Marine mammals	• Volume 2, Chapter 4: Marine mammals of the Environmental Statement • Volume 6, Annex 4.1: Marine mammals technical report of the Environmental Statement.
Offshore ornithology	• Volume 2, Chapter 5: Offshore ornithology of the Environmental Statement • Volume 6, Annex 5.1: Offshore ornithology baseline characterisation technical report of the Environmental Statement.

Benthic subtidal ecology

1.4.2.2 Subtidal sediments recorded from infauna grab samples collected across the Mona Array Area during the site-specific benthic subtidal surveys are presented in Volume 6, Annex 2.1: Benthic subtidal and intertidal ecology technical report of the Environmental Statement and Figure 1.2. Sediments ranged from gravelly sand to muddy sandy gravel with most samples classified as gravelly sand. A single sample station was classified as slightly gravelly muddy sand, (ENV95) which was located in the southeast section of the Mona Array Area. According to the simplified Folk Classification (Long, 2006), most stations were classified as mixed sediments (see Figure 1.2).

1.4.2.3 Subtidal sediment contamination analysis was undertaken on samples within the Mona Array Area. Regarding metals, levels of chromium, copper, nickel, lead, mercury and zinc did not exceed the relevant Cefas (Centre for Environment, Fisheries and Aquaculture Science) Action Level 1 (AL1) or the Canadian Threshold Effect Level (TEL) in any of the samples. Concentrations of arsenic did however exceed Cefas AL1 at two sample stations in the Mona Array Area but were below the Cefas Action Level 2 (AL2). Additionally, the concentration of cadmium marginally exceeded the Cefas AL1 at a single station in the Mona Array Area. No samples exceeded Cefas ALs or the Canadian TEL or Probable Effect Level (PEL) for PCBs. Levels of PAHs did not exceed the relevant Canadian TEL or PEL thresholds. Concentrations of organotins were below the limit of detection at all stations (see Volume 6, Annex 2.1: Benthic subtidal and intertidal ecology technical report of the Environmental Statement).

1.4.2.4 Across the Mona Array Area, the infauna communities were generally dominated by annelids and crustaceans. The most abundant individuals generally belonged to Annelida with the polychaete *Scalibregma inflatum* being overall the most abundant species. The biomass data reflected the dominance of annelids with respect to the number of individuals and number of taxa, in 35% of stations annelids contributed the most to biomass. Molluscs and echinoderms contributed the second and third most to biomass (36% and 17% respectively).

1.4.2.5 The epifaunal communities recorded by the seabed imagery varied according to the type of sediment. In general, high numbers of epifaunal species were recorded in association with the coarser sediments. Epifaunal species recorded were dominated by annelids and Cnidarians with low numbers of molluscs and chordates. Stations in areas of coarse and mixed sediments were associated with the presence of dead man's fingers *Alcyonium digitatum*, common starfish *Asterias rubens,* brittlestars *Ophiura* sp. and the common hermit crab *Pagurus bernhardus*.

