

The logo for Moray East Offshore Windfarm features a large, stylized sun or gear icon in the background, composed of light blue and white segments. The text 'MORAY EAST' is in a bold, dark blue sans-serif font, with the 'O' in 'MORAY' containing a small blue circle. Below it, 'OFFSHORE WINDFARM' is in a smaller, light blue sans-serif font.

# **MORAY EAST**

## **OFFSHORE WINDFARM**

**Offshore Substation Platforms**

**Marine Licence**

**Statement Regarding Implications for the ES and HRA**

**April 2017**

Moray Offshore Windfarm (East) Limited





**Copyright © 2017 Moray Offshore Windfarm (East) Limited**

All pre-existing rights reserved.

## Table of Contents

List of Abbreviations.....	4
1 Introduction.....	5
2 Project Envelope.....	6
2.1 Development Scenarios.....	6
3 Effects of Changing the OSP Design .....	8
3.1 Physical Environment .....	8
3.1.1 Hydrodynamic, Sedimentary and Coastal Processes .....	8
3.2 Biological Environment.....	9
3.2.1 Benthic.....	9
3.2.2 Fish and Shellfish Ecology.....	11
Marine Mammals .....	13
3.2.3 Ornithology.....	15
3.3 Human Environment .....	16
3.3.1 Commercial Fish .....	16
3.3.2 Shipping and Navigation.....	19
Archaeology.....	20
3.3.3 Seascape, Landscape and Visuals.....	21
3.3.4 Other Human Activities .....	22
4 Conclusion .....	25
5 References.....	26

## List of Figures

Figure 2-1: Modified OfTI Boundary.....	7
Figure 2-2: Marine Licence Application Boundary .....	7

## List of Tables

Table 2-1: OSP Design Parameters .....	6
Table 3-1: Hydrodynamic, Sedimentary and Coastal Processes Assessment (section 3.1.2 –Modified TI ES 2014).....	8
Table 3-2: Benthic Assessment (section 4.1.2 – Modified TI ES 2014).....	9
Table 3-3: Fish and Shellfish Ecology Assessment (section 4.2.2 – Modified TI ES 2014).....	11
Table 3-4: Marine Mammals Assessment (section 4.3.2 – Modified TI ES 2014) .....	13
Table 3-5: Ornithology Assessment (section 4.4.2 – Modified TI ES 2014).....	15
Table 3-6: Commercial Fish Assessment (section 5.1.2 – Modified TI ES 2014) .....	16
Table 3-7: Shipping and Navigation Assessment (section 5.2.2 – Modified TI ES 2014).....	19
Table 3-8: Archaeology Assessment (section 5.4.2 – Modified TI ES 2014).....	20
Table 3-9: Other Human Activities Assessment (section 5.7.2 – Modified TI ES 2014) .....	22

## List of Abbreviations

<b>AC</b>	Alternating Current
<b>EMF</b>	Electromagnetic Field
<b>ES</b>	Environmental Statement
<b>FIR</b>	Fisheries Industry Representative
<b>FLO</b>	Fisheries Liaison Officer
<b>HRA</b>	Habitats Regulations Assessment
<b>HVAC</b>	High Voltage Alternating Current
<b>IMR</b>	Inspection, Maintenance and Repair
<b>ML</b>	Marine Licence
<b>MFCFWG</b>	Moray Firth Commercial Fisheries Working Group
<b>NtM</b>	Notice to Mariners
<b>OftI</b>	Offshore Transmission Infrastructure
<b>OSP</b>	Offshore Substation Platform
<b>TI</b>	Transmission Infrastructure
<b>WSI</b>	Written Scheme of Investigation

## 1 Introduction

Moray Offshore Renewables (now called Moray Offshore Windfarm (East) Limited (known as Moray East)) was granted a Marine Licence (ML) on the 25 September 2014 for the Moray East Modified Offshore Transmission Infrastructure (Modified OfTI). This Modified OfTI is required for the Telford, Stevenson and MacColl offshore wind farms which were granted Section 36 consents under the Electricity Act in March 2014 and MLs in September 2014.

The Works permitted under section 2.2 of Marine Licence 04630/13/0 allows for:

*“Modified Offshore Transmission Infrastructure containing up to 2 AC Offshore Substation Platforms (“OSP’s”), substructure and foundations for the OSPs, inter-platform cabling within the three consented Telford, Stevenson and MacColl wind farms and up to 4 triplecore submarine HVAC export cables between the OSPs and the shore”.*

As part of project optimisation design and as a result of recent development of Offshore Substation Platform (OSP) technology Moray East now requires to use up to four distributed OSPs as part of the project’s Modified OfTI. Although the number of OSPs is higher than the original permitted design, the actual footprint and overall design parameters of four distributed OSPs are still within the original project parameters assessed in 2014 for the two AC OSPs. This is on the assumption that the two OSPs permitted under the modified OfTI ML 2014 are no larger than the two OSPs for which consent is sought under the current ML application.

As a result, Moray East is applying for a new ML for two additional distributed OSPs to accommodate this change in design. This Environmental Report illustrates that the revised design is within the original project envelope which was assessed within the 2014 Environmental Statement, and therefore does not represent a material change requiring a revised Environmental Statement. This Environmental Report has been prepared to accompany the ML application for two additional distributed OSPs. This Environmental Report demonstrates that the proposed OSPs (including the two additional OSPs) would remain within and are consistent with the conclusions of the Modified TI Environmental Statement (ES) (Modified TI ES 2014) and that no new significant additional effects would arise.

It is acknowledged that the submission of the application for two further OSPs potentially engages the Marine Works (Environmental Impact Assessment) Regulations 2007. This would be a variation to a project which had already been determined to be Annex II development. However, on the basis of the above analysis, it has been concluded that the proposed change or extension does not meet the criteria set out in paragraph 13(a) of Annex II of the Directive and therefore does not require a further Environmental Impact Assessment. Furthermore, this change would not result in any significant adverse effect on any European site.

## 2 Project Envelope

The following table provides a description of the worst case parameters assessed in the Modified TI ES 2014 (see section 2.2.3.1) and the revised parameters associated with the distributed OSP design parameters. In the Modified OfTI ML, it was assumed up to two AC OSPs would be required. This application if granted would permit a further two distributed OSPs. This would mean that a maximum of four distributed OSPs could be located within the Moray East site but only where the two OSPs permitted under the Modified TI ML 2014 have parameters that are no larger than the two distributed OSPs which are the subject of the current application (see Table 2-1 below). The use of conditions in both MLs requiring the approval of Design Specification and Layout Plans prior to the commencement of construction will ensure that the parameters are no greater than the assessed worst case parameters permitted in the Modified OfTI ML 2014 in the event that more than two OSPs are proposed to be constructed.

