MORAY OFFSHORE WINDFARM (WEST) LIMITED

OfTI Marine Licence Variation Application: Rock Grade Variation Supporting Environmental Information

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1 Introduction

1.1 Background

The Moray West Offshore Wind Farm and associated Offshore Transmission Infrastructure (OfTI) (together referred to as 'the Development') is being developed by Moray Offshore Windfarm (West) Limited (known as 'Moray West'). Consent for the Development was granted on 14 June 2019 under Section 36 (S36) of the Electricity Act 1989 (as amended), Part 4 of the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009 from Scottish Ministers. One S36 consent was granted by Scottish Ministers for the wind farm (012/OW/MORLW-8) and two Marine Licences were granted by Scottish Ministers, one for the wind farm and another for the offshore transmission infrastructure.

Variations of the S36 consent and wind farm Marine Licence were granted by the Scottish Ministers on 7 March 2022, and further variations of the Wind Farm Marine Licence (MS-00009774) and OfTI Marine Licence (MS-00009813) were granted on 7 March 2022 and 11 April 2022. The revised S36 consent and associated Marine Licences are referred to collectively as 'offshore consents'.

The Development covers an area of approximately 225 km^2 on the Smith Bank in the Outer Moray Firth approximately 22 km from the Caithness coastline (Figure 1-1). The Development which will be owned and operated by the generator will comprise 60 wind turbine generators (WTGs), associated substructures and seabed foundations, inter-array cables, one offshore substation platform (OSP) inter-connector cable and any scour protection around substructures or cable protection. The OfTI (which will be owned and operated by an Offshore Transmission Owner (OFTO)) will comprise two OSPs which will be located within the Moray West Offshore Wind Farm, and two offshore export cable circuits which will be located within the OfTI Corridor (187km^2) and will be used to transmit the electricity generated by the generating station to shore. The offshore export cable circuits will come ashore at Sandend Bay, which is located on the Aberdeenshire Coast at Broad Craig, approximately 65 km south of the Development.

The Development is aiming to be fully operational in 2024/25 with an operational life of 25 years from the date of final commissioning of the Development.