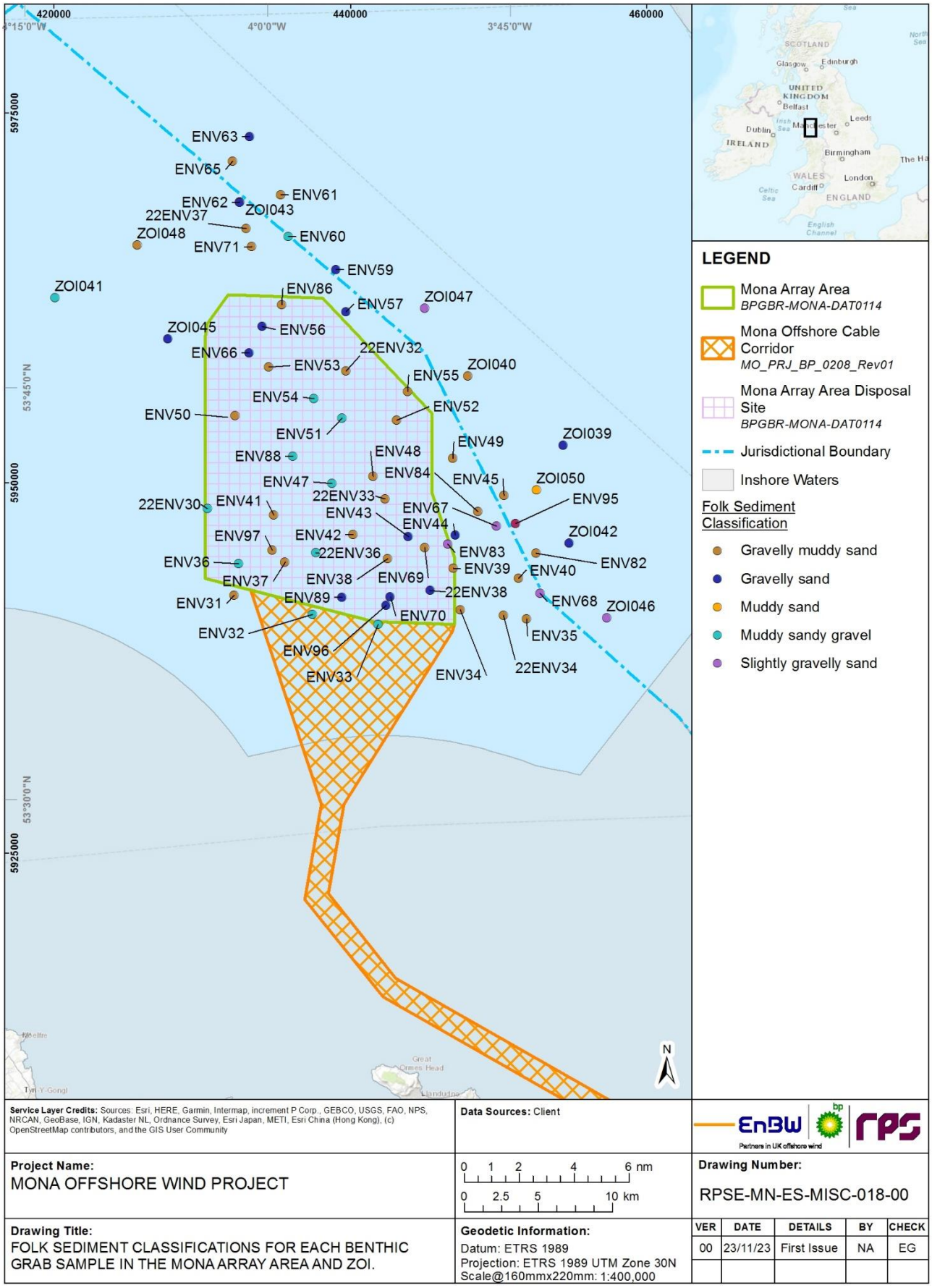

Figure 1.2: Folk sediment classification for each benthic grab sample in the Mona Array Area and ZoI.

Fish and shellfish ecology

1.4.2.6 Species identified as likely to be found within the fish and shellfish ecology study area include the following (the study area covers the east Irish Sea, extending from MHWS west from the Mull of Galloway in Scotland to the west tip of Anglesey, following the territorial waters 12 nm limit of the Isle of Man (IoM), based on consultation with all relevant stakeholders):

- Demersal species – sandeel. Whiting *Merlangius merlangus*, lemon sole *Microstomus kitt*, ling *Molva molva*, plaice *Pleuronectes platessa*, cod *Gadus morhua*, and European hake *Merluccius merluccius*
- Pelagic species – herring, mackerel *Scomber scombrus*, sprat *Sprattus sprattus*, and European sea bass *Dicentrarchus labrax*
- Elasmobranch species – basking shark *Cetorhinus maximus*, lesser spotted dogfish *Scyliorhinus canicular*, tope shark *Galeorhinus galeus*, spurdog *Squalus acanthias*, common skate *Dipturus batis*, spotted ray *Raja montagui*, and thornback ray *Raja clavate* and angel shark *Squatina squatina*.
- Diadromous species – Atlantic salmon *Salmo salar*, European eel *Anguilla anguilla*, sea trout *Salmo trutta*, river lamprey *Lampetra fluviatilis*, sea lamprey *Petromyzon marinus*, Allis shad *Alosa alosa*, twaite shad *Alosa fallax*, sparling/European smelt *Osmerus eperlanus*; and freshwater pearl mussel *Margaritifera margaritifera* (included here due to reliance on Atlantic salmon and sea trout at specific life stages)
- Shellfish species – king scallop, queen scallop, European lobster *Homarus gammarus*, edible crab *Cancer pagurus*, velvet swimming crab *Necora puber*, squid Loliginidae spp. and Ommastrephidae spp., common whelk *Buccinum undatum*, and *Nephrops*.