**Table 2-1: OSP Design Parameters**

Design Parameter	Modified OfTI ML	Distributed OSPs	Assessed worst case parameters
Indicative topside width x length	100 x 100 m	50 x 50 m	100 x 100 m
Indicative maximum height above LAT	70 m	70 m	70 m
Substructure type	Jacket or Jack-up	Jacket	n/a
Jacket base width	Up to 100 m	Up to 40 m	Up to 100 m
Number of legs per substructure	6 (jacket) 4 (jack-up)	4	6
Number of piles per substructure	6 piles (jacket) 16 piles (jack-up)	8 piles	A total of 32 piles (required for 2 jack-up substructures)
Diameter of piles	3 m	3 m	3 m
Length of piles	60 m	60 m	60 m
Scour protection around each leg plus pile diameter	16 m	16 m	16 m
Diameter of suction caissons	20 m	n/a	20 m
Scour protection around each leg plus suction caisson diameter	40 m	n/a	40 m
Voltage	220 kV	33, 66 or 220 kV	220 kV
Maximum inter-platform length	70 km	70 km	70 km

### 2.1 Development Scenarios

Two development scenarios are currently being considered:

- Construction of up to two OSPs up to the maximum design parameters under OfTI ML; or
- Construction of up to four distributed OSPs within the maximum design parameters detailed under Table 2-1 for distributed OSPs built out under both the Modified OfTI ML 2014 and current OSP ML application.



In terms of the Modified OfTI ML 2014 the two AC OSPs can be installed within any of the Telford, Stevenson and MacColl offshore wind farm sites (Figure 2-1). The two additional distributed OSPs would also be located within the same area as shown in Figure 2-2 below.

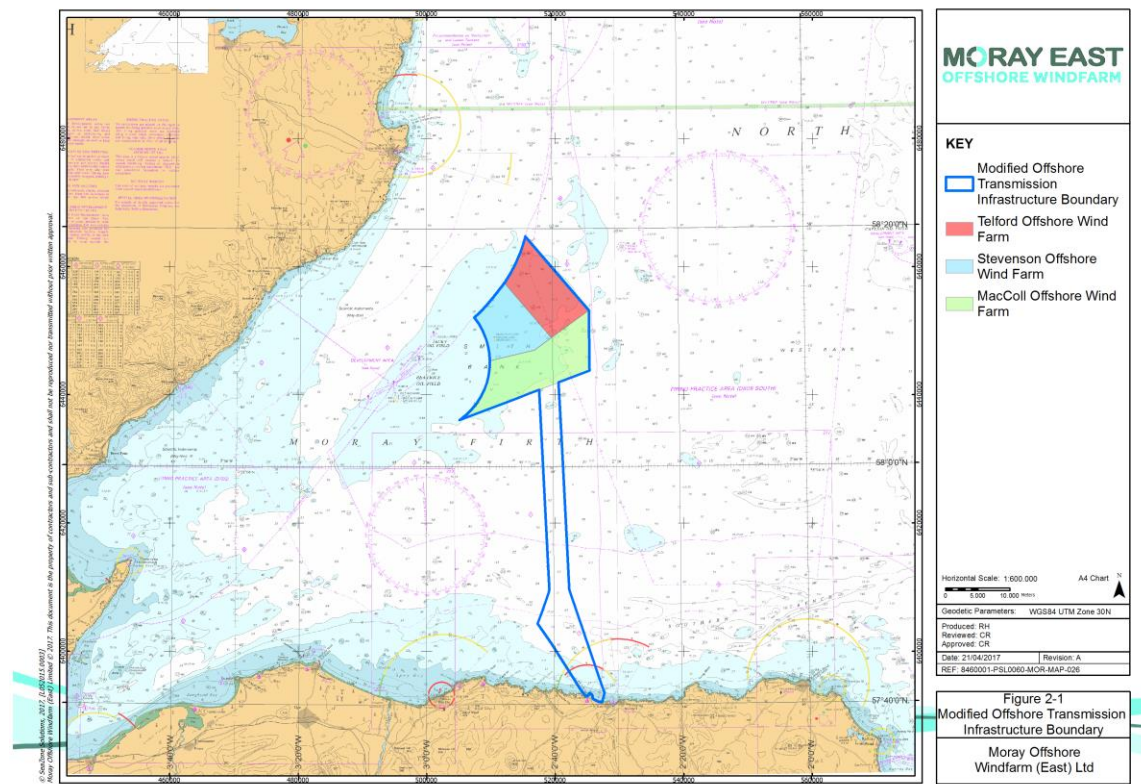


Figure 2-1: Modified OfTI Boundary

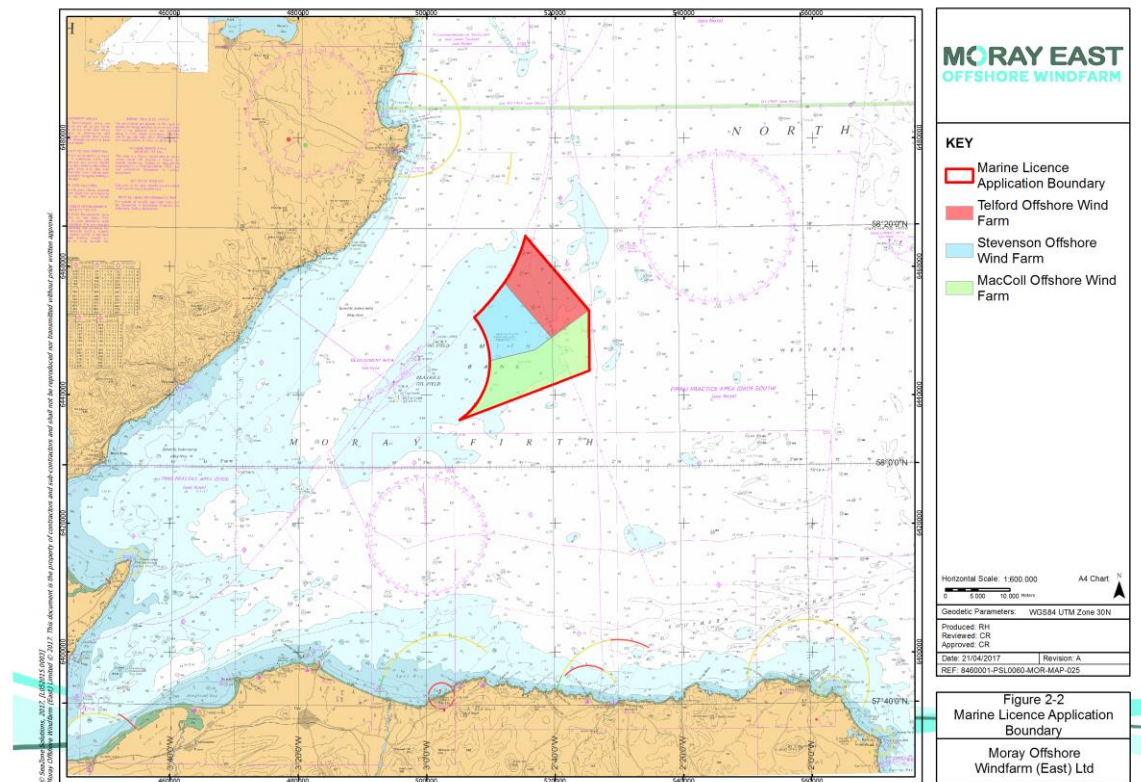


Figure 2-2: Marine Licence Application Boundary

### 3 Effects of Changing the OSP Design

The distributed OSPs are smaller structures / or the same when compared with the ‘traditional’ OSPs and the following can be concluded based on the parameters in Table 2-1:

