MORAY EAST
OFFSHORE WINDFARM

Moray East Offshore Windfarm
Alternative Design Parameters

Scoping Report

March 2017

Moray Offshore Windfarm (East) Limited

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List of Abbreviations

AC	Alternating Current
AIS	Automatic Identification Systems
ASACS	Airspace Surveillance and Control Systems
ATC	Air Traffic Control
BOWL	Beatrice Offshore Wind Farm Limited
CAA	Civil Aviation Authority
CaP	Cable Plan
Cefas	Centre for Environment, Fisheries and Aquaculture
CfD	Contracts for Difference
CIA	Cumulative Impact Assessment
CMS	Construction Method Statement
CoP	Construction Programme
CRM	Collision Risk Modelling
cSAC	Candidate Special Area of Conservation
CSLVIA	Cumulative Seascape, Landscape and Visual Assessment
DC	Direct Current
DECC	Department of Environment and Climate Change
DSLP	Development Specification and Layout Plan
EC	European Community
ECC	East Caithness Cliffs
EDA	Eastern Development Area
EDPR	EDP Renovaveis
EDPR UK	EDP Renewables UK Ltd
EIA	Environmental Impact Assessment
EMF	Electro-magnetic Fields
EMP	Environmental Management Plan
ES	Environmental Statement

EU	European Union
FLO	Fisheries Liaison Officer
GBS	Gravity Base Structures
GVA	Gross Value Added
GW	Gigawatt
HAT	Highest Astronomic Tide
HIAL	Highland and Islands Airports Ltd
HRA	Habitats Regulations Appraisal
HVDC	High-Voltage Direct Current
ICES	International Council for the Exploration of the Sea
IMO	International Maritime Organisation
JNCC	Joint Nature Conservation Committee
km	Kilometre
km^2	Square kilometre
LAT	Lowest Astronomical Tide
LMP	Lighting and Marking Plan
m	Metres
m^2	Squared metres
MCA	Maritime and Coastguard Agency
MFOWDG	Moray Firth Offshore Wind Developers Group
MFRAG	Moray Firth Renewables Advisory Group
MGN	Marine Guidance Notice
MINNS	Marine Invasive Non-native Species
MMO	Marine Management Organisation
MOD	Ministry of Defence
MORL	Moray Offshore Renewables Limited
MPAs	Marine Protected Areas
MS-LOT	Scottish Government, Marine Scotland Licensing Operations Team

MSS	Marine Scotland Science
MW	Megawatt
NATS	National Air Traffic Services
NCC	North Caithness Cliffs
NCMPA	Nature Conservation Marine Protected Area
NERL	NATS En-Route Ltd
nm	Nautical Mile
NSP	Navigational Safety Plan
OREIs	Offshore Renewable Energy Installations
OSPs	Offshore Substation Platforms
PEMP	Project Environmental Monitoring Programme
pSPA	Proposed Special Protection Area
PSR	Primary Surveillance Radar
PVA	Population Viability Analysis
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SAR	Search and Rescue
SCOS	Special Committee on Seals
SFF	Scottish Fishermen's Federation
SHE-T	Scottish Hydro Electric Transmission
SLVIA	Seascape, Landscape and Visual Impact Assessment
SMRU	Sea Mammal Research Unit
SNCBs	Statutory Nature Conservation Bodies
SNH	Scottish Natural Heritage
SPA	Special Protection Areas
TCE	The Crown Estate
TI	Transmission Infrastructure
TMZ	Transponder Mandatory Zone

UKHO	UK Hydrographic Office
UXO	Unexploded Ordnance
VMP	Vessel Management Plan
VP	Vantage Point
WCS	Worst Case Scenario
WTG	Wind Turbine Generator
ZDA	Zone Development Agreement
ZTV	Zone of Theoretical Visibility

Executive Summary

Moray Offshore Windfarm (East) Limited (known as Moray East) is seeking a new consent to take advantage of recent technological improvements which will enable offshore wind generation in the Moray Firth to be undertaken more economically than with the infrastructure for which consent of 1,116MW was previously granted on this site in 2014.

Wind turbine technology has progressed rapidly since 2012 when Moray Offshore Renewables Limited (renamed 'Moray East' in 2016) applied for consent to develop offshore wind generation on the site. It has become possible to increase the efficiency of generation using larger turbines, but fewer of them. Less infrastructure to produce more power.

This increase in efficiency delivers the cost reduction objectives set by Government through the 2013 Energy Act, which replaced the Renewables Obligation which provided support automatically with Contracts for Difference (CfD). CfDs are the only route to market for new renewable generation and are made available by the Government at competitive auctions. The market price of offshore wind will have reduced by one third by the time the second auction is complete (2017).

To deliver cost reduction by using fewer, larger turbines, the requirements of the Design Envelope for which consent was granted (in 2014) will require to be changed to accommodate a smaller number of larger turbines, with increased spacing between them. This scoping report examines those alternative turbine design parameters, and also includes options for suction bucket foundations. The proposed wind farm consent application will not increase the consented capacity or the size of the Moray East site.

In addition, the structure of the consents as proposed is different than before. Previously the Moray East site was divided into three wind farms sites (Stevenson, Telford and McColl) for which separate consents and marine licences were granted. A single Section 36 consent and Marine Licence will be sought for the Moray East Site (which may be built out in a maximum of three phases) rather than three separate Section 36 Consents and Marine Licences. The alternative design parameters for the proposed wind farm application will relate to the Moray East Offshore Wind Farm only. There will be no changes proposed in these applications to the transmission infrastructure associated with the Moray East Offshore Wind Farm.

The remainder of the Zone continues to be developed separately by Moray Offshore Windfarm (West) Limited, following a decision in 2010 to split the Zone in two, developing the eastern area (which at that time had fewer constraints) first.

This scoping report contains details of the proposed alternative design parameters along with site characterisation information currently available. It identifies potential impacts that will be studied in the Environmental Impact Assessment (EIA), and identifies those that can be scoped out and why. It proposes the studies and the surveys to inform the EIA process and outlines proposed stakeholder engagement

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Acknowledgments

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- Moray Offshore Windfarm (East) Limited
- Anatec Ltd
- Coleman Aviation
- Development Economics
- NIRAS
- Optimised Environments
- Wessex Archaeology

1 Introduction

1.1 Introduction

This scoping report has been prepared as part of a formal request for an opinion on the scope of the Environmental Impact Assessment (EIA) required to support applications for a new Section 36 Consent and Marine Licence for proposed changes to the Design Envelope for the consented Telford, Stevenson and MacColl wind farms.

Moray Offshore Windfarm (East) Limited (known as Moray East) is undertaking this work to seek a new consent for the Moray East site (see Figure 1.1) for alternative design parameters to take advantage of recent rapid improvements in technology which will allow the installation of more efficient turbines and foundations, delivering lower cost of energy using fewer installations.

This document provides information on the key design changes associated with the proposed wind farm consent application and discusses the implications of these changes for the impacts presented in the Moray East Environmental Statement (ES) 2012 prepared to accompany the applications for the consented Telford, Stevenson and MacColl wind farms. This scoping report focuses specifically on identifying those EIA topics / receptors that may be affected by the design changes and therefore require further assessment as part of the EIA. The scoping report also identifies any changes in baseline data or assessment methods that could alter the conclusions presented in the Moray East ES 2012, previously referred to as the MORL ES 2012, and referred to hereafter in as the Moray East ES 2012. Any significant impacts reported in the Moray East ES 2012 are also referred in this scoping report and will be reported in the proposed wind farm ES to inform decision makers.

1.2 Definitions

The following definitions have been used throughout this scoping report with respect to the company, the consented wind farms and how these definitions have changed since submission of the Moray East ES in 2012.

- **Moray East (formerly known as Moray Offshore Renewables Limited)** – the body submitting the scoping report;
- **Moray East Offshore Wind Farm** - the wind farm to be developed in the Moray East site;
- **Moray West Offshore Wind Farm** – the wind farm to be developed in the Moray West site;
- **The Zone** - the UK offshore wind Round 3 Zone 1 area held under a Zone Development Agreement (ZDA) by Moray Offshore Renewable Power Limited which is comprised of the Moray East site and the Moray West site(see Figure 1.1);
- **Moray Offshore Renewable Power Limited (Moray Offshore)** - the company which holds the exclusive rights to develop offshore wind farms in the Zone;
- **The Moray East site** - the area of the Zone shown as Moray East on Figure 1.1 in which the Moray East Offshore Wind Farm will be located. Section 36 consents and associated Marine Licences to construct and develop up to a total of 1,116 MW in the Moray East site were granted in March 2014. At that time the Moray East site was known as the "Eastern Development Area" and was made up of three sites known as Telford, Stevenson and MacColl offshore wind farm sites;
- **The Moray West site** - the area of the Zone shown as Moray West on Figure 1.1 which was previously known as the Western Development Area;
- **The proposed wind farm consent application** – the proposed applications for a Section 36 Consent and a Marine Licences for Moray East Offshore Wind Farm encompassing wind generation turbines, substructures, foundations and inter-array cables between turbines;

- **Telford, Stevenson and MacColl wind farms** – this term refers to the three consented wind farms located within the Moray East site as shown in Figure 1.1;
- **Modified Transmission Infrastructure (Modified TI)** - includes both offshore and onshore electricity transmission infrastructure for the consented Telford, Stevenson and MacColl wind farms. Includes connection to the national grid near New Deer in Aberdeenshire encompassing AC offshore substation platforms, AC export cable offshore to landfall point at Inverboyndie continuing onshore to the AC collector station and the additional regional Transmission Operator substation at New Deer (as shown on Figure 1.1). The offshore Modified TI was awarded a Marine Licence in September 2014. The onshore Modified TI was awarded Planning Permission in Principle in September 2014 by Aberdeenshire Council and Section 42 consent in June 2015;
- **Moray East ES 2012** – The ES for the Telford, Stevenson and MacColl wind farms and Associated Transmission Infrastructure, submitted August 2012;
- **Moray East Modified TI ES 2014 –** the ES for the Modified Transmission Infrastructure works (revised export cable route) in respect to the Telford, Stevenson and MacColl wind farms, submitted September 2014; and
- **Design Envelope** - the range of design parameters used to inform the assessment of impacts.