1.4.2.7 Coull *et al*. (1998), and the NINEL datasets showed significant herring spawning areas to the northwest of the Mona Array Area, and to the north, east and northeast of the IoM. The most suitable spawning grounds were located entirely outside of the Mona Array Area, which is further supported by results from detailed site-specific survey PSA data (see Volume 6, Annex 3.1: Fish and shellfish ecology technical report of the Environmental Statement for full results). This site-specific survey data found that the majority of the Mona Array Area comprised unsuitable sediment for herring spawning, with only small patches of marginal habitat in the southeast section of the Mona Array Area.

1.4.2.8 The site-specific surveys and EMODnet seabed substrate data show overall good alignment within the Mona Array Area, with most stations classed as unsuitable habitat. A number of stations in the west and south of the Mona Array Area represented marginal and preferred habitats. Site-specific surveys performed for the benthic baseline characterisation confirmed the presence of only two sandeel within the Mona Array Area, although these were only opportunistic catches from apparatus not designed for sandeel sampling, and therefore cannot be used to inform overall abundance. EMODnet data indicates that the Mona Offshore Cable Corridor is situated entirely within high intensity sandeel spawning grounds, with substrates mainly comprising gravelly sand and (gravelly) sand, which are preferred sandeel habitats. This was confirmed by the site-specific data PSA results, which indicated that most stations within the Mona Offshore Cable Corridor were classified as preferred habitat for sandeel spawning.

1.4.2.9 Elasmobranch species occurring within the Irish Sea include the spotted and thornback ray. Thornback ray have important spawning grounds in the east Irish Sea around Anglesey, within the fish and shellfish ecology study area (Ellis *et al*., 2012). Other elasmobranch species, including the lesser spotted dogfish and cuckoo ray, are also found throughout the east Irish sea, with both preferring gravelly or coarse sandy substrates for feeding. Basking shark migrate north to south through the Irish and Celtic Seas in August to October while travelling between north Africa and Scotland to overwinter in the 50 – 200 m continental shelf depth range (Doherty *et al.*, 2017).

1.4.2.10 High levels of commercial fishing of king scallop have been recorded within the wider fish and shellfish ecology study area (ICES, 2020), and queen scallop in the middle of the Mona Array Area.

Marine mammals

1.4.2.11 The marine mammal species which are most likely to occur within the Mona Array Area are: harbour porpoise *Phocoena phocoena*, bottlenose dolphin *Tursiops truncatus*, Risso's dolphin *Grampus griseus*, short-beaked common dolphin *Delphinus delphis*, minke whale *Balaenoptera acutorostrata*, grey seal *Halichoerus grypus* and harbour seal *Phoca vitulina.*

Offshore ornithology

1.4.2.12 Digital aerial surveys for seabirds have been undertaken across the Mona Offshore Ornithology Array Area study area and commenced in March 2020 and concluded in February 2022, completing a suite of 24 monthly surveys spanning two years. A total of 22 bird species were recorded, with the key species recorded in the greatest abundance/density within the Mona Array Area (and 4 km buffer) being black-legged kittiwake *Rissa tridactyla*, great black-backed gull *Larus marinus*, herring gull *Larus argentatus*, lesser black backed gull *Larus fuscus*, common guillemot *Uria aalge* razorbill, northern fulmar *Fulmarus glacialis*, manx shearwater *Puffinus puffinus*, Northern gannet *Morus bassanus.*

Designated sites

1.4.2.13 The Mona Array Area does not overlap with any sites designated for nature conservation or water quality. The nearest Special Area of Conservation (SAC) is the Menai Strait and Conwy Bay/Y Fenai a Bae Conwy SAC which is located 26.8 km from the Mona Array Area and the nearest Special Protected Area (SPA) is the Liverpool Bay/Bae Lerpwl SPA which is located 15.9 km from the Mona Array Area. The closest Marine Conservation Zone (MCZ) is the Fylde MCZ which is located 31.3 km from the Mona Array Area.