- The indicative topside length and width for each distributed OSP is up to 50 m compared to up to 100 m for each ‘traditional’ OSP. Therefore two ‘traditional’ OSPs would equate to a combined area of up to 20,000 m<sup>2</sup> whilst the combined area of four distributed OSPs would equate to up to 10,000 m<sup>2</sup>.
- The jacket base width for each distributed OSP is up to 40 m compared to up to 100 m for each ‘traditional’ OSP. Therefore two ‘traditional’ OSPs would equate to a combined width of up to 200 m whilst four distributed OSPs would equate to up to 160 m.
- The maximum number of piles considered for the two ‘traditional’ OSPs was 32 (16 piles per jack-up foundation), whilst the maximum number of piles for the four distributed OSPs would also be 32 (8 piles per jacket foundation).
- The maximum voltage for the ‘traditional’ OSPs and the distributed OSPs is still considered to remain the same (at up to 220 kV).

The baseline and methodologies for assessing relevant environmental impacts, including approach to cumulative impact assessment (CIA), have not changed significantly since 2014 (for further details see Moray East Offshore Wind Farm - Alternative Design Parameters Scoping Report (Moray East, 2017)) although it is noted that the Beatrice Offshore Windfarm has commenced construction for a lower (84) number of turbines than originally consented (140/125 turbines depending on the circumstances).

The following tables list the effects assessed as relevant to the OSPs, the project envelope scenarios assessed, the mitigation measures and the pre- and post-mitigation effect.

#### 3.1 Physical Environment

##### 3.1.1 Hydrodynamic, Sedimentary and Coastal Processes

**Table 3-1: Hydrodynamic, Sedimentary and Coastal Processes Assessment (section 3.1.2 –Modified TI ES 2014)**

Type of Effect Assessed	Project Envelope Scenario Assessed	Mitigation	Pre-Mitigation and Post-Mitigation Effect
<b>Construction</b>			
Increase in suspended sediment concentrations as a result of OSP installation activities	Two OSPs. Foundation type assessed – jack-up.	None	Minor significance
<b>Operation</b>			
Changes to the tidal and wave regimes.	Two OSPs. Foundation type assessed – jacket	None	Negligible significance
Changes to the sediment transport regime due to the presence of the OSP foundations	Two OSPs. Foundation type assessed – jack-up.	None	Negligible significance
Scour effects due to the presence of the OSP foundations	Two OSPs. Foundation type assessed – jack-up.	Scour protection	Minor significance Negligible significance (post-mitigation)

The Modified TI ES 2014 (section 3.1.2.15) concluded that *“The final locations of these two OSP structures have not yet been established, but do not influence the overall outcome of the assessments due to their relatively small scale when compared to the offshore wind farm infrastructure”*. Although it is proposed that the number of OSPs will increase to four, the maximum base width of the distributed OSPs is 40 m, as opposed to 100 m. Thus, the total combined base width of the distributed OSP jackets will be 160 m, compared to the 200 m of the total combined base width of the two modified OFTI jackets. Therefore, the maximum dimensions of the distributed OSPs are within the maximum dimensions of the original design which were assessed and the effects will be within those of the original assessment.

## 3.2 Biological Environment

### 3.2.1 Benthic

**Table 3-2: Benthic Assessment (section 4.1.2 – Modified TI ES 2014)**

Type of Effect Assessed	Project Envelope Scenario Assessed	Mitigation	Pre-Mitigation and Post-Mitigation Effect
<b>Construction</b>			
Temporary direct seabed disturbance	<p>Maximum footprint= 1.76 km<sup>2</sup> based on:</p> <ul style="list-style-type: none"> <li>Length of cable corridor from boundary of three consented wind farm sites to landfall site – 52 km (not including micro-siting allowance);</li> <li>Number of cable trenches = 4;</li> <li>Width of trench affected area = 6 m;</li> <li>Length of OFTI cable within three consented wind farms (including inter-platform cabling = 70 km);</li> <li>Area of seabed prepared for each OSP – 7,536 m<sup>2</sup>;</li> <li>Maximum number Ac OSPs = 2 (installed at least one year apart);</li> <li>Vessel anchors – 36,000 m<sup>2</sup>; and</li> <li>Jack-up vessel footprint of 420 m<sup>2</sup> per installation.</li> </ul> <p>The seabed preparation is based on the use of suction buckets.</p>	None	Minor
Temporary increases in SSC's and sediment deposition	<p>Fine sediment arising from installation of four export cables from the boundary of the three consented wind farms to landfall (although these will be temporally separated) (total length 208 km), inter-platform cables and cabling up to the boundary of the three consented wind farms (total length 70 km) via jetting and seabed preparatory works for suction bucket foundations for the two OSPs transported and dispersed via tidal currents and wave events as described within Chapter 3.1 Hydrodynamics, Sedimentary and Coastal Processes.</p>	n/a	Minor

Type of Effect Assessed	Project Envelope Scenario Assessed	Mitigation	Pre-Mitigation and Post-Mitigation Effect
Seabed contamination as a result of accidental spillage of chemicals	The construction window is five years in which time there will be 72 vessel movements and 255 total vessel working days associated with the OSP, interplatform and export cable installations (indicative vessel movements). Maximum increase in vessel activity over the maximum construction timeframe provides for highest potential for accidental spills.	Adherence to EMP	Up to major Negligible post mitigation
<b>Operation</b>			
Permanent net reduction of original habitat	<p>Total footprint = 0.1 km<sup>2</sup> based on:</p> <ul style="list-style-type: none"> <li>Area per OSP foundation and scour material = 7,536 m<sup>2</sup>;</li> <li>Cable protection (assuming protection is required to a distance of 100 m from each OSP foundation to a width of 10 m and up to 20 "J" tubes (or cable connections) per OSP = 20,000 m<sup>2</sup>;</li> <li>Number AC OSPs = 2;</li> <li>Nominal area of cable protection material required along each export cable = 11,000 m<sup>2</sup>;</li> <li>Number of export cables = 4; and</li> <li>Use of rock cutting equipment in water depths &lt;10 m.</li> </ul> <p><i>Rationale</i></p> <p>Net loss of seabed habitat is assessed as the total area of seabed occupied by OSP foundations, scour material and cable protection material on completion of the construction phase. However, it is acknowledged that there will be an incremental loss of seabed habitat throughout the construction phase as the OSPs and associated cable protection will be installed at yearly intervals.</p>	None	Minor
Habitat and associated community change	<ul style="list-style-type: none"> <li>Number AC OSPs = 2;</li> <li>Cable protection (assuming protection is required to a distance of 100 m from the foundation to a width of 10 m and up to 20 "J" tubes (or cable connections) per OSP = 20,000 m<sup>2</sup>;</li> <li>Number of export cables = 4; and</li> <li>Nominal area of cable protection material required along each export cable = 4,000 m<sup>2</sup>.</li> </ul> <p><i>Rationale</i></p> <p>The introduction of OSP foundations, scour and cable protection material will provide localised hard substrata for colonisation by encrusting and attaching species changing the predominately sedimentary communities to hard substrata communities within the footprint of the infrastructure.</p>	None	Minor