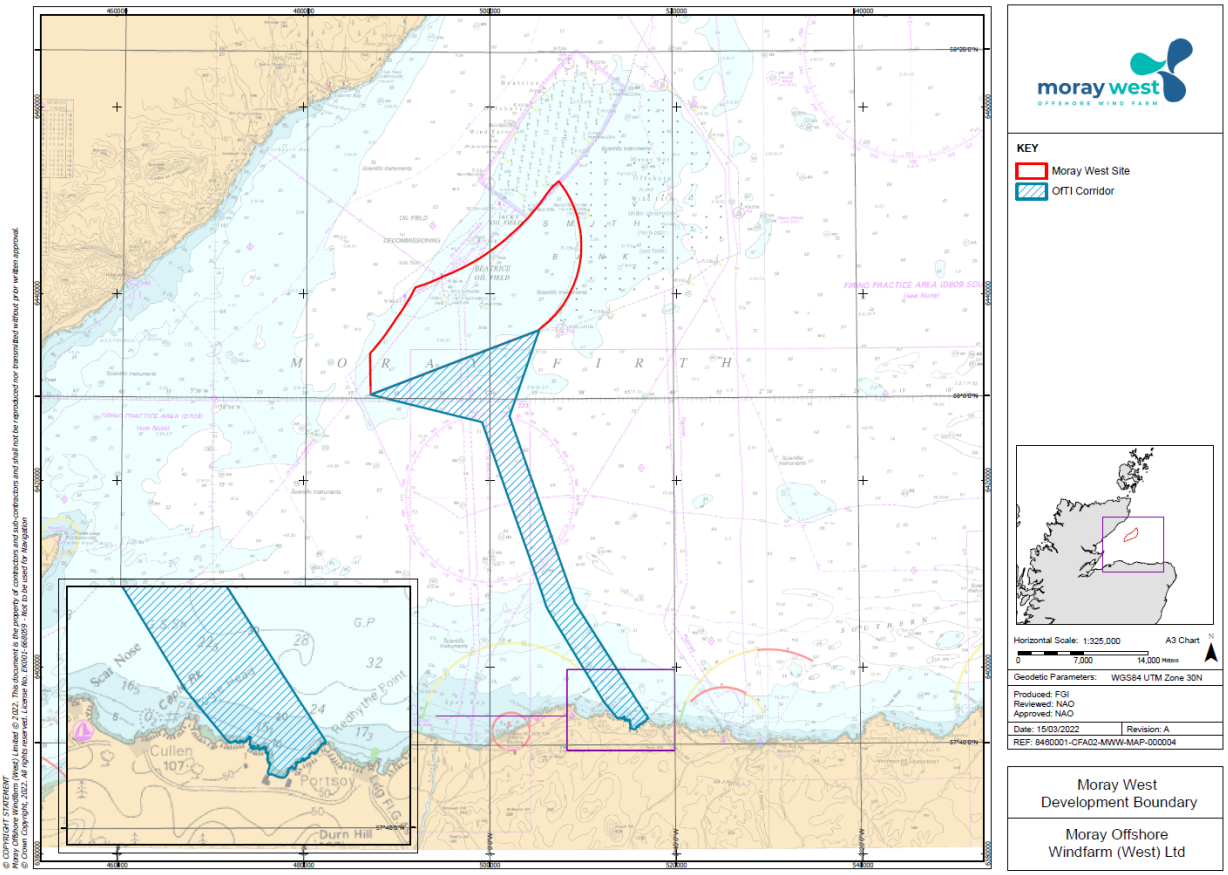


Figure 2-1 Moray West Offshore Wind Farm (Moray West) Site and OfTI Corridor.

1.2 Purpose of this report

As detailed in the Moray West Export Cable Plan (ECP) (8460005-DBHA11-MWW-PLN-000001), where the minimum Depth of Lowering (DoL) cannot be achieved using trenching during installation of the Offshore Export Cable (OEC), remedial protection such as the use of rock berms, rock bags and/or concrete mattresses will be employed.

As detailed engineering has progressed, it has been identified that in order for any nearshore rock berms to withstand hydrodynamic forces for the duration of the design life, a heavier weight of rock than originally expected may be required in some inshore areas. If this is the case, there may be a requirement to use rock of up to 400mm maximum diameter, which is larger than the maximum diameter currently permitted under the existing OfTI Marine Licence (with a 200mm maximum size covered currently).

Therefore in order to undertake this necessary activity, which will reduce the likelihood of remedial cable protection repair work to be carried out over the Operations and Maintenance (O&M) period, a variation to the existing OfTI Marine Licence is requested from Marine Directorate Licensing Operations Team (MD-LOT) under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009.

The information contained within this report is presented in support of the Marine Licence variation application to MD-LOT for the required OEC protection works. This document is intended to provide the necessary information to MD-LOT (and statutory advisers, where relevant) to facilitate the Marine Licence decision-making process. The report should be read in conjunction with the approved Moray West Export Cable Plan (ECP) (8460005-DBHA11-MWW-PLN-000001).

2 Description of the Proposed Works

The following section provides a description of the proposed rock berm cable protection, as set out in the Moray West Export Cable Plan (ECP). The options for using rocks with greater weight and larger diameter are presented. The potential effects of using larger diameter rocks for the rock berm cable protection are described in Section 3.

2.1 Remedial Cable Protection

As detailed in the Moray West Export Cable Plan (ECP), where the minimum cable Depth of Lowering cannot be achieved using trenching during installation of the OEC, remedial protection such as the use of rock berms, rock bags and/or concrete mattresses will be employed. The final achieved (i.e., as-built) burial profile for the OECs will be provided by the cable installation contractor once cable installation and post-lay survey have been completed.