1.4.2.14 Further information and assessment of impacts to designated sites can be found in the Habitats Regulations Assessment (HRA) Stage 2 Information to Support an Appropriate Assessment (ISAA) (Document Reference E1, E1.1 and E1.2) which considers effects on sites within the national site network (SACs, Special Protection Areas (SPAs) and Ramsar sites), the Marine Conservation Zone (MCZ) Assessment (Document reference E.2) and the Volume 6, Annex 2.2: WFD coastal waters assessment of the Environmental Statement.

1.4.3 Human environment characteristics

1.4.3.1 This section provides a summary of the human environment of the Mona Array Area. Further detail can be found in Volume 2, Chapter 6: Commercial fisheries of the Environmental Statement, Volume 2, Chapter 7: Shipping and navigation of the Environmental Statement, Volume 2, Chapter 10: Other sea users of the Environmental Statement and their associated annexes.

Commercial fisheries

1.4.3.2 Data compiled by both the MMO (MMO, 2020a) and EU STECF[1] (EU STECF, 2017) was reviewed for the most recently available 10 year period of landings (2010 to 2020 and 2006 to 2016 respectively). MMO and EU STECF datasets were filtered to show only landings from the commercial fisheries study area (ICES Rectangles 35E5, 35E6, 36E5 and 36E6). The Mona Array Area will be located in 36E5 and 36E6. The MMO data indicate that over the period 2010 to 2020, shellfish was the most important species group in terms of landed weight and value for UK vessels, with the highest landings from ICES Rectangle 36E5 (within which the Mona Array Area is located).

1.4.3.3 Dredges accounted for approximately 75% of total landings by UK vessels from the commercial fisheries study area. This indicates the importance of the queen and king scallop fisheries in the region. Pots and traps (targeting crab, lobster and whelk) were also of notable importance in the commercial fisheries study area and consisted mostly of vessels >10 m in length.

1.4.3.4 The dredge fishery targets scallops, with minimal landings of other commercial species. Landings by Isle of Man dredge vessels are highest from 36E5 landings by Scottish dredge vessels are highest from 36E5, with notable landings from 36E6; landings by Northern Irish dredge vessels were highest from 36E5 and notable from 36E6; landings by Irish dredge vessels were highest from 36E5. Vessel Monitoring System (VMS) data indicated that highest intensities of the dredge fishery were within the Isle of Man 12 nm limit, and within the central and west parts of the Mona Array Area.

1.4.3.5 VMS data illustrating activity by otter trawl vessels (>12 m) from England, Isle of Man and Northern Ireland was limited within the commercial fisheries study area, with the highest levels observed in the northwest part of ICES Rectangle 36E5 and predominantly close to the Isle of Man.

1.4.3.6 Within the commercial fisheries study area, the landings data indicates that landings by vessels using beam trawl were predominantly undertaken by Belgian and south coast English fleets. The target species of this fishery are sole and plaice, which are principally taken from ICES Rectangles 36E6 and 36E5.

Marine archaeology

1.4.3.7 Geophysical data was collected across the Mona Array Area and Mona Offshore Cable Corridor. A total of 107 anomalies of potential archaeological interest were identified through the geophysical surveys. Of these, 17 are considered to be high potential

[1] EU STECF is a group of experts, appointed by the European Commission, that undertakes scientific work, provides scientific advice on fisheries management and implements a data collection framework.

anomalies, 16 are of medium potential and 74 have been classed as low potential anomalies.