The benthic assessments are based on the footprint of the two Modified OfTI OSPs. Although the number of OSPs is increasing to four, the total footprint of the OSPs is consistent with the maximum dimensions of the original design which was assessed, so the effects of the distributed OSPs will be consistent with the original assessment.

### 3.2.2 Fish and Shellfish Ecology

**Table 3-3: Fish and Shellfish Ecology Assessment (section 4.2.2 – Modified TI ES 2014)**

Type of Effect Assessed	Project Envelope Scenario Assessed	Mitigation	Pre-Mitigation and Post-Mitigation Effect
<b>Construction</b>			
Temporary disturbance to seabed (increased suspended sediment concentrations and sediment re-deposition)	<p>Up to 6-legged Jacket foundations (suction caissons):</p> <ul style="list-style-type: none"> <li>Maximum number of OSPs: 2 AC</li> <li>Maximum number of suction caissons per OSP: 4</li> <li>Maximum suction caisson diameter: 20 m</li> </ul> <p>Drilling to facilitate pin pile installation:</p> <ul style="list-style-type: none"> <li>Pile diameter: 3 m</li> </ul> <p>Cable installation by energetic means (i.e. jetting):</p> <ul style="list-style-type: none"> <li>Inter-platform cable installation: 220 kV AC</li> <li>Maximum number of trenches: 1</li> <li>Target trench depth: 1 m</li> <li>Trench affected width per trench: 6 m</li> <li>Maximum interplatform cabling length: 70 km of 220 kV HVAC cable for inter-platform cables and cabling up to the boundary of the three consented wind farms</li> </ul> <p>Offshore Export Cables installation:</p> <ul style="list-style-type: none"> <li>Maximum number of export cables: 4</li> <li>Maximum number of cable trenches: 4</li> <li>Cable route length from wind farm to shore: 52 km from edge of three consented wind farms</li> </ul>	None	<p><b>Adult &amp; Juvenile Fish and Shellfish</b> Negative, Minor, Unlikely</p> <p><b>Diadromous Fish</b> Negative, Minor Unlikely (general) Probable (salmon &amp; sea trout)</p> <p><b>Fish and shellfish which lay eggs on the seabed (herring, sandeels and squid)</b> Negative, Minor Unlikely (general) Probable (salmon &amp; sea trout)</p>
Habitat Loss (temporary physical disturbance)	<p>Maximum area of physical disturbance during construction for the Modified OfTI:</p> <ul style="list-style-type: none"> <li>Maximum number of suction caissons per OSP: 4</li> <li>Maximum suction caisson diameter: 20 m</li> <li>Maximum scour protection diameter per OSP: 40 m</li> </ul>	None	Negative, Not significant, Unlikely

Type of Effect Assessed	Project Envelope Scenario Assessed	Mitigation	Pre-Mitigation and Post-Mitigation Effect
Noise Impact Piling for installation of OSPs	Maximum number of OSPs: 2 AC Maximum pile diameter: 3 m Maximum Number of piles for foundations: 16 piles for 8-legged jacket	Soft start piling	<b>Plaice</b> Negative, Not significant, Probable  <b>Salmon &amp; sea trout</b> Negative, Minor, Probable  <b>Cod, Whiting, Herring, Larvae &amp; Glass Eels, Shellfish</b> Negative, Minor, Probable
<b>Operation</b>			
EMFs	Inter-platform cabling: <ul style="list-style-type: none"> <li>Type: 220 kV AC</li> <li>Maximum number of OSPs: 2 AC</li> <li>Maximum number of trenches: 2</li> <li>Maximum number of cables in a trench: 2</li> <li>Maximum cabling length: 70 km of 220 kV HVAC cable for inter-platform cables and cabling up to the boundary of the three consented wind farms</li> <li>Target trench depth: 1 m</li> </ul>	Cable burial / protection	<b>Elasmobranchs, European Eel, Salmon &amp; Sea Trout</b> Negative, Minor, Probable  <b>River and Sea Lamprey, Other fish species, Shellfish species</b> Negative, Minor, Unlikely
Changes to Fishing Activity	Maximum number of OSPs: 2 AC Maximum inter-platform cable length: 70 km of 220 kV HVAC cable for inter-platform cables and cabling up to the boundary of the three consented wind farms Maximum offshore export cables length: 52 km	None	<b>General (All)</b> Negative, Not significant, Unlikely

As stated in section 4.2.2.16 of the Modified TI ES 2014: “[i]n general terms, it is considered that the installation of the maximum number of cables and OSPs constitutes the worst case scenario, as this would result in the greatest footprint, duration and frequency of modified OfTI installation operations”. As the footprint of the distributed OSPs is within the worst case scenario assessed in the Modified TI ES 2014, and the worst case scenario for the number of piles to be installed is also the same (i.e. 32 piles with a 3 m diameter), the effects of the distributed OSPs will be consistent with the original assessment.

In addition, it can also be concluded that this change would also not result in any significant adverse effect on any European site.