1.3 The Developer

1.3.1 Moray Offshore Windfarm (East) Limited

Moray Offshore Windfarm (East) Limited (known as Moray East) is owned 100% by EDPR UK Limited (EDPR UK). Moray East will develop, consent, finance, construct, operate and maintain the offshore wind projects within the Moray East site.

Town and Country Planning consent for the onshore Modified TI and the Marine Licence for the offshore Modified TI for the Project were granted in September 2014. Moray East also holds a grid connection agreement to connect the Moray East Offshore Wind Farm to the national grid. Moray East has, through its subsidiary companies Telford Offshore Windfarm Limited, Stevenson Offshore Windfarm Limited and MacColl Offshore Windfarm Limited, Agreements for Lease from The Crown Estate for the Moray East site together with Section 36 consents and Marine Licences for the generating station (i.e. the Telford, Stevenson and MacColl wind farms).

1.3.2 EDP Renovaveis (EDPR)

EDP Renovaveis (EDPR) owns 100% of EDPR UK Limited. It is a leading global renewable energy company, headquartered in Madrid, operating in markets around the globe and is continuously expanding its business to new regions making the commitment to lead in each market as well as create value for its stakeholders and shareholders. As of December 2016 EDPR manages a global portfolio of 10.4 GW spread over 11 countries, of which 5.1 GW are in Europe (2.4 GW in Spain, 1.3 GW in Portugal and 1.5 GW in the rest of Europe). Beyond Europe, EDPR manages a portfolio of 5.0 GW in North America, and the balance in Brazil. At December 2016, EDPR had 248 MW of onshore wind developments in construction. EDPR entered the offshore wind market in 2009, when it located its global headquarters for offshore wind development in Edinburgh.

1.4 The Zone development overview

In 2009, Moray Offshore Renewables Limited (MORL (now known as Moray East)) was established as a joint venture company which was awarded the right to develop offshore wind in Zone 1 of the third offshore wind licencing round (EDPR was the lead partner in the venture and is now the sole owner). The Zone is located on the Smith Bank in the outer Moray Firth approximately 22 km (12 nm) from the Caithness coastline at its closest point to shore as shown in Figure 1.1 and covers 520 km^2 (281 nm^2). One of the first actions following the award of the ZDA was to undertake a Zone appraisal. This found that, at that time, as a result of other human activities, more constraints existed in the west of the Zone than in

the east. Such activities were expected to change over time, consequently the decision was taken to divide the Zone into two; an eastern and a western development area, and to develop the eastern area first. These areas are now referred to as the Moray East and Moray West sites respectively.

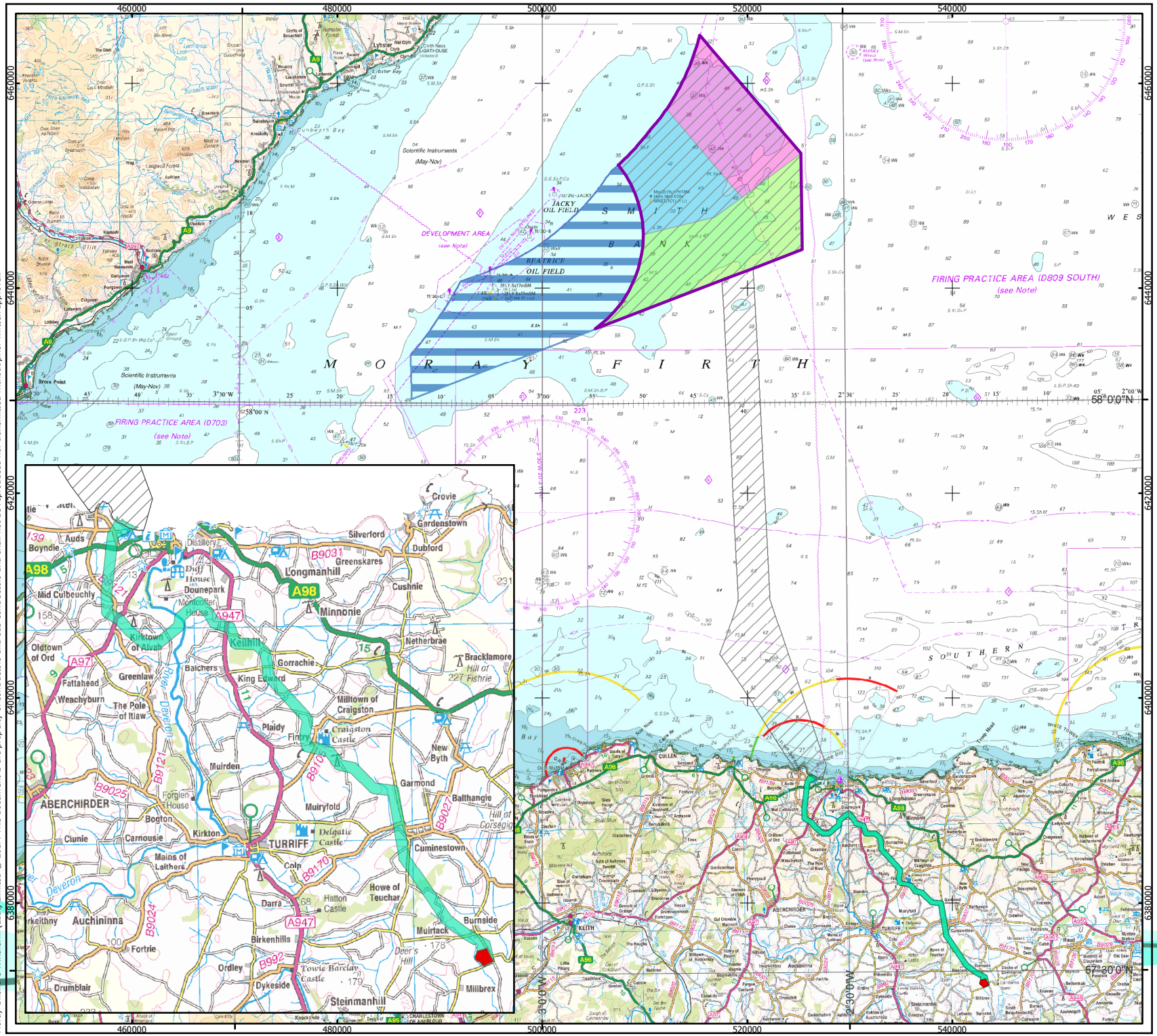
In 2012 an application to the Scottish Government was made for consent to construct and operate offshore wind generation in three sites (Telford, Stevenson and MacColl wind farms) which together now make up the Moray East site. Consents for a total capacity of 1,116 MW were granted in March 2014.

The 2013 Energy Act ended the Renewables Obligation which provided automatic support for renewable energy, such as offshore wind. To provide alternative support for renewables, the Act introduced Contracts for Difference (CfDs). The CfD provides the only route to market for the power generated by new renewable projects, so to be viable a new renewable project must win a CfD. CfDs are made available by the Government at auction, and are won by projects bidding the lowest price for their power. There are more renewable energy projects than there is support. Although it was expected that auctions would be held annually, only one has been held to date (in 2015).

The consented Telford, Stevenson and MacColl wind farms were entered in the first CfD auction. When the results of this auction were announced in early 2015, it was established that although a CfD was not awarded, the wind farms were highly competitive. Moray East has since carried out work to ensure that Moray East site can compete in future CfD rounds. In the meantime, the constraints in the Moray West site have reduced as a result of changing human activities, including Ministry of Defence designations, and decisions to decommission existing oil infrastructure in the area. This allowed Moray West to initiate investigation of the Moray West site for offshore generation, and consultation and the publication of a scoping report followed in 2016.

(Moray East is undertaking this work to seek a new consent for the Moray East site to take advantage of recent rapid improvements in technology which will allow the installation of more efficient turbines and foundations, delivering lower cost energy using fewer installations. Improvements in technology means fewer turbines can be used to generate more power, thus reducing costs. The new consent applications will not increase the consented capacity or size of site, i.e. Moray East is seeking the means to generate the same power with less infrastructure than already consented.