1.4.3.8 Of the 17 high potential anomalies identified, five are located within the Mona Array Area. Full details on the detail and location of the anomalies is provided in Volume 6, Annex 9.1: Marine archaeology technical report of the Environmental Statement. Sites identified as high or medium potential will be avoided due to the implementation of Archaeological Exclusion Zones (AEZs) included as measures adopted as part of the Mona Offshore Wind Project and further outlined in Volume 2, Chapter 9: Marine Archaeology of the Environmental Statement.

1.4.3.9 The submerged prehistoric archaeological potential of the Mona marine archaeology study area is summarised in Volume 6, Annex 9.1: Marine archaeology technical report of the Environmental Statement.

Infrastructure and other users

1.4.3.10 There are three licenced marine aggregate extraction areas in the vicinity of the Mona Offshore Wind Project. Of these three sites, none overlap with the Mona Array Area and only Liverpool Bay 457 overlaps with the regional other sea users study area.

1.4.3.11 There are no marine disposal sites within the regional other sea users study area (which is based on one tidal excursion of the Mona Array Area and the Mona Offshore Cable Corridor and Access Areas). There is a slight overlap between the east edge of the regional other sea users study area and the Liverpool Bay (sludge) B site, which is 13.9 km from the Mona Array Area. This site received sewage sludge and industrial waste for disposal and was closed in 1998.

1.4.3.12 There are two wreck diving sites within the regional other sea users study area, including one in the Mona Offshore Cable Corridor itself near the south boundary of the Mona Array Area.

1.4.3.13 There are four recreational bathing sites within the regional other sea users study area:

- Llandudno North Shore
- Colwyn Bay
- Colwyn Bay Porth Eirias
- Abergele (Pensarn).

1.4.3.14 Volume 2, Chapter 10: Other sea users of the Environmental Statement illustrates that recreational sailing and motor cruising in inshore and coastal areas is of a low to medium intensity.

1.4.3.15 Sea fishing trips run from Conwy, North Wales and specialise in wreck fishing, deep sea fishing and reef fishing from Anglesey to Liverpool Bay (Sea Fishing Trips in North Wales, 2022). Sea fishing trips also operate from the Isle of Man (Manx Sea Fishing, 2022) and Fleetwood, Lancashire (Blue Mink Boat Charters, 2022) amongst other ports along the coasts of the east Irish Sea.

1.4.3.16 There are a number of proposed and operational offshore wind farms in the east Irish Sea. There is no spatial overlap between any proposed or operational wind farms and the local other sea users study area (and therefore the Mona Array Area).

1.4.3.17 There are seven active cables and one proposed cable which intersect the local other sea users study area.

1.4.3.18 No currently licenced blocks overlap with the local other sea users study area, although block 110/12a immediately to the east of the local other sea users study area is currently licenced and operated by ENI UK Ltd.

1.4.3.19 There are two main clusters of platforms with associated pipelines nearby:

- The South Morecambe cluster to the northeast of the Mona Array Area, operated by Spirit Energy.
- The Douglas cluster to the southeast of the Mona Array Area (including the Offshore Storage Installation (OSI), a barge which serves as a floating oil terminal), operated by ENI.

1.5 Characteristics of material to be disposed

Physical characteristics

1.5.1.1 Subtidal sediments recorded from infaunal grab samples collected across the Mona Array Area during the site-specific benthic subtidal surveys are presented in Volume 2, Chapter 2: Benthic subtidal and intertidal ecology of the Environmental Statement. Sediments across the Mona Array Area ranged from gravelly sand to muddy sandy gravel with most samples classified as gravelly sand. A single sample station was classified as slightly gravelly muddy sand, (ENV95) which was located in the southeast section of the Mona Array Area.

Chemical characteristics

1.5.1.2 As part of the subtidal survey, sediment samples were taken for the purpose of sediment chemistry analysis. Sediment hydrocarbon, metals, total organic carbon, organotins and PCB analyses were carried out by SOCOTEC, a laboratory validated by the MMO for sediment analysis to inform marine licence applications.

1.5.1.3 As part of the subtidal sediment contamination analysis from samples within the Mona Array Area, levels of heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), PAHs and PCBs were identified and compared to Cefas AL1 and AL2 as well as the Canadian PEL and TEL. In summary, no contaminants were found to exceed Cefas AL2 or the Canadian PEL.