In the shallower parts of the route where the water depth is <20 m LAT, alternative berm designs may be required with slide slopes varying between 1 in 3 and 1 in 5 in order to provide berm stability over the design life from hydrodynamic forces. In these areas, it can be necessary to install both filter and heavier armour layers (two-layer rock berms) in order to meet the design requirements (Figure 2-1).

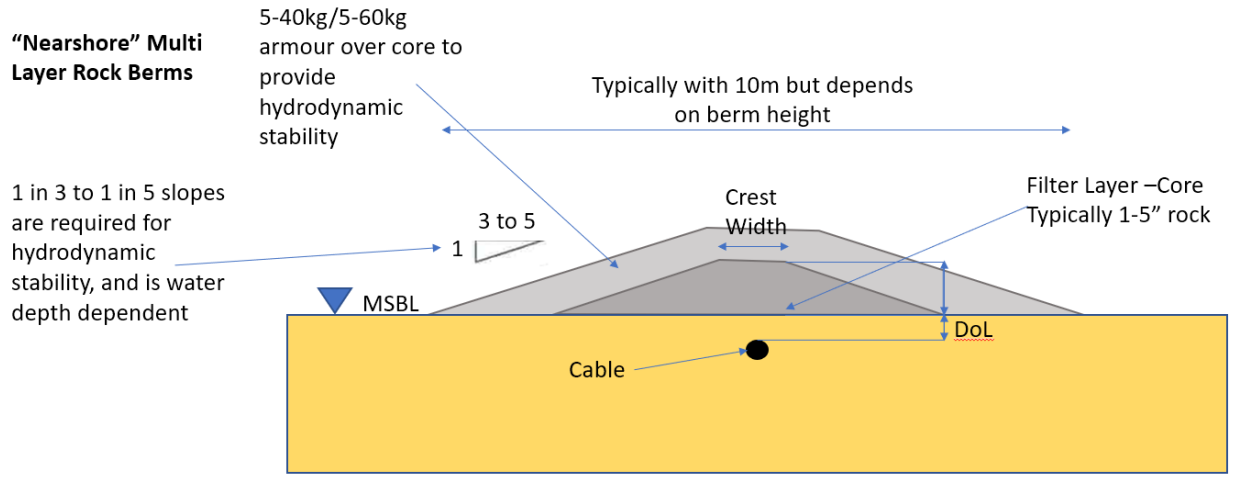


Figure 2-1 Example schematic of a nearshore multi-layer rock berm.