Recognising that proposals for Moray East are now highly advanced, and that Moray West offers the prospect of the development of similar proposals at a later stage, in 2016 the decision was taken to restructure EDPR UK to allow investors flexibility of investing in the more advanced project. The two windfarm companies, Moray East and Moray West are owned by the holding company Moray Offshore Renewable Power Limited (known as Moray Offshore), which in turn is 100 % owned by EDPR UK Limited which is a wholly owned subsidiary of EDP Renewables.



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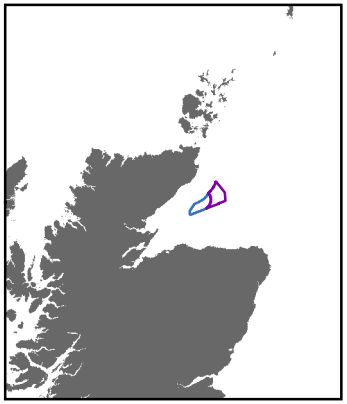
KEY

- Moray East site
- Moray West site
- Telford Windfarm
- Stevenson Windfarm
- MacColl Windfarm

OFTO Transmission Infrastructure Consent Boundary

- Offshore
- Onshore
- Substation



Horizontal Scale: 1:500,000 A4 Chart

0 5,900 11,800 Meters

N

Geodetic Parameters:	WGS84 UTM Zone 30N
Produced: JDM Reviewed: SE Approved: SE	
Date: 3/3/2017	Revision: A
REF: 8460001-PPV0010-MOR-MAP-002	

Figure 1.1
Telford, Stevenson and MacColl Wind Farms and Associated Modified Transmission Infrastructure

Moray Offshore Windfarm (East) Ltd

1.5 Overview of the existing consents

The Moray East site was originally split into the three wind farm sites listed below to provide flexibility in phasing of the development (Figure 1.1):

- Telford Offshore Wind Farm;
- Stevenson Offshore Wind Farm; and
- MacColl Offshore Wind Farm.

Separate consents were sought for each of the three wind farm sites.

In March 2014, the three wind farms were granted consent by the Scottish Government under Section 36 of the Electricity Act 1989. Marine Licences were then issued for each of the three wind farms in September 2014.

Although Moray East sought to construct up to a maximum total capacity of 1,500 MW across the Telford, Stevenson and MacColl wind farms, the final consented total maximum capacity for was 1,116 MW. This is based on the development of up to a total of 186 turbines with rating between 6 and 8 MW.

The Marine Licence for the offshore Modified TI was granted in September 2014. This covers a modified export cable route and landfall location and comprises up to two offshore substation platforms, four export cable circuits and associated infrastructure. The export cables will come ashore at a landfall at Inverboyndie Bay, Aberdeenshire, on the southern coast of the Moray Firth. Planning permission for the onshore Modified TI including up to 4 export cable circuits within a 60 m route located in a 500 m corridor and up to two onshore substations to the south-west of New Deer was granted in September 2014. The modifications to the TI were caused by a change in the national grid interface point from Peterhead to New Deer which led to a change of both locations of the export cable route and onshore substations as well as to the Design Envelope parameters caused by a change from direct current (DC) connection to an alternating current (AC) connection.

1.5.1 Work carried out to support the 2012 Telford, Stevenson and MacColl wind farms and associated transmission infrastructure consent applications

Consent applications for the Telford, Stevenson and MacColl wind farms and associated TI were supported by two separate EIAs in a single ES: one covering the Telford, Stevenson and MacColl wind farms and the other the DC TI (Moray East ES 2012); A further ES was then submitted in 2014 for the Modified TI with revised design parameters and export cable route (referred to as the Moray East Modified TI ES 2014).

A number of comprehensive and detailed technical studies and surveys were carried out as part of these EIAs to characterise the baseline across Moray East area as a whole. Further information on baseline studies and surveys is provided in Chapter 4 of this scoping report.

In addition to this, for a number of the EIA topics it was necessary to undertake additional modelling to inform the assessment of impacts. This included running various development scenarios looking at development across the Telford, Stevenson and MacColl wind farms in order to understand the potential impacts across the entire Moray East site. Primary environmental impact assessments were undertaken for the Telford, Stevenson and MacColl wind farms together and secondary assessments for different combinations of development of the three wind farms in order to understand whether it would affect the assessments. It was also necessary for certain topics to run various development scenarios as part of the whole project assessment (Telford, Stevenson and MacColl wind farms and electricity transmission infrastructure) and cumulative impact assessment (CIA)). Where relevant, further information on the different assessment methods is provided in Chapters 8 to 12.

Stakeholder engagement was also an integral part of the EIA process. A summary of the key stakeholder activities carried out as part of the EIA, during the determination period and post consent is provided in Chapter 14.

1.6 Proposed changes to the offshore wind farm Design Envelope

The proposed changes to the Design Envelope for the consented Telford, Stevenson and MacColl wind farms that form the basis of this new Section 36 consent and Marine Licence application are summarised below. These changes are discussed in more detail in Chapter 3.

- A single Section 36 consent and associated Marine Licence will be sought for the Moray East site. However, as with the consents granted in 2014 the Moray East site may be built out in a maximum of three phases;
- There will be an increase in turbine size / nominal capacity and a corresponding reduction in turbine numbers and increase in turbine spacing; and
- The revised Design Envelope will include the option for using suction bucket foundations.

Consistent with the approach to Section 36 consents and Development Consent Orders (DCOs) for offshore wind farms in England and Wales, Moray East does not intend to specify the duration of the operations to be permitted under the Section 36 consent in its application. It will be acknowledged that the expected wind farm design life would be around 25-30 years and that any repowering would require a full EIA. As is required in England and Wales, the consent duration would be fixed through the submission and approval of a Decommissioning Plan, which will be a requirement of a consent condition and also a requirement under the Energy Act 2004. Following a review of the assessment methodologies it has been concluded that this approach does not affect the assessment methodologies undertaken as part of the Moray East 2012 ES or those proposed in this scoping report for the proposed wind farm consent application. This approach will enable full utilisation of the wind farm infrastructure during its design life allowing all the benefits of the wind farm to be fully achieved.

The new consent will apply to the offshore wind farm only. There will be no changes to the Modified TI. Information on the Modified TI is therefore not included in this scoping report or the proposed wind farm consent application. However, it will be necessary to consider the consented transmission infrastructure as part of the whole project assessment and CIA.

1.7 Regulatory and policy background

1.7.1 Regulatory framework

Through discussions with Marine Scotland Licencing Operations Team (MS-LOT) it has been determined that the proposed increase in turbine size would constitute a change in the Design Envelope for the consented Telford, Stevenson and MacColl wind farms.

In light of these changes, Moray East will apply for a new Section 36 consent under the Electricity Act 1989 and a new Marine Licence under the Marine and Coastal Access Act 2009. It has also been determined that an EIA is required under The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 ("the 2000 EIA Regulations") and the Marine Works (Environmental Impact Assessment) Regulations 2007 to assess the impacts of the proposed design changes on the environment.

In addition to the relevant EIA legislation, the proposed wind farm consent application will also be required to comply with the following:

- The Habitats Directive (Council Directive 92 / 43 / EEC) as transposed into UK law by the Conservation (Natural Habitats &c) Regulations 1994, as amended (Habitat Regulations) and the Offshore Marine Conservation (Natural Habitats &c) Regulations 2007, as amended (Offshore Marine Regulations) with regard to:
    - Carrying out a Habitat Regulations Appraisal (HRA) for the proposed wind farm consent application; and
    - Requirement to obtain a European Protected Species (EPS) licence where there is potential for the proposed wind farm consent application to cause disturbance to cetaceans.

- Energy Act 2004 with respect to:
    - Establishment of construction safety zones around offshore installations; and
    - Preparation and submission of a decommissioning programme for the proposed wind farm consent application.
- Protection of Seals under the Marine (Scotland) Act 2010 with respect to potential impacts of the proposed wind farm consent application on seals; and
- Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003 with respect to ensuring the protection of salmon and sea trout.

1.7.1.1 Revised EIA Regulations

The newly amended Environmental Impact Assessment (EIA) Directive 2014/52/EU entered into force on May 15, 2014. Scotland is required to apply the new rules by 16 May 16 2017 at the latest. It is expected that the requirements of the new Directive will be enacted through the draft Town and Country Planning (Scotland) Regulations and draft The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (Scottish Government, 2016). On the basis that the Revised EIA Regulations are still to be enacted, they will not apply to this application.

Although the Revised EIA Regulations therefore do not apply to Moray East's request for a scoping opinion, which this scoping report accompanies, or the proposed wind farm consent application consideration has been given to the key relevant changes relating to the information requiring assessment as part of an EIA under the Revised EIA Regulations. Under Article 3(1) the EIA under the revised EIA Regulations is required to identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant impacts of a project on a number of key factors and interactions between the factors.