1.5.1.4 Regarding metals, levels of chromium, copper, nickel, lead, mercury and zinc did not exceed the relevant Cefas AL1 or the Canadian TEL in any of the samples. Concentrations of arsenic did however exceed Cefas AL1 at two sample stations in the Mona Array Area but were below the Cefas AL2. Additionally, the concentration of cadmium marginally exceeded the Cefas AL1 at a single station in the Mona Array Area. No samples exceeded Cefas ALs or the Canadian TEL or PEL for PCBs. Levels of PAHs did not exceed the relevant Canadian TEL or PEL thresholds. Concentrations of organotins where below the limit of detection at all stations (see Volume 6, Annex 2.1: Benthic subtidal and intertidal ecology technical report of the Environmental Statement).

Biological characteristics

1.5.1.5 Information on the biological characteristics of the material to be disposed is outlined above in section 1.4.2.2 to 1.4.2.12. The locations for more detailed information on specific data categories is outlined in Table 1.5.

Table 1.5: Relevant Environmental Statement technical report/chapter for each data type.

Data type	Relevant PEIR document
Contaminant analysis	• Volume 2, Chapter 2: Benthic subtidal and intertidal ecology of the Environmental Statement • Volume 6, Annex 2.1: Benthic subtidal and intertidal ecology technical report of the Environmental Statement.
Seabed geology	• Volume 2, Chapter 1: Physical processes of the Environmental Statement • Volume 6, Annex 1.1: Physical processes technical report of the Environmental Statement • Volume 6, Annex 2.1: Benthic subtidal and intertidal ecology technical report of the Environmental Statement.
Biotopes and benthic fauna	• Volume 2, Chapter 2: Benthic subtidal and intertidal ecology of the Environmental Statement • Volume 6, Annex 2.1: Benthic subtidal and intertidal ecology technical report of the Environmental Statement.
Fish and shellfish spawning and nursery areas	• Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement • Volume 6, Annex 3.1: Fish and shellfish ecology technical report of the Environmental Statement.

1.6 Assessment of potential adverse effects

1.6.1 Physical environment

1.6.1.1 The following section of this report provides an overview of the key findings for Mona Array Area, as reported in the Environmental Statement, which are relevant to the disposal of dredged and/or drilled material *in situ* within the Mona Array Area. One impact been assessed in the context of dredging and disposal activities (see Table 1.6).

1.6.1.2 It should be noted that marine processes are not in themselves receptors in the majority of cases when carrying out an impact assessment, but changes to these processes may have an impact on other sensitive receptors (Lambkin *et al.*, 2009). The receptor groups for the potential impact pathways considered within Volume 2, Chapter 1: Physical processes of the Environmental Statement lie principally in other offshore EIA topics, namely:

- Volume 2, Chapter 2: Benthic subtidal and intertidal ecology of the Environmental Statement
- Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement
- Volume 2, Chapter 4: Marine mammals of the Environmental Statement
- Volume 2, Chapter 5: Offshore ornithology of the Environmental Statement
- Volume 2, Chapter 9: Marine archaeology of the Environmental Statement
- Volume 2, Chapter 10: Other sea users of the Environmental Statement.

1.6.1.3 A full impact assessment has however been provided within Volume 2, Chapter 1: Physical processes of the Environmental Statement for the hydrodynamic regime and the sediment transport regime, which have been identified as potentially sensitive physical processes receptors.

1.6.2 Biological and human environment

1.6.2.1 The Environmental Statement for Mona Array Area provides detailed impact assessments related to disposal activities on a number of sensitive biological and human environment receptors, including benthic habitats, fish and shellfish habitats, marine mammals, offshore ornithology, commercial fisheries, marine archaeology and infrastructure and other users.

1.6.2.2 For all of these assessments, the effects defined within Volume 2, Chapter 1: Physical processes of the Environmental Statement have been interpreted with regard to their subsequent impact on various receptors. The sensitivity of various receptors to these effects (increased suspended sediment concentrations, sediment deposition and potential loss of seabed habitats) has been determined based on relevant literature and an assessment of the significance of any impacts undertaken.