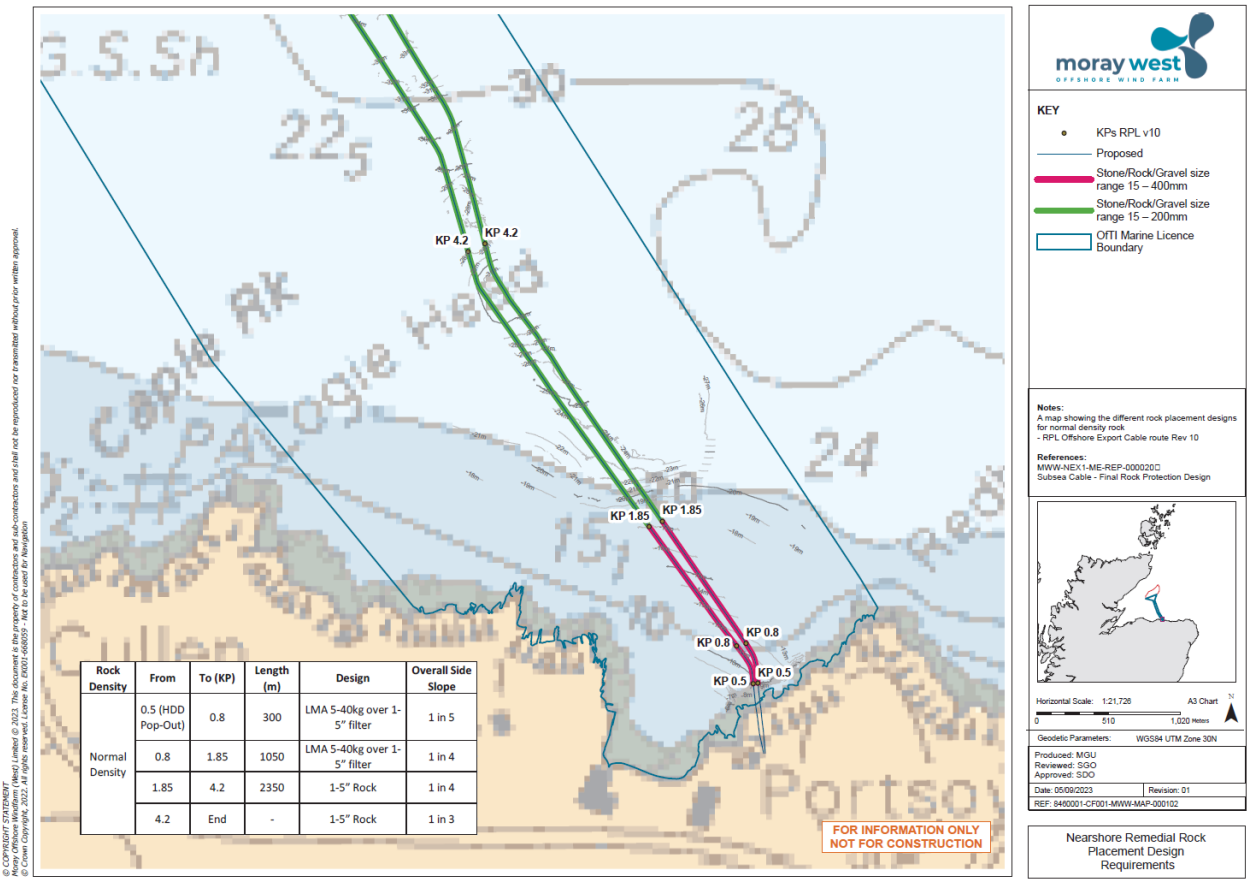
The details of rock berm installation methods, dimensions and parameters as set out in the Moray West ECP remain unchanged but for one aspect: the maximum size of the rock grading to be used in the armour layer of two- layer rock berms.

Following completion of detailed engineering including acquisition of further location specific metocean data collected during 2022 by Moray West, it has been identified that if the cables cannot be buried to minimum DoL using trenching alone, and mechanical protection is required, then heavier rock than originally planned will be required to ensure stability against hydrodynamic loading that would be placed

on the protection (i.e. during storm events) in the very nearshore area. If this heavier rock grading is not used in the nearshore area, the outcome can be expected that during the operational life of the cables, further remedial rock placement to repair any rock berms that have become displaced by the hydrodynamic forces would be required each time the conditions arise. This would present an unacceptable risk to the cable and to other users of the sea. As such, to mitigate these risks, it is important to ensure that the rock berms are constructed of a suitable rock grading for the hydrodynamic environment in which they are placed for the design life of the project.

Where this is required (Figure 2-2), there are two options available to achieve the weight needed. One option is to achieve the additional weight required by using high density rock with a maximum 200mm diameter for this purpose. This would already be permitted under the existing OfTI Marine License. However, the supply of appropriate high-density rock is limited to a small number of quarries, and there a possibility that this option will be unavailable at the point in time at which Moray West needs to source the rock. In this situation, there will be a need to source normal density rock of a larger maximum size (400mm) to achieve the required weight, and therefore a second option is necessary to permit the use of 400mm rock.

If 400mm size rock is used for the armour layer of the two-layer rock berms, Moray West commits to remaining within all other worst-case parameters of the rock berm protection that have already been assessed and consented. This includes the total rock protection footprint, the rock berm height and width, and the rock berm slope angles.