With respect to the EIA for the proposed wind farm consent application, the factors or topics requiring assessment relate directly to the marine environment, users of the marine environment and/or topics with direct interactions with the marine environment. Links between the factors listed in the EIA Directive and those topics included in this scoping report are summarised in Table 1.1 below.

Table 1-1: Factors requiring assessment as identified in EIA Directive 2014/52/EU and relevant EIA topics covered in this scoping report

EIA Directive factors for assessment	Relevant marine and marine related factors covered in this scoping report
Population and human health	Civil and military aviation Socio-economics Commercial fisheries Other human activities (oil and gas infrastructure, subsea cables and military exercise areas)
Biodiversity with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC	Benthic ecology Fish and shellfish ecology Marine mammals Ornithology (seabirds)
Land, soil, water, air and climate	Physical environment and sediment processes
Material assets, cultural heritage and the landscape	Seascape, landscape and visual assessment (SLVIA) Cultural heritage

The potential for an offshore wind farm to have direct impact on human health is limited. In terms of human health, wind farms do not generate any atmospheric emissions, or require any discharges to water that would have the potential to harm human health. This also applies to the proposed wind farm consent application. Impacts that could be considered a nuisance to humans resulting in indirect impacts on human health are considered as part of the seascape, landscape and visual assessment. The location of the Moray East site 22 km offshore further reduces the potential for the proposed wind farm consent application to have any impacts on human health associated with airborne noise from construction vessels and piling activities.

With respect to air quality, as discussed in Chapter 8.7 of the Moray East ES 2012, the main source of atmospheric emissions is from vessels involved in construction, operations and maintenance activities. There is existing vessel traffic within the Moray Firth (mainly relating to Beatrice oil field and fishing vessels). However, with the maximum number of vessel movements per day observed as 18 in summer and 14 in winter (Moray East ES 2012) vessel traffic levels are considered to be low. As discussed in Chapter 8.7 of the Moray East ES 2012, the maximum number of vessels expected to be present at the Moray East site is expected to be six (during construction). Emissions from these vessels are therefore expected to only make a small contribution to the overall vessel emissions in the Moray Firth. Given existing traffic levels, and associated emissions, in the Moray Firth are already low, the impact of this contribution will be negligible. Given that there will be no change in the number of vessels required during construction as part of the proposed wind farm consent application, impacts on air quality will require no further consideration in this scoping report or the ES.

Similarly, as discussed in Chapter 8.7 of the Moray East ES 2012, given the existing low levels of vessel traffic in the Moray Firth and the distance of the Moray East site from any sensitive receptors e.g. people onshore, any potential impacts associated with airborne noise from construction vessels and piling activities, and operations and maintenance activities for the proposed wind farm consent application will also be negligible and require no further consideration in this scoping report or the ES.

Scoping Question 1.1:

Does Marine Scotland agree that the following can be scoped out from the EIA for the proposed wind farm consent application:

- Air quality, and
- Airborne noise?

Scoping Question 1.2:

Does Marine Scotland agree that the EIA topics considered in this scoping report cover the factors requiring assessment under the EIA Directive 2014?

1.7.2 Policy framework

The key driver for the proposed wind farm consent application is the development of renewable sources of energy. This is not only critical for combatting global climate change, but for enabling Scotland (and the wider UK) to realise the wider environmental, societal and economic benefits of a low–carbon economy.

1.7.2.1 Development of renewable energy and climate change policy

Climate change and the effect of climate change on the environment have been high on the political agenda since the adoption of the Kyoto Agreement back in 1997. Since then, the European Union (EU) and UK Government have taken significant steps to tackle climate change through the introduction of

various Directives, regulations, plans and policies. These set out long-term aims and objectives, and provide a legal framework for tackling climate change that have resulted in the enforcement of a number of targets for reducing CO2 emissions and increasing the amount of energy produced from renewable sources of energy including wind power. The importance of these Directives, regulations, plans and policies has been recently reinforced (December 2015) through the adoption of the Paris Agreement (UNFCCC, 2015) which legally binds 195 countries to limiting global warming to well below 2°C.

1.7.2.2 2020 Route Map for Renewable Energy in Scotland

At a local level, the 2020 Route Map for Renewable Energy in Scotland (Scottish Government, 2011a) sets out how Scotland will achieve its target to meet an equivalent of 100% demand for electricity from renewable energy by 2020, as well as its target of 11% renewable heat. The 2020 Route Map is an update and extension to the Scottish Renewables Action Plan 2009.

Further updates to the Route Map were published in September 2015 (Scottish Government, 2015a). This update reports on progress on development across the renewables sector and towards reaching the 2020 targets, highlighting that provisional figures showed renewable sources generated a record 49.8% of Scotland's gross electricity consumption in 2014. The 2015 update also identifies further collective actions needed to unlock Scotland's full renewable energy potential. In particular, it identifies challenges faced by developers with the Government's move from the system of Renewable Obligations to Contracts for Difference (CfDs).

1.7.2.3 Scotland's Offshore Wind Route Map

Scotland's Offshore Wind Route Map: Developing Scotland's Offshore Wind Industry to 2020 and Beyond (Scottish Government, 2010 updated 2013a), recognises that, with 25 % of Europe's offshore wind potential, the large scale development of offshore wind represents the biggest opportunity for sustainable economic growth in Scotland.

1.7.2.4 Blue Seas - Green Energy A Sectoral Marine Plan for Offshore Wind Energy in Scottish Territorial Waters

This plan, produced in 2011 sets out proposals for the development of offshore wind in territorial waters (Scottish Government, 2011b). The plan identified 10 short term options for delivery by 2020 and a further 25 medium term areas of search for delivery between 2020 and 2030. The 10 short term options were subsequently reduced to nine with developer withdrawal of the Bell Rock site in the Firth of Forth. Of the remaining nine short term options, four were located on the East Coast including the Neart na Gaoithe and Inch Cape sites in the Firth of Forth and the Beatrice site in the Moray Firth. A further two medium term areas of search were identified in the Moray Firth, as well of medium term areas of search located further south around the firths of Forth and Tay. The Moray Firth Zone is acknowledged in the plan. It was proposed in the plan that the medium term areas of search would be subject to further review as part of the ongoing bi-annual review of the overall plan (Scottish Government, 2011b).

The two UK Round 3 offshore wind zones (Firth of Forth and Moray Firth) were considered as part of the UK Government Department for Energy and Climate Change (DECC) Offshore Wind SEA4 and were not included in the plan.

1.7.2.5 Scotland's National Marine Plan

The Scottish Government adopted its National Marine Plan in early 2015 (Scottish Government, 2015b). The purpose of the plan is to provide an overarching framework for marine activity in Scottish waters, in an aim to enable the sustainable development and use of the marine area in a way that protects and enhances the marine environment whilst promoting both existing and emerging industries. This is underpinned by a set of core general policies which apply across all existing and future development and use of the marine environment and sectoral specific policies.

With respect to offshore wind, the plan emphasises the growth of the global wind industry and Scotland's contribution to this industry by becoming a key hub for the design, development and deployment of the

next generation of offshore wind technologies. The plan emphasises the importance of offshore wind in achieving Scotland's targets for generating the equivalent of 100% of Scotland's own electricity demand from renewable resources by 2020 and to deliver an 80% reduction in greenhouse gas emissions by 2050. (Scottish Government, 2015b). The plan also highlights that within the Scottish marine area, there are a number of planned development sites for offshore wind. These include The Crown Estate 'Round 3' offshore wind zones including the Moray Firth Zone (Scottish Government, 2015b).

The plan also acknowledges that Scotland is becoming a key location for test and demonstration facilities in renewable energy development, with the Beatrice Demonstrator Project in the Moray Firth being the world's first offshore wind deep-water demonstration project and the Statoil Hywind Scotland Project offshore from Peterhead, the UK's first floating wind park comprising multiple turbines (up to five).

The core objectives and marine planning policies are to:

- Ensure sustainable development of offshore wind in the most suitable locations;
- Maximise economic benefits from offshore wind by securing a competitive local supply chain in Scotland;
- Align marine and terrestrial planning and efficient consenting and licensing processes including, but not limited to, data sharing, engagement and timings, where possible;
- Align marine and terrestrial transmission grid planning and development in Scottish waters;
- Contribute to achieving the renewables target to generate electricity equivalent to 100% of Scotland's gross annual electricity consumption from renewable sources by 2020;
- Contribute to achieving the decarbonisation target of 50gCO2/kWh by 2030 (to cut carbon emissions from electricity generation by more than four-fifths);
- Encourage sustainable development and expansion of test and demonstration facilities for offshore wind and marine renewable energy devices; and
- Ensure co-ordinated government and industry-wide monitoring.

1.7.2.6 Planning Scotland's Seas: Draft Sectoral Marine Plans for Offshore Renewable Energy in Scottish Waters: Consultation Paper

In 2013, the Scottish Government published a consultation paper for the preparation of a draft Sectoral Marine Plan for Offshore Renewable Energy in Scottish Waters. This paper sets out proposals for adopting a marine planning approach to the development of draft Sectoral Marine Plans for Offshore Wind, Wave and Tidal Energy in Scottish Waters (Scottish Government, 2013b). The approach involves giving consideration to resources and key constraints before applying social, economic and environmental assessments to inform the development of options contained within the Draft Sectoral Marine Plans. The Moray Firth Zone is acknowledged in the draft plan.