1.6.2.3 Table 1.6 below provides a summary of the key impacts on physical, biological and human receptors assessed within the Environmental Statement. The relevant section of the Environmental Statement, where further details of these impact assessments are presented, is also provided.

Table 1.6: Summary of impacts relevant to the disposal of spoil within the Mona array area disposal site.

Potential impact	Relevant section of the Environmental Statement	Magnitude of impact	Sensitivity of receptor	Significance of effect
Physical processes				
Increase in suspended sediments due to construction, operations and maintenance and/or decommissioning related activities, and the potential impact to physical features.	Volume 2, Chapter 1: Physical processes of the Environmental Statement	C: Low O: Negligible D: Low	C: Low O: Low D: Low	C: Negligible O: Negligible D: Negligible
Benthic ecology				
Temporary subtidal habitat disturbance	Volume 2, Chapter 2: Benthic subtidal and intertidal ecology of the Environmental Statement	Subtidal Important Ecological Feature (IEFs) C: Low O: Negligible D: Low	Subtidal IEFs • Medium - high	Subtidal IEFs C: Minor adverse O: Minor adverse D: Minor adverse
Increase in suspended sediment concentrations and associated deposition	Volume 2, Chapter 2: Benthic subtidal and intertidal ecology of the Environmental Statement	Subtidal IEFs C: Low O: Negligible D: Negligible	Subtidal IEFs • Negligible – medium	Subtidal IEFs C: Negligible – minor adverse O: Negligible D: Negligible – minor adverse
Disturbance/remobilisation of sediment-bound contaminants	Volume 2, Chapter 2: Benthic subtidal and intertidal ecology of the Environmental Statement	Subtidal IEFs C: Negligible D: Negligible	Subtidal IEFs • Low	Subtidal IEFs C: Negligible D: Negligible

Potential impact	Relevant section of the Environmental Statement	Magnitude of impact	Sensitivity of receptor	Significance of effect
Fish and shellfish ecology				
Temporary habitat loss/disturbance	Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement	C: Negligible to Low O: Negligible to Low D: Negligible to Low	C: Marine – Low - high Diadromous- Negligible O: Marine – Low - high Diadromous - Negligible D: Marine – Low - high Diadromous - Negligible	C: Marine - Minor adverse Diadromous - Negligible O: Marine – Minor adverse Diadromous - Negligible D: Marine – Minor adverse Diadromous - Negligible
Increased SSCs and associated sediment deposition	Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement	C: Low O: Negligible D: Low	C: Marine – Low - medium Diadromous- Low O: Marine – Low - medium Diadromous - Low D: Marine – Low - medium Diadromous - Low	C: Marine – Minor adverse Diadromous - Negligible O: Marine – Negligible to minor adverse Diadromous - Negligible D: Marine – Minor adverse Diadromous - Negligible
Marine mammals				
Changes in fish and shellfish communities affecting prey availability	Volume 2, Chapter 4: Marine mammals of the Environmental Statement	C: Low O: Low D: Low	C: Minke whale – medium. All other marine mammals – low O: Low D: Low	C: Minor adverse O: Minor adverse D: Minor adverse
Ornithology				
Temporary habitat loss/disturbance and increased SSCs	Volume 2, Chapter 5: Offshore ornithology of the Environmental Statement	C: Negligible O: Negligible D: Negligible	C: Medium O: Medium D: Medium	C: Minor adverse O: Minor adverse D: Minor adverse