Rock Density	From	To (KP)	Length (m)	Design	Overall Side Slope
Normal Density	0.5 (HDD Pop-Out)	0.8	300	LMA 5-40kg over 1-5" filter	1 in 5
	0.8	1.85	1050	LMA 5-40kg over 1-5" filter	1 in 4
	1.85	4.2	2350	1-5" Rock	1 in 4
	4.2	End	-	1-5" Rock	1 in 3

Figure 2-2 Area where 400mm diameter rock may be required

2.2 Programme

The cable laying works programme would not change as a result of the use of heavier rock for two-layer rock berms.

2.3 Summary of changes

There are sections of the inshore area of the OEC, already identified in the approved ECP as potentially requiring two-layer rock berm remedial protection. If high density rock of maximum 200mm diameter cannot be acquired for this purpose, then larger maximum 400mm diameter rock will be required to achieve to desired weight of individual rocks making up the armour layer of the two-layer rock berm. This increase to 400mm rock size is not covered under the maximum 200mm rock size allowed for in the current OfTI Marine License. Therefore, the variation application is to permit the use of rock up to a maximum of 400mm diameter.

The preferred approach is to use no mechanical protection for the OEC where possible and the preference hierarchy for OEC cable installation methods is as follows:

- Option 1: trench to achieve DoL;
- Option 2: repeat trench to achieve DoL;
- Option 3: mechanical protection using high density 200mm rock or 400mm rock.

If it is required, the larger 400mm rock size would only be used out to approximately KP1.85 (which is approximately 1.35km from the HDD punchout location, because KP0 is at the onshore Transition Joint Bay) as shown in Figure 2-2.

Furthermore, before installing any rock placement, Moray West will undertake remedial trenching activities and will also undertake a review of the overall protection achieved which will include optimisation of the DoL where feasible, however this review will also need to take account of the expected seabed mobility and relevant survey tolerances.

As a result of the proposed variation there would be no changes to:

- Total volume of rock used (no application to vary the permitted volume of rock is being submitted);
- Area of seabed disturbance; or
- Rock berm dimensions or slope angles.

This change will reduce the likelihood of:

- An unacceptable decrease in the depth of burial or cables becoming exposed on the seabed;
- The need for additional remedial cable protection being required during the O&M phase of the Project; and
- The consequence of additional vessel traffic and interaction with fishing activity associated with the above additional cable protection .

3 Assessment of Potential Effects

The Environmental Impact Assessment (EIA) submitted in support of the application for the Development (Moray Offshore Windfarm (West) Limited, 2018[1]) (hereafter referred to as the Moray West EIA) assessed the potential effects of the remedial rock berm protection for the OEC. The assessment is summarised and, where required, updated here. The following receptors are considered to be potentially impacted by OEC rock berm protection:

- Physical processes and water quality – changes to the tidal regime, changes to the wave regime, changes to sediment transport and sediment transport pathways, scour of seabed sediments, Impacts to designated marine and coastal geomorphological features (due to operation), Impacts to recreational surfing venues (due to operation), Impacts to stratification fronts (due to operation), Impacts to Smith Bank (due to operation);
- Benthic and intertidal ecology – Long term habitat loss, scouring of benthic habitats at foundations and around cables, creation of new substrate and habitat;
- Fish and shellfish ecology – Long term habitat loss, Creation of new substrate and habitat;
- Marine mammal ecology – Reduction in prey availability;
- Offshore ornithology – Indirect effects (prey species and habitat loss);
- Commercial fisheries – Safety issues for fishing vessels, Obstacles on the seabed;
- Shipping and navigation – Anchor interaction and snagging; and
- Archaeology and cultural heritage – Destabilisation of marine archaeology assets through changed hydrography and sedimentary regimes.