*Marine Mammals*

**Table 3-4: Marine Mammals Assessment (section 4.3.2 – Modified TI ES 2014)**

Type of Effect Assessed	Project Envelope Scenario Assessed	Mitigation	Pre-Mitigation and Post-Mitigation Effect
<b>Construction</b>			
Disturbance/ Displacement	<p>Greatest potential cause of disturbance / displacement will be increased noise, in particular from piling, created during construction.</p> <p>Worst case (as modelled) is 32 x 3 m piles from two substations (16 piles per OSP for jackup foundation type).</p>	<p>None additional to JNCC protocol for minimising the risks to marine mammals. Designated vessel routes.</p>	<p>The modelling on which the assessment is based has been undertaken including mitigation measures (JNCC protocol and designated vessel routes) and therefore pre-mitigation effects are not separately identified).</p> <p>No significant long term impact.</p>
Permanent Threshold Shift (PTS - hearing damage)	<p>Greatest potential cause of auditory damage will be from piling noise during construction.</p> <p>Worst case (as modelled) is 32 x 3 m piles from two substations (16 piles per OSP for jackup foundation type).</p>		
Collision Risk	<p>An assessment will be undertaken with respect to anticipated increased vessel traffic around the offshore transmission works, taking account of the use of standard vessel routes which will help to localise effects.</p> <p>A separate review of ducted propeller related injury from vessel movement near haulout sites will be undertaken as part of the impact assessment as described below. It is assumed for this assessment that all vessels associated with the installation of the cable and OSFs will utilise ducted propellers.</p>		
Risk of Corkscrew Injury from use of Ducted Propellers	The Rochdale Envelope scenario assessed assumes that vessels with ducted propellers will be used.		
Reduction in Prey Availability	<p>Secondary impacts as a result of changes in prey distribution or density.</p> <p>Worst case, maximum 70 km of cable for inter platform cables and cabling up to the boundary of the three consented wind farms.</p> <p>Corridor length from the boundary of the three consented wind farms of 52 km; maximum of four trenches; maximum corridor width 1,200 m, 1 m width per trench with associated loss of habitat and impacts of piling on prey availability (32 x 3 m piles for two substations).</p>		
Reduction in Foraging Ability	Secondary effect due to increased suspended sediment associated with construction activities i.e. piling or trenching. Refer to Chapter 3.1: Hydrodynamics, Sedimentary and Coastal Processes of Modified TI ES 2014 details.		

Type of Effect Assessed	Project Envelope Scenario Assessed	Mitigation	Pre-Mitigation and Post-Mitigation Effect
Toxic Contamination	Potential for non-toxic and toxic contamination through accidental spillages and pollution incidents. It is assumed all offshore vessels/ installations will use sacrificial anodes and/ or anti fouling coatings.		
<b>Operation</b>			
Collision Risk and Barrier to Movement	Increased vessel movements associated with maintenance of the cable and OSPs.	Designated vessel routes	Not significant pre- and post- mitigation
Ducted Propellers	The Rochdale Envelope scenario assessed assumes that vessels with ducted propellers will be used.		
Electromagnetic Fields	70 km of 220 kV HVAC cable for inter-platform cables and cabling up to the boundary of the three consented wind farms; and a maximum of 52 km of 220 kV HVAC export cable corridor length.		
Changes in Prey Availability (habitat loss)	<p>Secondary impacts due to changes in prey distribution or density as a result of loss or gains in habitat (refer to Chapter 4.1: Benthic Ecology and 4.2: Fish &amp; Shellfish Ecology of Modified TI ES 2014 for details) due to presence of EMF.</p> <p>Maximum 70 km of cable for interplatform cables and cabling up to the boundary of the three consented wind farms. Corridor length from the boundary of the three consented wind farms of 52 km from the boundary of the three consented wind farms; maximum of four trenches; maximum corridor width 1,200 m, 1 m width per trench</p>		
Toxic Contamination	Potential for non-toxic and toxic contamination through accidental spillages and pollution incidents. It is assumed all offshore vessels /installations will use sacrificial anodes and/or anti fouling coatings.		

The marine mammal assessments for the Modified OfTI were based on the maximum number of piles to be installed (32 piles with a 3 m diameter). This worst case scenario is consistent with the parameters proposed for the distributed OSPs. The number and type of vessels to be utilised for the installation and operation of the OSPs is not yet known but will be consistent with the original assessments (please see section 4.3.1.68 to 4.3.1.70 of the Modified TI ES 2014 for details). The numbers used for installation will be low compared to the existing vessel activity and the numbers used during operation will not represent a significant increase in existing vessel activity within the Moray Firth. Therefore, the effects of the distributed OSPs will be consistent with the original assessment.

Since the submission of the Modified TI ES (Modified TI ES 2014) new evidence that came to light in 2015 in relation to the cause of corkscrew injuries. This evidence (SMRU, 2015 and van Neer *et al.*, 2015) indicates that the corkscrew injuries on juvenile seals are a result of fatal attacks by adult grey seals, as opposed to seals becoming caught in ducted propellers of ships. While previous studies have indicated



that ducted propellers could also cause such injuries, the likelihood of this now being the main cause is very low. Corkscrew injury effects therefore no longer need to be considered.

In addition, it can also be concluded that this change would also not result in any significant adverse effect on any European site.

### 3.2.3 Ornithology

**Table 3-5: Ornithology Assessment (section 4.4.2 – Modified TI ES 2014)**

Type of Effect Assessed	Project Envelope Scenario Assessed	Mitigation	Pre-Mitigation and Post-Mitigation Effect
Construction			
Disturbance	<p>The offshore export cable route corridor (including the area of the three consented wind farms where the OSPs will be located) is shown in Figure 1.1-4 of Volume 3 of Modified TI ES 2014.</p> <p>The worst case scenario estimate for the area of disturbance arising from installation and decommissioning of the OSPs and export cable is 1.76 km<sup>2</sup>.</p> <p>The number and type of vessels to be utilised in OSPs and export cable installation and decommissioning is yet to be confirmed but it is expected to be low in comparison to those normally using the Firth (see Chapter 5.2: Shipping and Navigation of this ES). Installation vessels will travel at slow speeds along predefined corridors.</p>	Wind farm and OfTI vessel corridors.	<p>Minor risk (probable; short-term, temporary).</p> <p>No significant effect predicted.</p> <p>Not significant post mitigation.</p>
Indirect Effects	Piling for OSPs may have the potential to affect fish stocks locally and thus affect those ornithological receptors that prey upon them (see Chapter 4.2: Fish and Shellfish Ecology of this ES).		
Operation			
Disturbance	The number and type of vessels to be utilised in the OSPs operation and maintenance is yet to be decided but will not represent a significant increase in existing vessel activity within the Firth (see Chapter 5.2: Shipping and Navigation of this ES).	Wind farm and OfTI vessel corridors.	<p>Minor risk (probable; medium-term, temporary).</p> <p>No significant effect predicted.</p> <p>Not significant post mitigation.</p>
Displacement	The worst case scenario estimate for the area of displacement arising from the presence of OSPs is 0.02 km <sup>2</sup> .		

The ornithology assessments are based on the footprint of the proposed project being within the export cable route corridor as defined in Modified TI ES 2014. Therefore, although the number of OSPs is increasing to four, the total footprint of the OSPs is consistent with the maximum dimensions of the original design and within the original corridor which was assessed. The number and type of vessels to be

utilised for the installation and operation of the OSPs is not yet known but will be consistent with the original assessments. The numbers used for installation will be low compared to the existing vessel activity and the numbers used during operation will not represent a significant increase in existing vessel activity within the Moray Firth. Therefore, the effects of the distributed OSPs will be consistent with the original assessment.

In addition, it can also be concluded that this change would also not result in any significant adverse effect on any European site.