The Draft Plan for Offshore Wind Energy uses the medium term areas of search identified in the Blue Seas – Green Energy plan as the starting point for identifying options for future commercial scale offshore wind development (over 100 MW) in Scottish Waters. Following more detailed appraisal and a scoping study, the initial 25 areas of search were reduced to 10. These include an area of search of the north coast of Aberdeenshire (southern Moray Firth) and an area of search of the east coast of Aberdeenshire.

Results from consultation on the proposed options presented in this consultation paper were published in a Consultation Analysis Report (Scottish Government, 2014). This report summarises the key responses received from consultation on the proposed options for future commercial scale offshore wind development. The Final Plan for Offshore Wind Energy, taking the responses from consultation into account, is yet to be published.

1.7.2.7 Draft Scottish Energy Strategy: The Future of Energy in Scotland

In January 2017, the Scottish Government issued, for consultation, its Draft Energy Strategy for Scotland. This sets out Scotland's 2050 vision for energy which encompasses the development of a strong low carbon economy, building on the 2020 Route Map, and development of a modern, integrated clean energy system for Scotland. The focus of the strategy is on continued growth of the economy through secure, reliable and affordable energy supplies. The strategy examines Scotland's current energy mix and provides a framework for the future growth of technologies and fuels that will be required to supply Scotland's energy needs over the coming decades (Scottish Government, 2017).

1.8 References

Scottish Government (2011a). 2020 Routemap for Renewable Energy in Scotland. Available at: http://www.gov.scot/Publications/2011/08/04110353/0

Scottish Government (2011b). Blue Seas - Green Energy A Sectoral Marine Plan for Offshore Wind Energy in Scottish Territorial Waters Part A The Plan. Available at: http://www.gov.scot/Publications/2011/03/18141232/0

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Scottish Government (2016). Consultation on Environmental Impact Assessment amending Scottish Environmental Impact Assessment Regulations to Transpose Directive 2014/52/EU. Available at: http://www.gov.scot/Publications/2016/08/2499/1

Scottish Government (2017). Draft Scottish Energy Strategy: The Future of Energy in Scotland. Available at: http://www.gov.scot/Publications/2017/01/3414

UNFCCC (2015) Paris Agreement. Available at: http://unfccc.int/paris_agreement/items/9485.php

2 Approach to defining the scope of the EIA

2.1 Purpose of this scoping report

The main aim of this scoping report is to identify those EIA topics where, in light of the proposed alternative design parameters which differ from the Design Envelope for the consented Telford, Stevenson and MacColl wind farms, further assessment is required as part of an EIA to determine potential impacts of the changes on the environment. This includes project specific impacts, whole project impacts (generating station together with the Modified TI) and potential cumulative impacts. The scoping report also identifies any changes in site characterisation data or assessment methods that could alter conclusions presented in the Moray East ES 2012.

Where it is identified that there will be no change to the assessed Worst Case Scenario (WCS) for the consented Telford, Stevenson and MacColl wind farms, as detailed in the Moray East ES 2012, and where there are no changes in site characterisation data and impact assessment methods, it is proposed that these topics are scoped out of the EIA for the proposed wind farm consent application. Information to support the scoping out of certain EIA topics is provided in Chapters 4, 5 and 6.

For topics where there are no changes in the assessed WCS, but where potentially significant residual impacts were identified the Moray East ES 2012, these significant impacts are identified in the relevant chapters of this scoping report and will also be reported in the ES.

For those EIA topics where further assessment is required, detailed method statements describing the approach to the assessment of impacts are presented in Chapters 5 to 9. These method statements also provide information on work completed as part of the Moray East ES 2012 and a summary of the key findings from Moray East ES 2012 impact assessment.

It is not the intention of the ES for the proposed wind farm consent application to reproduce the entire Moray East ES 2012 where impacts have been scoped out or the current assessments remain valid. Where appropriate, each EIA topic's specific site characterisation will be based on data presented in the Moray East ES 2012, with updates included where necessary (e.g. where additional data has been collected or made available since 2012). Where site characterisation studies are informed by specific technical studies and reports prepared for the Moray East ES 2012 these reports will be provided as supporting documents to the ES.

Moray East also does not intend to carry out any additional site specific surveys except for the seascape, landscape and visual assessment where additional site visits may be required to inform the impact assessment. With respect to ornithology Scottish Natural Heritage (SNH) has advised Marine Scotland that there are no requirements to update the ornithological site characterisation data with additional site surveys (email from MS-LOT of the 16th February 2017). The ornithological assessment will therefore be based on site data collected as part of the Moray East ES 2012 and any additional published data that has been made available since 2012.

Further advice was received from SNH on 23rd February 2017 (Appendix B) on the suggested scope of EIA for the proposed wind farm consent application. This included specific advice on the scope of the impact assessment studies to be completed for ornithology and SLVIA. Further reference to this advice is provided in the relevant chapters (Chapters 8 and 9 respectively).

As part of this scoping report, specific questions have been included in relevant chapters. These questions focus specifically on specific issues where Moray East is seeking confirmation that proposed approaches and conclusions made are correct for the purpose of scoping the EIA of the proposed wind farm consent application. These questions are presented in coloured boxes in relevant chapters of this report.

2.2 Approach to defining the scope of the EIA

Having scoped out impacts on air quality, airborne noise and human health (Chapter 1, Section 1.7.1.1), the approach to defining the scope of the EIA for the remaining topics is described below. This approach has been split into three stages:

1. Validation of site characterisation data and impact assessment methods used in the Moray East ES 2012 to:
    - Identify any new data sources / updated data sources;
    - Identify any amendments or updates to impact assessment methods;
    - Determine whether new / updated data sources and / or assessment methods contradict data presented in the Moray East ES 2012; and
    - Conclude whether changes in site characterisation data and / or assessment methods have any implications for the impacts predicted in Moray East ES 2012 (site characterisation data and impact assessment methodology validation).
2. Validation of project specific impacts:
    - Review of the Design Envelope for the consented Telford, Stevenson and MacColl wind farms to identify where proposed design changes could have implications for the project specific impacts presented in the Moray East ES 2012.
3. Validation of whole project assessment and cumulative impacts:
    - Review of the Design Envelope for the consented Telford, Stevenson and MacColl wind farms to identify where proposed design changes could have implications for the whole project assessment;
    - Identification of new projects that have been consented or proposed since 2012 and appraisal of the potential implications of these new projects for the cumulative impacts presented in the Moray East ES 2012; and
    - Review of the Design Envelope for the consented Telford, Stevenson and MacColl wind farms to identify where proposed design changes could have implications for the cumulative impacts presented in the Moray East ES 2012.

This approach is illustrated in Figure 2.1 below. Any scoped out topics would be subject to reporting any potential significant residual impacts.

Results from stages 1 to 3 (presented in Chapters 4, 5 and 6 respectively of this scoping report) are used to determine which topics require further assessment as part of the EIA for the proposed wind farm consent application (Chapter 7).

Information to support the site characterisation and impact assessment methods validation and the appraisal of impacts is provided in Appendix A (project specific impacts).

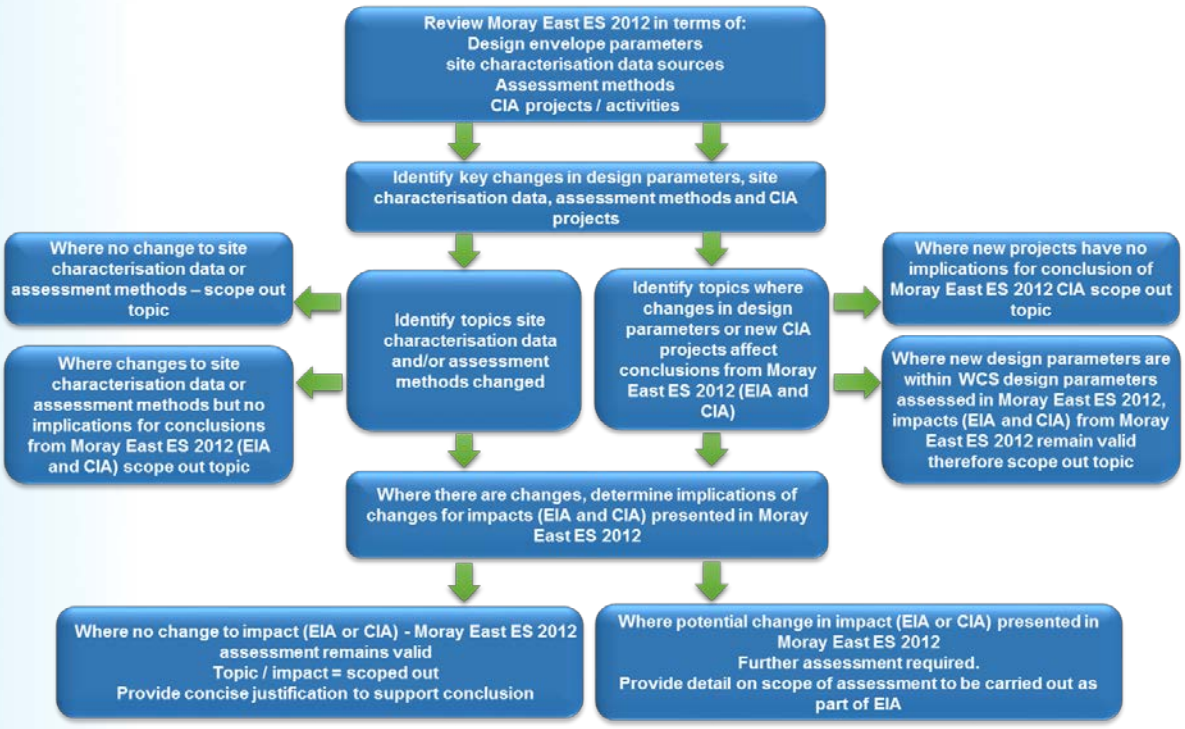

Figure 2-1: Approach to defining scope of the EIA

Scoping Question 2.1:

Does Marine Scotland agree with the approach to the scoping in / out of topics and reporting of significant residual impacts for the proposed wind farm EIA?