Potential effects on the following receptors are not considered further in this document as there are no potential impact pathways associated with rock berm protection, or in the case of socio-economics, tourism and recreation the overall effect on the receptor during construction was identified in the Moray West EIA as beneficial:

- Military and civil aviation;
- Seascape, landscape and visual; and
- Socio-economics, tourism and recreation.

3.1 Physical Processes and Water Quality

The potential for rock berm protection to affect physical processes and water quality receptors arises from the potential for alterations to the following pathways: the tidal regime, the wave regime, and sediment transport pathways. As described in the Moray West EIA, potential of rock berm protection on these pathways is a function of the following rock berm parameters:

- The height of the rock berm (m)

[1] Moray Offshore Windfarm (West) Limited (2018) Volume 2: Offshore EIA Report

- The width of the rock berm (m)
- The slope of the rock berm
- The total length of OEC requiring rock berm protection (km)
- The location the of the lengths of OEC requiring rock berm protection (km)

Given that none of these parameters will change relative to the previously consented parameters if larger rocks of 400mm size are used, there remains no significant effect of cable protection on physical processes and water quality, as set out in the Moray West EIA.

3.2 Benthic and intertidal ecology; Fish and shellfish ecology; Marine Mammal Ecology; Offshore Ornithology; Designated Sites; Shipping and navigation; Archaeology and cultural heritage; Other human activities

The potential for rock berm protection to affect these receptor groups arises from the following rock berm parameters:

- The height of the rock berm (m);
- The width of the rock berm (m);
- The slope of the rock berm (expressed as the ratio between height and width e.g. 1 in 3);
- The total length of OEC requiring rock berm protection (km); and
- The locations of the individual lengths of OEC requiring rock berm protection (KPs).

Given that none of these parameters will change relative to the previously consented parameters if larger rocks of 400mm size are used, there is no change to any of the impacts assessed in the Moray West EIA.

3.3 Commercial fisheries

For areas where the minimum DoL is not achieved (and remedial protection has been installed), where high density fishing activity occurs and where substantial lengths of the OECs have required mechanical protection, Moray West will be required to provide methodologies to undertake targeted overtrawl surveys. The appropriate methodologies will be discussed with the local fishing industry and agreed with the Licencing Authority. Moray West will liaise with commercial fisheries stakeholders and are committed to discuss the methodologies for overtrawl surveys with those stakeholders. Once as-built information is available, this can be provided for review. Following the review of the as-built information, Moray West will discuss the scope and timings of overtrawl trials, should they be required.

The primary drivers of overtrawl risk of rock berms are expected to be the slope angles, berm height. In this case, the berm height and slope angle remains unchanged as per the ECP.

Whilst rock size may have a bearing on trawling risk, the change in size of rock to be used in some inshore sections of the OEC rock berm protection from 200mm to 400mm is not expected to materially affect the snagging risk for commercial fishing gear. However, this change will be communicated to the SFF for feedback in ongoing discussion on overtrawl trial methodologies.

It is noted that this rock size has been used as remedial cable rock protection on other nearby projects including the Moray East Offshore Windfarm OEC and the Caithness Moray HVDC transmission cable.

3.4 Cumulative effects

Cumulative effects were considered within the Moray West EIA and the conclusions are still considered to be valid as the OEC protection works considered within this report are not an addition to those assessed within the Moray West EIA Report. Due to lack of change in the key rock berm parameters that have the capacity to cause impacts on receptors, no new or different cumulative effects with other works, or with the overall construction works associated with the Development, are anticipated.

4 Conclusions

This document has been prepared to support a Marine Licence variation for works within the OfTI Corridor. The cable laying works will commence from October 2023 and will take place over an approximately seven month period, subject to typical constraints such as weather and fall pipe vessel availability. Consideration has been given to the potential impacts expected because of the change in the size of rock used for two-layer rock berm cable protection in inshore areas on the associated receptors. No change to the nature or scale of the impacts of the works alone or cumulatively will occur beyond those already assessed and consented in the Moray West EIA.