### 3.3 Human Environment

#### 3.3.1 Commercial Fish

**Table 3-6: Commercial Fish Assessment (section 5.1.2 – Modified TI ES 2014)**

Type of Effect Assessed	Project Envelope Scenario Assessed	Mitigation	Pre-Mitigation and Post-Mitigation Effect
<b>Construction</b>			
Adverse effects on commercially exploited fish and shellfish populations	See Chapter 4.2: Fish and Shellfish Ecology (Modified TI ES 2014) and Table 3-3 above.	None	Minor significance
Disturbance		Soft-start piling	Minor significance
Noise			
Temporary loss or restricted access to fishing grounds	<p>Maximum loss of fishing grounds resulting from maximum number of safety zones around construction works.</p> <p>The maximum number of infrastructure to be constructed will result in the highest number of safety zones:</p> <ul style="list-style-type: none"> <li>Maximum number of OSPs in the area of the three consented wind farms with jacket substructures – two 100 x 100 m</li> <li>Inter-platform cable route length plus to export cable to wind farm boundary – approximately 70 km</li> <li>Offshore export cable route length from the southern boundary of the MacColl wind farm – approximately 52 km</li> <li>Maximum number of export cables – 4</li> <li>Maximum width of export cable trenches – 4 x 6 m</li> </ul>	<p>Ongoing discussions through the MFCFWG to include development of mitigation strategies and construction schedules.</p> <p>Cable burial and protection.</p> <p>Over-trawlability surveys.</p> <p>Ongoing fisheries liaison.</p>	<p><b>All fisheries except creelers</b></p> <p>Minor significance</p> <p><b>Creel fisheries only</b></p> <p>Moderate significance</p> <p>Minor significance (post-mitigation)</p>

Type of Effect Assessed	Project Envelope Scenario Assessed	Mitigation	Pre-Mitigation and Post-Mitigation Effect
	<ul style="list-style-type: none"> <li>Maximum construction period – 18 months</li> </ul>		
Increased steaming times	Maximum number of safety zones in the area resulting in increased steaming times.	<p>Ongoing discussions through the MFCFWG to include development of mitigation strategies and construction schedules.</p> <p>Ongoing fisheries Liaison.</p>	Minor significance
Displacement of fishing activity	<p>Maximum number of safety zones in the area resulting in fishing activity being displaced into other grounds and impacting fishermen in that area.</p> <p>An indirect effect could result in conflict between static and mobile vessels and/ or increased competition for a limited resource.</p>	<p>Ongoing discussions through the MFCFWG to include development of mitigation strategies and construction schedules.</p> <p>Cable burial and protection.</p> <p>Over-trawlability surveys.</p> <p>Ongoing fisheries liaison.</p>	<p><b>All fisheries except creelers</b> Minor significance</p> <p><b>Creel fisheries only</b> Moderate significance Minor significance (post-mitigation)</p>
Interference with fishing activities	Location of port (not currently known) for construction and maximum number of construction works vessels – 6 vessels working 255 days/ year for 18 months in two phases (installation of 1 OSP and 2 cables in 2017 and potentially a further 1 OSP and 2 cables in 2020)	<p>Ongoing discussions through the MFCFWG to include development of construction schedules.</p> <p>Ongoing fisheries liaison.</p> <p>Information distributed through FIRs, FLO and NtMs.</p>	<p><b>Towed gear vessels</b> Minor significance</p> <p><b>Static gear vessels</b> Moderate significance Minor significance (post-mitigation)</p>
Safety issues for fishing vessels	<p>See Chapter 5.2: Shipping and Navigation (Modified TI ES 2014) and Table 3-7.</p> <ul style="list-style-type: none"> <li>In addition, the worst case scenario should also recognise the safety risks posed from the construction of the infrastructure detailed above.</li> </ul>	<p>Ongoing discussions through the MFCFWG to include development of mitigation strategies and construction schedules.</p> <p>Ongoing fisheries liaison.</p>	Minor significance
<b>Operation</b>			
Adverse effects on commercially exploited fish and shellfish populations	See Chapter 4.2: Fish and Shellfish Ecology (Modified TI ES 2014) and Table 3-3 above.	Cable burial / protection	Minor significance

Type of Effect Assessed	Project Envelope Scenario Assessed	Mitigation	Pre-Mitigation and Post-Mitigation Effect
Loss or restricted access to fishing grounds	Maximum number of OSPs in the area of the three consented wind farms with jacket substructures – two 100 x 100 m.	Ongoing discussions through the MFCFWG.  Cable burial and protection.  Ongoing fisheries liaison.	Minor significance
Safety issues for fishing vessels	See Chapter 5.2: Shipping and Navigation (Modified TI ES 2014) and Table 3-7.  Maximum number of OSPs in the area of the three consented wind farms with jacket substructures – two 100 x 100 m.	Ongoing fisheries liaison.  Information distributed through FIRs, FLO and NtMs.	Within acceptable limits.
Increased steaming times	None foreseen.	Ongoing discussions through the MFCFWG.  Cable burial and protection.  Ongoing fisheries liaison.	Within acceptable limits.
Displacement of fishing activity	Maximum number of OSPs in the area of the three consented wind farms with jacket substructures – two 100 x 100 m.	Ongoing discussions through the MFCFWG.  Cable burial and protection.  Ongoing fisheries liaison.	Minor significance
Interference with fishing activities	None foreseen in addition to potential operational effects above.	Ongoing fisheries liaison.  Information distributed through FIRs, FLO and NtMs.	Minor significance

The commercial fisheries assessments are based on the footprint of the two Modified OfTI OSPs. Although the number of OSPs is increasing to four, the total footprint of the OSPs is consistent with the maximum dimensions of the original design and within the original corridor which was assessed. The number and type of vessels to be utilised for the installation and operation of the OSPs is not yet known but will be consistent with the original assessments. The numbers used for installation will be low compared to the existing vessel activity and the numbers used during operation will not represent a significant increase in existing vessel activity within the Moray Firth. Therefore, the effects of the distributed OSPs will be consistent with the original assessment.

### 3.3.2 Shipping and Navigation

**Table 3-7: Shipping and Navigation Assessment (section 5.2.2 – Modified TI ES 2014)**

Type of Effect Assessed	Project Envelope Scenario Assessed	Mitigation	Pre-Mitigation and Post-Mitigation Effect
<b>Construction &amp; Decommissioning</b>			
Allision risk for commercial shipping, fishing and recreational vessels with OSPs during construction and decommissioning phases (partially constructed OSPs).	OSP layout giving maximum loss of navigable sea area.  4 circuits in 4 trenches, total width up to 1,200 m depending on water depth (based on current geophysical data).	n/a	Minor
Increasing ship-to-ship encounter and collision risk for commercial shipping, fishing vessels and recreational vessels during construction and decommissioning phases.	Installation related vessel activity in the area.  OSP layout giving maximum loss of navigable sea area.  4 cables in 4 trenches, total width up to 1,200 m depending on water depth,  Installation related vessel activity in the area.	Safety Zones during Construction.  Guard Vessels.  Works Vessel Coordination.  Promulgation of Information including Fisheries Liaison.	<b>Fishing vessels</b> Moderate Minor (post-mitigation)  <b>Recreational vessels and commercial shipping</b> Minor
<b>Operation</b>			
Allision risk for commercial shipping, fishing and recreational vessels with OSPs during operation	4 cables in 4 trenches, total width up to 1,200 m depending on water depth.  2 OSPs.  4 cables in 4 trenches, total width up to 1,200 m depending on water depth.	Works vessel coordination.  Promulgation of information including Fisheries Liaison.	<b>Fishing Vessels</b> Moderate Minor (post-mitigation)  <b>Commercial Shipping &amp; Recreational Vessels</b> Minor
Increasing ship-to-ship encounter and collision risk for commercial shipping, fishing vessels and recreational vessels during operation	4 cables in 4 trenches, total width up to 1,200 m depending on water depth.	n/a	Minor