2.3 Considerations for appraisal of cumulative impacts presented in the Moray East ES 2012

In 2012, when the Moray East ES was submitted, there were two key projects requiring consideration in the CIA:

- Beatrice Offshore Windfarm Limited (BOWL); and
- Moray West.

2.3.1 BOWL

The CIA for BOWL involved both qualitative and in some cases (e.g. with regard to ornithology and impacts on marine mammals) quantitative assessments. The quantitative assessments were based on specific design parameters for BOWL available at the time such as turbine numbers, sizes, foundation types, installation methods (e.g. piling), construction programmes etc.

BOWL has since been consented (March 2014) and is due to start construction in April 2017. Final design details of the wind farm are presented in the Development Specification and Layout Plan (DSLP) (BOWL, 2016). Given that BOWL will have commenced construction prior to the submission of the consent application for the proposed wind farm consent application, BOWL will now form part of the 'baseline' rather than being considered as an additional project with respect to the CIA. Therefore, given that BOWL will no longer be considered as a CIA project, there is no requirement for this scoping report to validate the conclusions from Moray East ES 2012 CIA with respect to BOWL.

Further consideration of BOWL as part of the baseline is included in Chapter 4 as part of the validation of site characterisation data. Nevertheless, given that BOWL was considered as part of the CIA in the Moray East ES 2012 and that it has been consented (and is to be constructed soon within the parameters of what

was considered in the Moray East ES), there will be no impact on the residual impacts in the Moray East ES 2012 from BOWL alone.

2.3.2 Moray West

Moray West, at the time the Moray East ES 2012 was submitted, was still in the development phase. Therefore, although some initial information was available on turbine numbers and sizes, it was only possible to carry out a qualitative assessment of potential cumulative impacts.

A scoping report has since been submitted for the Moray West generating station (May 2016). The scoping report for the Transmission Infrastructure is due to be submitted in 2017.

Consents for the Moray West Offshore Wind Farm will be applied for later than the date on which the proposed wind farm consent application will be submitted. Moray East and Moray West will request that the proposed wind farm application is determined before the applications for Moray West. Moray Offshore owns 100% of both Moray East and Moray West and therefore controls the development of the Zone as a whole.

Given that Moray West will only go ahead if the Moray East site is determined, there is no requirement to include Moray West in the CIA for the proposed wind farm consent application. However, both the proposed wind farm consent application for the Moray East site and the Moray West wind farm will be included in the CIA carried out as part of the Moray West Offshore Wind Farm consent application.

Further validation of the cumulative impacts associated with the Moray West wind farm presented in the Moray East ES 2012 is therefore, also not required as part of this scoping report.

Scoping Question 2.2:

Does Marine Scotland agree with the proposal that BOWL and potential future development within the Zone (i.e. Moray West) should be excluded from the CIA based on the fact that:

- BOWL is now considered with the baseline (due to the commencement of construction in 2017), and
- It will be requested that the Moray East application is determined before Moray West's?

2.4 Overview of the EIA process

2.4.1 General approach to assessment of impacts

Having defined the scope of the EIA it is then necessary to carry out the impact assessment. The aim of the EIA process is to assess the likely significance of potential impacts on the environment, both before and after mitigation. The assessment of impact significance requires consideration of the magnitude of the impact (taking into account the duration, spatial extent and frequency of the potential impact) and the sensitivity of the receptor.

The approaches and methods used to determine impact magnitude, receptor sensitivity and overall impact significance vary from topic to topic and will be based on discussions with relevant specialists and stakeholders, current guidance and best practice. Detailed assessment methods, and relevant assessment criteria, for those topics / receptors identified as requiring more detailed assessment are presented in Chapters 8 to 12 of this scoping report.

Although specific assessment methods vary from topic to topic, as part of the EIA process, there is a requirement for each assessment to include information on the following:

- Description and characterisation of key aspects / features of the environment that will potentially be affected by the proposed wind farm consent application (baseline environment / conditions);

- Description of potential impacts in terms of nature (positive or adverse); type (direct or indirect, inter-relationships, cumulative); stage of project (installation, operation or decommissioning); geographical extent (within project footprint, local, regional, national or international), duration (temporary, short to long term, permanent), timing (time of year when impact will occur); and frequency of the impact (continuous or intermittent);
- Information on the sensitivity of key receptors to potential impacts, taking into account, where appropriate, the vulnerability and value of the receptor;
- Evaluation of impact significance based on impact magnitude and receptor sensitivity;
- Mitigation measures to be considered as appropriate. There are three types of mitigation (design embedded, standard practice measures based on legislation and guidance etc. and additional non-embedded, impact specific mitigation measures e.g. additional post consent surveys and studies, monitoring programmes, further consultation etc.); and
- Residual impacts – impacts that remain once all options for removing, reducing or managing potentially significant impacts have been taken into account.

2.4.2 Whole project and cumulative impacts

The approach to the assessment of cumulative impacts (e.g. qualitative or quantitative) will vary depending on the availability of specific information on projects and other developments / activities requiring consideration as part of the CIA. The availability of relevant information is likely to vary from topic to topic and the status of the projects / activities being assessed, for example projects in the planning stage may have very limited project design information available in the public domain in comparison to consented projects.

As discussed in Section 2.3 above, it is proposed that in terms of CIA no further assessment is required for either BOWL (on the basis that this is now baseline) or Moray West (on the basis that cumulative impacts of Moray East and Moray West will be assessed in the Moray West application).

Therefore, for those topics identified as requiring further assessment in the EIA, the approach to the assessment of whole project and cumulative impacts will be as follows:

- Assessment of potential impacts of the design changes associated with the proposed wind farm consent application together with impacts associated with the consented modified transmission infrastructure for Moray East as presented in the Moray East Modified TI ES 2012 (whole project assessment); and
- Assessment of potential cumulative impacts of the design changes associated with the proposed wind farm consent application and the consented Modified TI, other projects included in the Moray East ES 2012 (excluding BOWL and Moray West) and any new projects that have been consented or proposed since submission of the Moray East ES in 2012.

The proposed approach for the CIA for each of the topic to be included in the EIA is outlined in relevant chapters of the scoping report (Chapters 8 to 12).

2.4.3 Assessment of impacts associated with different development scenarios

It should be noted that with respect to the proposed wind farm consent application, there are a number of development scenarios. These are discussed below.

2.4.3.1 Development of the consented Telford, Stevenson and MacColl wind farms or proposed wind farm consent application

Under this scenario, the proposed wind farm would be developed instead of the consented Telford, Stevenson and MacColl wind farms in their entirety. For example, for this scenario, development will comprise either the proposed wind farm consent application OR the consented Telford, Stevenson and MacColl wind farms, not both. Therefore, under this scenario there is no requirement to assess the

consented Telford, Stevenson and MacColl wind farms as part of the CIA on the basis that only one of the Moray East projects will be developed, not both.

2.4.3.2 Relationship with existing Telford, Stevenson and MacColl wind farm consents

Alternatively, Moray East may elect to carry out some wind farm development under the existing consents for the Telford, Stevenson and MacColl wind farm sites (i.e. using turbines within the consented 6 to 8 MW range) with the remainder of the Moray East site being developed under any consent granted pursuant to the proposed wind farm consent application (i.e. with a turbine range of 8.1 MW to 15 MW and suction bucket foundations). This would be subject to an overall limit of 1,116 MW for the whole Moray East site, and a consistent approach to turbine layout (i.e. either diamond or grid).

Consideration has been given as to whether this would affect the WCS assessed for either the consented Telford, Stevenson and MacColl wind farms or the proposed wind farm consent application. It has been concluded that in terms of the assessed WCSs the sum of the parts (e.g. WCS for part of the Telford, Stevenson and MacColl wind farms combined with WCS for part of the proposed wind farm consent application) will never exceed WCS for each project as a whole. Therefore, this development scenario is not considered further in the proposed wind farm consent application assessments.