Potential impact	Relevant section of the Environmental Statement	Magnitude of impact	Sensitivity of receptor	Significance of effect
Commercial Fisheries				
Potential impacts on commercially important fish and shellfish resources	Volume 2, Chapter 6: Commercial fisheries of the Environmental Statement.	C: Negligible – low O: Negligible – low D: Negligible – low	C: Low – medium O: Low – medium D: Low - medium	C: Negligible – minor adverse O: Negligible – minor adverse C: Negligible – minor adverse
Marine archaeology				
Sediment disturbance and deposition leading to indirect impacts on marine archaeology receptors	Volume 2, Chapter 9: Marine archaeology of the Environmental Statement	C: Low O: Low D: Low	C: High O: High D: High	C: Minor adverse O: Minor adverse D: Minor adverse
Alteration of sediment transport regimes	Volume 2, Chapter 9: Marine archaeology of the Environmental Statement	O: Low	O: High	O: Minor adverse
Infrastructure and Other Users				
Increased SSC and associated deposition affecting recreational diving and bathing sites	Volume 2, Chapter 10: Other sea users of the Environmental Statement	C: Low O: Negligible D: Low	C: Low O: Low D: Low	C: Minor adverse O: Negligible D: Minor adverse
Reduction or restriction of oil and gas exploration activities (including surveys, drilling and the placement of infrastructure) within the Mona Array Area	Volume 2, Chapter 10: Other sea users of the Environmental Statement	C: Medium O: Medium D: Medium	C: Negligible O: Negligible D: Negligible	C: Minor adverse O: Minor adverse D: Minor adverse

1.7 Monitoring

1.7.1.1 Based on the findings of the impact assessments presented in the Environmental Statement, and summarised within this document, long-term impacts from the disposal of spoil and dredged material within the Mona Array Area are not anticipated. This is due to the limited increase in seabed level, the low levels of contamination in sediments and the temporary nature of any sediment plumes generated.

1.7.1.2 In light of the above, and that impact assessments presented in the Environmental Statement (also see Table 1.6), concluded no significant effects to physical processes, biological or human receptors no monitoring specific to disposal is proposed for the Mona Array Area disposal site.

1.8 Conclusions

1.8.1.1 This document represents the site characterisation for the Mona Array Area and is required by NRW to allow them to consider the potential impacts of disposal within the site. The document forms the proposal for the licensing of a disposal site within the Array Area for drill arisings, and material arising from foundation seabed preparation, cable installation preparation.

1.8.1.2 Noting that all the information required for a site characterisation to support a disposal licence application is contained within the Mona Offshore Wind Project Environmental Statement, this document takes the form of a 'framework' document that provides a summary of the key points of relevance to site characterisation and refers to more detailed information and data presented within the relevant sections of the Environmental Statement at this stage.

1.8.1.3 The source of material proposed to be disposed of within the Mona Array Area will be sediment dredged from the upper layer of the existing seabed via suction hopper dredger as part of seabed preparation works ahead of foundation and cable installation preparation, and/or materials from the deeper soil profile and upper sediments derived from drilling activities for piled foundations.

1.8.1.4 Within the Mona Array Area Disposal Site, up to a maximum of 13,037,497 m^3 of material will be disposed of *in situ*. Where drilling is required to facilitate the installation of piles to target depth, the drill arisings will be disposed of at sea, adjacent to the foundation location. The impacts of disposal via the return of dredged material to the water column and/or the placement of drill arisings adjacent to foundations has been fully assessed within this document and in relevant chapters of the Environmental Statement, noting that the dredging and site preparation associated with conical gravity base foundations may involve the use of up to 7,000 m^3 of this material, per foundation, as ballast within the structure.

1.8.1.5 The deposition of sediment from disposal activities is predicted to only result in short term, spatially discrete impacts, and the fact that the seabed material to be disposed of *in situ* is not heavily contaminated (as outlined in paragraph 1.5.1.2) has shown that contamination of surrounding sediments will be highly unlikely. The only potential longer-term impact of disposal that may arise will be the deposition of drill arisings on the seabed which may consist of large, granular materials that are too large to be moved by tidal currents and may remain *in situ* for long periods of time. The exact scope for this potential impact will rely on the nature of the materials drilled out during pile drilling.

1.8.1.6 No effects of moderate or major adverse significance (i.e. significant in EIA terms) have been identified in relation to sediment disposal, with only negligible to minor adverse effects predicted on relevant receptors.

1.8.1.7 In conclusion, based on the proposals for disposal within the Mona Array Area Disposal Site, the nature of the material to be disposed of, the receiving environment and the predictions of the Environmental Statement on the impact of these activities on physical, biological and human receptors, no significant adverse impacts are predicted and disposal *in situ* is the most viable option.

1.9 References

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