The shipping and navigation assessments are based on the footprint of the two Modified OfTI OSPs. Although the number of OSPs is increasing to four, the total footprint of the OSPs is consistent with the maximum dimensions of the original design and within the original corridor which was assessed. The number and type of vessels to be utilised for the installation and operation of the OSPs is not yet known but will be consistent with the original assessments. The numbers used for installation will be low compared to the existing vessel activity and the numbers used during operation will not represent a

significant increase in existing vessel activity within the Moray Firth. Therefore, the effects of the distributed OSPs will be consistent with the original assessment.

### Archaeology

**Table 3-8: Archaeology Assessment (section 5.4.2 – Modified TI ES 2014)**

Type of Effect Assessed	Project Envelope Scenario Assessed	Mitigation	Pre-Mitigation and Post-Mitigation Effect
<b>Construction</b>			
Direct effect as a result of installation of OSP	<p>Damage and/or displacement of cultural heritage assets within footprint of pin piling or suction caissons.</p> <p>Damage and/or displacement of cultural heritage assets within construction footprint.</p> <p>Damage and/or displacement of cultural heritage assets within scour protection footprint.</p> <p>Worst case scenario involves an effect footprint of 3 m diameter pin piles or 20 m diameter suction caissons; with a maximum depth of effect of 60 m (pin piles).</p>	<p>Geophysical and geotechnical assessment facilitating micro-siting and/ or geoarchaeological assessment.</p> <p>Written Scheme of Investigation.</p> <p>Reporting protocol for finds of archaeological interest.</p>	<p><b>Recorded cultural heritage assets</b> No effect</p> <p><b>Unknown cultural heritage assets</b> Minor-major depending on receptor sensitivity Minor-negligible (post-mitigation)</p>
Direct effect by construction vessel	<p>Damage and/or displacement of cultural heritage assets within footprint of jackup spud cans during OSP installation.</p> <p>Damage and/or displacement of cultural heritage assets within construction vessel anchor pattern (caused by contact with anchors and/or their cables) during OSP and cable installation and general marine activities associated with construction.</p> <p>The spud cans of the four or six jack-up legs of the construction vessel will be in contact with the seabed and will penetrate 1-4 m. The worst case area of effect will be m<sup>2</sup> per vessel placement.</p>	<p>Avoidance of effect through Exclusion Zones or offsetting through the recovery /preservation by record (depending upon WSI provisions).</p> <p>Written Scheme of Investigation.</p> <p>Reporting protocol for finds of archaeological interest.</p>	<p>Minor-major depending on sensitivity of receptor.</p> <p>Minor-negligible post-mitigation.</p>
<b>Operation</b>			

Type of Effect Assessed	Project Envelope Scenario Assessed	Mitigation	Pre-Mitigation and Post-Mitigation Effect
Direct effect by IMR (inspection, maintenance and repair) vessel.	<p>Damage and/or displacement of cultural heritage assets within footprint of jack-up spud cans during IMR work.</p> <p>Damage and/or displacement of cultural heritage assets within IMR vessel anchor pattern (caused by contact with anchors and/or their cables).</p> <p>Although it is likely that there will be some co-location, worst case area of effect will be a multiple of the installation figures.</p>	<p>Geophysical and geotechnical assessment facilitating micro-siting and/ or geoarchaeological assessment.</p> <p>Avoidance of effect through Exclusion Zones or offsetting through the recovery/ preservation by record (depending upon WSI provisions).</p>	<p><b>Recorded cultural heritage asset</b> Major Minor/negligible (post-mitigation)</p> <p><b>Unknown cultural heritage asset</b> Minor-major depending upon receptor sensitivity Minor/negligible (post mitigation)</p>
Indirect effect due to changes in scour and sedimentation	<p>Damage and/or displacement of cultural heritage assets caused by scour induced by the nearby presence of the OSPs and sections of offshore cables protected by rock placement or concrete mattresses.</p> <p>Changes in preservation environment of cultural heritage assets caused by sedimentation induced by the nearby presence of the OSPs and sections of offshore cables protected by rock placement or concrete mattresses.</p> <p>Worst case area of effect will depend upon the final design of the substructure and the characteristics of the chosen location. Assessed in conjunction with findings of Chapter 3.1: Hydrodynamics, Sedimentary and Coastal Processes (Modified TI ES 2014).</p>	<p>Written Scheme of Investigation.</p> <p>Reporting protocol for finds of archaeological interest.</p>	<p><b>Recorded cultural heritage asset</b> No effect</p> <p><b>Unknown cultural heritage asset</b> Minor-major depending upon receptor sensitivity Minor/negligible (post mitigation)</p>

The archaeology assessments are based on the footprint of the two Modified OfTI OSPs. Although the number of OSPs is increasing to four, the total footprint of the OSPs is consistent with the maximum dimensions of the original design and within the original corridor which was assessed. The number and type of vessels to be utilised for the installation and operation of the OSPs is not yet known but will be consistent with the original assessments. The numbers used for installation will be low compared to the existing vessel activity and the numbers used during operation will not represent a significant increase in existing vessel activity within the Moray Firth. Therefore, the effects of the distributed OSPs will be consistent with the original assessment.

### 3.3.3 Seascape, Landscape and Visuals

No significant effects were identified on the seascape/landscape and visual receptors in relation to the installation or operation of the OSPs or the modified offshore export cable route construction (Modified TI ES 2014). Although the maximum number of OSPs is increasing to four, the total combined parameters



of the distributed OSPs (i.e. topside width x length) are consistent with the worst case originally assessed for the modified OfTI. Therefore, the effects of the distributed OSPs will be consistent with the original assessment.