2.4.3.3 Phasing of development

There is potential for the proposed wind farm consent application to be constructed in a number of phases. Further detail on the construction scenarios of the proposed wind farm consent application will be provided in the ES. In the same way as the current consents allow the consented Telford, Stevenson and MacColl wind farms to use different turbine sizes and spacing, under the proposed wind farm consent application Moray East may also construct and operate different turbine sizes and spacing within each of the phases of the Moray East site. The total capacity of the Moray East site is limited to 1,116 MW, but the maximum size of each phase will be determined by the CfD awarded for that particular phase. These construction scenarios will be considered in more detail for those topics to be assessed as part of the EIA.

2.4.4 Transboundary impacts

Article 7 of the EIA Directive requires the assessment of transboundary impacts where a project implemented in one Member State is likely to have significant impacts on the environment of another Member State. Given the location of the Moray East site, and the fact that no transboundary impacts were identified from the Moray East ES 2012, the potential for transboundary impacts are considered to be unlikely and therefore are not included in this scoping report and considered to be scoped out of the proposed EIA.

However, there may be a requirement to consider transboundary impacts with regard to the HRA where key receptors are a qualifying feature of Natura sites located in England or elsewhere in the UK. These will be identified during HRA screening (see below).

2.5 Habitat Regulations Appraisal (HRA)

HRA information is included in this scoping report for reasons of administrative efficiency, to allow MS-LOT and consultees to find all the information in one place and respond to one document. In addition to the EIA, a separate HRA will also be carried out for the proposed wind farm consent application. The HRA will be carried out in accordance with the following regulations which transcribe the requirements of the Habitat Directive (Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora) into Scottish law:

- The Conservation of Habitats and Species Regulations 2010 as amended (the "2010 Regulations") out to 12 nm for reserved matters[1] ; and

[1] Reserved matters include: activities consented under sections 36 or 37 of the Electricity Act 1989; activities consented under the Pipelines Act 1962; matters related to the exploration for, and exploitation of, deposits of oil and natural gas; and matters related to defence of the realm.

- The Offshore Marine Conservation (Natural Habitats &c) Regulations 2007, as amended (the "Offshore Marine Regulations") beyond 12 nm.

The results from the HRA will be presented in a separate HRA report for submission alongside the ES for the proposed wind farm consent application. Further information on the proposed approach to the HRA is provided in Chapter 13.

Scoping Question 2.3

Does Marine Scotland agree that the consented Telford, Stevenson and MacColl wind farms do not need to form part of the CIA?

Scoping Question 2.4

Does Marine Scotland agree that the assessment of impacts should be based on the development scenario set out in 2.4.3?

Scoping Question 2.5

Does Marine Scotland agree that the potential for transboundary impacts is unlikely?

2.6 Structure of this scoping report

Scoping Report Chapter	Content
Chapter 3	Project description including comparative assessment of the Design Envelope for the consented Telford, Stevenson and MacColl wind farms and the Design Envelope for the proposed wind farm consent application.
Chapter 4	Validation of site characterisation data and impact assessment methodologies.
Chapter 5	Appraisal of project specific impacts presented in the Moray East ES 2012 based on changes to Design Envelope.
Chapter 6	Appraisal of whole project and cumulative impacts presented in the Moray East ES 2012 based on changes to Design Envelope.
Chapter 7	Proposed scope of the EIA for the proposed wind farm consent application.
Chapters 8 – 12	Detailed method statements for topics identified as requiring further assessment as part of the EIA (scoped in EIA topics).
Chapter 13	Approach to HRA.
Chapter 14	Stakeholder engagement.
Chapter 15	Structure of the ES.

2.7 References

BOWL (2016). Beatrice Offshore Wind Farm Development Specification and Layout Plan, November 2016. Report available through http://www.gov.scot/Resource/0051/00510248.pdf.

3 Project Description

3.1 Introduction

This chapter of the scoping report provides information on the alternative design parameters in the Design Envelope for the proposed wind farm consent application in the context of the Design Envelope for the consented Telford, Stevenson and MacColl wind farms.

Offshore wind turbine technologies have advanced significantly in recent years resulting in the development of larger and more efficient turbines and innovations in foundations. Moray East is therefore seeking consent for a revised Design Envelope in order to encompass these technological developments with the aim of maximizing the efficiency of the Moray East site while continuing to work towards reducing the overall cost of electricity generation.

3.2 Overview of design changes

As illustrated in Figure 1.1, this proposed wind farm consent application applies to the entire Moray East site. For the purpose of this proposed wind farm consent application the Moray East site will no longer be split into three separate wind farm areas thus simplifying the consenting process. However, as discussed in Chapter 2, the Moray East site may be developed in phases under the proposed wind farm consent application.

The main changes to the Design Envelope relate to an increase in the size of the turbines to be installed in the Moray East site. This will not affect the overall generation capacity of the Moray East site, which will remain at 1,116 MW maximum installed capacity. However, it will result in a reduction in the total number of turbines installed within the Moray East site and a possible increase in spacing between the turbines (although for the purposes of informing this scoping report and the subsequent EIA the minimum spacing will remain the same as is in the current consents as this represents the WCS).

Suction bucket foundations will also be included in the Design Envelope (see Section 3.2.1). However, given that the design parameters for these foundations will be within the worst case design parameters assessed as part of the Moray East ES 2012, inclusion of these foundations is not considered to affect the conclusions of the impact assessment presented in the Moray East ES 2012.

Although there will be an increase in turbine size in terms of maximum tip height and rotor diameter, there is no requirement to increase the size of the foundations (Gravity Base Structure (GBS) foundation or jacket foundations) required to support the turbines or any of the design parameters associated with these structures. For example, the number and diameter of pin piles requires for the jacket foundations will remain the same.

There will be no changes proposed in this application to the transmission infrastructure associated with the Moray East Offshore Wind Farm.

Further detail on the Design Envelope for the consented Telford, Stevenson and MacColl wind farms is provided in the Moray East ES 2012 Chapter 2 and for the Modified TI within Chapter 2.2 of the Moray East Modified TI ES 2014.

3.2.1 Suction bucket foundation design overview

This foundation concept has been used extensively for the support of structures in the oil and gas sector and is being increasingly employed for offshore wind supporting structures, and is used as an alternative to driven piles at the base of steel jackets. The concept consists of a steel cylindrical skirt or skirts (the bucket) sealed at the top, which penetrate into the seabed under the weight of the jacket and hydrostatic forces created as a result of hydraulically evacuating the internal cavity of the bucket (Figure 3.1). Once sealed into position these hydrostatic forces are sufficient to provide the structure with sufficient connection with the seabed for the environmental and turbine loads.

The main benefit with utilising such a design is the elimination of impact hammering required for pile driving and the ability to easily reverse the operation by applying positive internal pressure within the bucket to aid decommissioning.

As with GBS and pin piled jackets the application of scour protection maybe required.

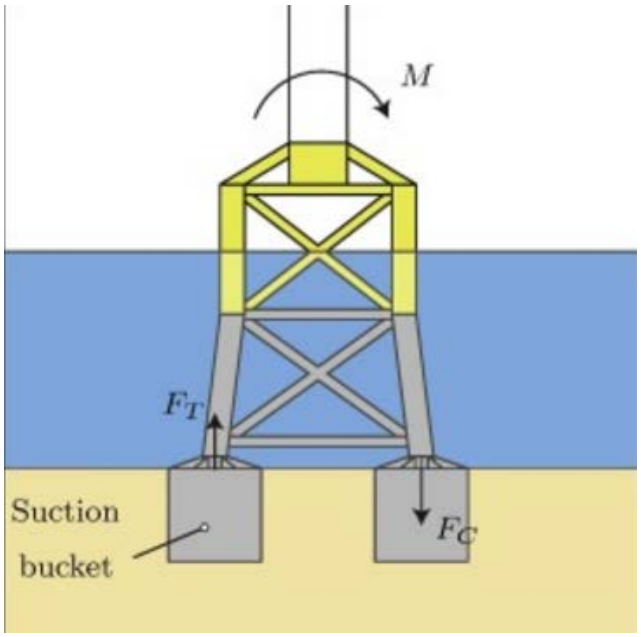

Figure 3-1: Diagram of suction bucket foundation structure

3.3 Design Envelope Analysis

Based on the changes described above, in order to clearly define the scope of the EIA required to support the Section 36 consent and Marine Licence applications, it is necessary to carry out a comparative review of the Design Envelope for the proposed wind farm consent application against the Design Envelope of the consented Telford, Stevenson and MacColl wind farms.

This comparative review will identify whether any of the new design parameters fall outside the consented Design Envelope. This applies to both the direct changes (e.g. increase in turbine height) and any potential indirect changes in design parameters. Results from the comparative review are presented in Table 3.1.

Where specific design parameters fall outside the consented Design Envelope, further analysis is required to determine whether the proposed changes would have an implication for the outcome of the Moray East ES 2012 in terms of the impacts predicted. Further information on the potential implications of changes to the consented Design Envelope for impacts assessed as part of the Moray East ES 2012 are discussed in Chapter 5 with respect to project specific impacts and Chapter 6 with respect to whole project and cumulative impacts.