### 3.3.4 Other Human Activities

**Table 3-9: Other Human Activities Assessment (section 5.7.2 – Modified TI ES 2014)**

Type of Effect Assessed	Project Envelope Scenario Assessed	Mitigation	Pre-Mitigation and Post-Mitigation Effect
<b>Construction &amp; Decommissioning</b>			
Damage / Disturbance / Disruption of Other Human Activities	<p>Maximum footprint = 1.76 km<sup>2</sup> based on:</p> <ul style="list-style-type: none"> <li>Length of cable corridor from boundary of the three consented wind farm sites to the landfall site = 52 km (not including micro-siting allowance);</li> <li>Number of cable trenches = 4;</li> <li>Width of trench affected area = 6 m;</li> <li>Length of modified OfTI cable within three consented wind farms (including inter-platform cabling) = 70 km;</li> <li>Area of seabed prepared for each OSP = 7,536 m<sup>2</sup>;</li> <li>Maximum number AC OSPs = 2 (installed at least one year apart);</li> <li>Vessel anchors = 36,000 m<sup>2</sup>; and</li> <li>Jack-up vessel footprint of 420 m<sup>2</sup> per installation.</li> </ul> <p>In addition, rolling safety zones / advisory exclusion zones may be applied for / recommended, extending 500 m around active installation works.</p> <p>Maximum construction activity:</p> <ul style="list-style-type: none"> <li>Cable and OSPs likely to be installed in two phases:               <ul style="list-style-type: none"> <li>Phase 1 (indicative timescales Q2 2017 – Q4 2018): installation of two cables and 1 OSP;</li> <li>Phase 2 (indicative timescales 2020 – 2021): installation of two cables and 1 OSP.</li> </ul> </li> <li>255 working days at sea to install 2 x OSPs and 4 x export cables.</li> <li>72 vessel movements to install 2 x OSPs and 4 x export cables.</li> </ul> <p>Maximum decommissioning activity:</p> <ul style="list-style-type: none"> <li>Construction window, working days and vessel movements as per maximum construction activity above.</li> </ul>	Ongoing consultation with oil and gas licence holders to remain informed of their exploration plans.	Not significant



Type of Effect Assessed	Project Envelope Scenario Assessed	Mitigation	Pre-Mitigation and Post-Mitigation Effect
Health and Safety Risk Associated with UXO	Maximum construction footprint as defined above.	Pre-construction UXO survey.	Major adverse
	Maximum construction activity as defined above.	UXO Safety Plan.	Minor adverse (post-mitigation)
	Maximum decommissioning activity as defined above.		
<b>Operation</b>			
Damage / Disturbance / Disruption of Other Human Activities	<p>Maximum operational footprint 0.09 km<sup>2</sup> based on:</p> <ul style="list-style-type: none"> <li>Area per OSP foundation and scour material = 5,026 m<sup>2</sup>;</li> <li>Cable protection (assuming protection is required to a distance of 100 m from the foundation to a width of 10 m and up to 20 "J" tubes (or cable connections)) per OSP = 20,000 m<sup>2</sup>;</li> <li>Number AC OSPs = 2;</li> <li>Nominal area of cable protection material required along each export cable = 11,000 m<sup>2</sup>;</li> <li>Number of export cables = 4; and</li> <li>Use of rock cutting equipment in water depths &lt; 10 m.</li> </ul> <p>In addition, rolling safety zones / advisory exclusion zones may be applied for/ recommended, extending 500 m around major maintenance works.</p> <p>Maximum operational lifetime 25 years.</p> <p>Most frequent maintenance schedule.</p>	<p>In relation to OSPs, adherence to any consent conditions on the lighting, marking and charting of infrastructure.</p> <p>Ongoing consultation with oil and gas licence holders to remain informed of their exploration plans.</p> <p>Adherence to appropriate guidance to resolve conflicts of interest.</p>	
Health and Safety Risk Associated with UXO	<p>Maximum maintenance activity as defined above.</p> <p>Maximum decommissioning activity as defined above.</p>	As per Construction/ Decommissioning mitigation measures, as required, where intrusive works are planned.	Not significant

The other human activity assessments are based on the footprint of the two Modified OfTI OSPs. Although the number of OSPs is increasing to four, the total footprint of the OSPs is consistent with the maximum dimensions of the original design and within the original corridor which was assessed. The number and type of vessels to be utilised for the installation and operation of the OSPs is not yet known but will be consistent with the original assessments. The numbers used for installation will be low compared to the existing vessel activity and the numbers used during operation will not represent a significant increase in existing vessel activity within the Moray Firth. In addition, seabed preparation is not required for the distributed OSPs. Therefore, the effects of the distributed OSPs will be consistent with the original assessment.

As was the case for the Modified OfTI, the decommissioning programme has not yet been finalised, therefore a detailed assessment is not possible at this stage. The same conclusions are therefore identified as reported in Modified TI ES 2014. The decommissioning of the OSPs and export cable may involve the use of cutting tools and / or other methods if appropriate. Impacts from decommissioning are predicted to be broadly similar to or less than those from construction. The greatest impact is likely to be due to increased anthropogenic noise associated with removal of the OSPs.

## 4 Conclusion

In summary, as detailed in this report, Moray East's proposals are based on the evidence that the physical parameters of two additional distributed OSPs combined with two OSPs of no greater parameters under the Modified OfTI ML 2014 will be equal to or within the worst case scenario assessed within Modified TI ES 2014. The baseline and methodologies for assessing relevant environmental impacts, including approach to cumulative impact assessment (CIA), have not changed significantly since 2014 (Moray East, 2017) and it has been concluded that no change to the significance of the assessed effects arises from either the baseline or methodologies. It is also considered that an increase in the number of distributed OSPs to four, with smaller dimensions, would not affect the results of the environmental impact assessments as reported within Modified TI ES 2014. Therefore it can be concluded that the environmental effects of the proposed distributed OSPs are no greater than assessed within the Modified OfTI ES (2014) and its conclusions remain valid.

As mentioned in the Introduction section above, it is acknowledged that the submission of the application for two further OSPs potentially engages the Marine Works (Environmental Impact Assessment) Regulations 2007. However it has been concluded that the proposed change or extension does not meet the criteria set out in paragraph 13(a) of Annex II of the Directive and therefore does not require a further Environmental Impact Assessment. Furthermore, this change does not result in any significant adverse effect on any European site.

## 5 References

Moray East (2017) Moray East Offshore Wind Farm – Alternative Design Parameters Scoping Report.

MORL (2014) Modified Transmission Infrastructure for Telford, Stevenson and MacColl Wind Farms Environmental Statement.

SMRU (2015). Preliminary report on predation by adult grey seals on grey seal pups as a possible explanation for corkscrew injury patterns seen in the unexplained seal deaths: addendum. Report to Scottish Government.

Van Neer *et al.*, (2015) Grey seal (*Halichoerus grypus*) predation on harbour seals (*Phoca vitulina*) on the island of Helgoland, Germany. Abbo van Neer, Lasse Fast Jensen, Ursula Sieberta



# **MORAY EAST**

## **OFFSHORE WINDFARM**

### **Contact**

Moray Offshore Windfarm (East) Limited  
4<sup>th</sup> Floor, 40 Princes Street  
Edinburgh EH2 2BY  
Tel: +44 (0)131 556 7602