Table 3-1: Design Envelope comparative assessment

Design Envelope parameter	Parameters assessed in Moray East ES 2012	Consented parameters (2014)	New parameters	Implications for consented parameter?
Wind turbine generators (WTGs)				
Maximum wind farm capacity	Up to 1,500 MW	1,116 MW	1,116 MW	No change

Design Envelope parameter	Parameters assessed in Moray East ES 2012	Consented parameters (2014)	New parameters	Implications for consented parameter?
Maximum number of Wind Turbine Generators (WTGs)	189 - 339	186	137	Within WCS parameters assessed in the Moray East ES 2012
WTG rating	3.6 – 8 MW	6 – 8 MW	8.1 – 15 MW	Outside consented Design Envelope
Maximum tip height	162 m - 204 m (LAT)	186 m - 204 m (LAT)	280 m (HAT)	Outside consented Design Envelope
Maximum rotor diameter	120 m – 172 m	150 m - 172 m	250 m	Outside consented Design Envelope
Maximum hub height	97 m – 118 m	97 m – 118 m	To be confirmed at design freeze for inclusion in the ES	For the purpose of scoping it is assumed that this will be outside the consented Design Envelope
Minimum spacing (downwind)	840 m	1,200 m	1,200 m	Within WCS parameters assessed in the Moray East ES 2012
Minimum spacing (crosswind)	600 m	1,050 m	1,050 m	Within WCS parameters assessed in the Moray East ES 2012
Minimum clearance (HAT)	22 m	22 m	22 m	No change
Rotational speed range (rpm)	4 – 15.1	4 – 12.8	To be confirmed at design freeze for inclusion in the ES	For the purpose of scoping it is assumed that this will be outside the consented Design Envelope
Maximum blade width	4.2 – 5.8	5 – 5.8 m	To be confirmed at design freeze for inclusion in the ES	For the purpose of scoping it is assumed that this will be outside the consented Design Envelope
Suction bucket foundation – parameters shown per individual suction bucket (three or four may be installed depending on jacket substructure design – 3 or 4 legged)				
Suction bucket diameter	N/A	N/A	27 m	Within assessed WCS for gravity base structure (GBS) foundations
Maximum footprint (m^2) per suction bucket	N/A	N/A	573 m^2	Within assessed WCS for gravity base structure (GBS) foundations

Design Envelope parameter	Parameters assessed in Moray East ES 2012	Consented parameters (2014)	New parameters	Implications for consented parameter?
Suction bucket diameter with scour protection	N/A	N/A	47 m	Within assessed WCS for gravity base structure (GBS) foundations
Maximum footprint per suction bucket with scour protection	N/A	N/A	1,735 m^2	Within assessed WCS for gravity base structure (GBS) foundations
GBS foundations				
GBS diameter (base width)	65 m	65 m	No change	No change
GBS footprint (without scour protection)	3,318 m^2	3,318 m^2	No change	No change
Gravel / grout bed diameter	75 m	75 m	No change	No change
Excavated bed and scour protection diameter	95 m	95 m	No change	No change
GBS footprint (with scour protection)	7,088 m2	7,088 m^2	No change	No change
Maximum dredge affected diameter	125 m	125 m	No change	No change
Maximum bed extraction depth	5 m	5 m	No change	No change
Maximum gravel bed depth	2.5 m	2.5 m	No change	No change
Jacket foundation structures				
Jacket base width	60 m	60 m	No change	No change
Number of legs / pin piles	3 – 4	3 – 4	No change	No change
Maximum diameter of pin piles	2.5 m	2.5 m	No change	No change
Maximum length of pin piles	60 m	60 m	No change	No change

Design Envelope parameter	Parameters assessed in Moray East ES 2012	Consented parameters (2014)	New parameters	Implications for consented parameter?
Maximum scour protection around each leg including pin pile diameter	16 m	16 m	No change	No change
Inter-array cabling				
Cable type	Alternating Current (AC)	Alternating Current (AC)	No change	No change
Voltage of cables	33 kV – 66 kV	33 kV – 66 kV	No change	No change
Total length	572 km	572 km	No change	No change
Entry / exit method to turbines	J tube	J tube	No change	No change
Target burial depth	1 m	1 m	No change	No change
Protection where burial not achieved	Rock placement / concrete mattressing / concrete tunnels / grout bags / plastic ducting / protective sleeves		No change	No change

3.4 Summary of key Design Envelope differences

Based on findings from the comparative review presented in Table 3.1 the key changes in Design Envelope requiring further assessment include:

- Increase in turbine size with approximate maximum parameters of:
  - Blade tip height up to 280 m (HAT);
  - Rotor diameter up to 250 m;
- Revised turbine rating range of 8.1 MW – 15 MW;
- Reduction in total number of turbines – maximum 137 turbines; and
- Inclusion of suction bucket foundation structures.

Minimum clearance at Highest Astronomical Tide (HAT) will be 22 m.

There is also potential for changes in layout associated with a reduction in the total number of turbines and associated changes in spacing between turbines. However, for the purpose of this scoping report and the EIA, the minimum spacing will remain the same as the spacing for the consented Telford, Stevenson and MacColl wind farms which is no less than the 840 m downwind spacing by 600 m crosswind spacing assessed as the WCS in the Moray East ES 2012 (Table 3.1).

Specific parameters relating to blade rotational speeds (rpm) and blade width will be available for the EIA following the conclusion of Moray East's market review in March 2017. It is also likely, based on the changes associated with the turbines identified above, that these parameters may be different to those assessed in the Moray East ES 2012 and therefore require further assessment as part of the EIA.

Scoping Question 3.1

Is the level of detail presented in the project description in this scoping report of sufficient detail to inform the proposed windfarm EIA, if not what further details would Marine Scotland expect to see presented in the ES?

4 Validation of site characterisation data and impact assessment methods

4.1 Introduction

This chapter presents results from an appraisal of site characterisation data and impact assessment methods used in the Moray East ES 2012. The focus of the appraisal is to determine whether there have been any changes in, or updates to, the site characterisation data and assessment methods used in the Moray East ES 2012 that could invalidate the findings from the impact assessment.

Where there are changes, or updates, to site characterisation data (e.g. where new data has been collated as part of additional studies carried out post submission / post consent, or more up to date data available e.g. fisheries statistics) or assessment methods, the implications of these in terms of whether further work / assessment is required as part of the EIA is also assessed.

4.2 Consideration of BOWL within the baseline

One change that affects characterisation of the site for all of the EIA topics is the inclusion of BOWL, which is to commence construction in April 2017, within the baseline. An assessment of cumulative impacts associated with BOWL and the Telford, Stevenson and MacColl wind farms was included in the Moray East ES 2012. This assessment was based on a WCS design parameter of a maximum of 277 turbines being installed at the BOWL site. For all topics except fish and shellfish ecology, marine mammals, ornithology, commercial fisheries, SLVIA and socio-economics, potential cumulative impacts based on the 277 turbines were assessed to be minor, negligible or not significant.

However, since being granted consent, BOWL has been subject to a number of design changes. The final "as built" project design presented in the DSLP is for 84 turbines (BOWL, 2016a).

The implications of including BOWL in the baseline for these topics is discussed as part of the overall validation of site characterisation studies, surveys and assessment methods presented below.

4.3 Validation of site characterisation studies, surveys and assessment methods

As part of the validation of site characterisation data and assessment methods it is necessary to identify the following:

- Technical studies and surveys completed as part of the Moray East ES 2012 to characterise the baseline within the consented Telford, Stevenson and MacColl wind farms which together make the whole of the Moray East site;
- Methods used in the Moray East ES 2012 to assess potential impacts of the Telford, Stevenson and MacColl wind farms on the environment;
- Additional site specific studies and surveys that have been completed by Moray East following ES submission in 2012 and / or receiving consent for the Telford, Stevenson and MacColl wind farms in March 2014;
- Additional, or updated, data and research, from other sources that has been made available since submission of the Moray East ES in 2012 and / or consent award in March 2014; and
- Updated assessment methods, or publication of new / revised guidance and literature relating to the assessment of impacts on certain receptors.

A summary of the key site characterisation studies and surveys and assessment methods included in the Moray East ES 2012 and obtained post ES submission is provided in Table 4.1.

It should be noted that Table 4.1 focuses on site specific studies and surveys only. In addition to these site specific studies and surveys, extensive desk based studies were carried out to further inform site characterisation. The desk based studies included reviews of relevant data obtained from other sources (local, regional and national data), research studies and literature reviews. With regard to the approaches to the assessment of impacts, where guidance is referenced this is only primary guidance. As with the

site characterisation studies, the assessment of impacts also involved extensive reviews of relevant literature and research studies and were carried out in accordance with various topic and impact specific guidance.

Table 4-1: Site characterisation updates and assessment methods carried out as part of, and post submission of, the Moray East ES 2012

Key site characterisation studies and surveys included in the Moray East ES 2012	Site characterisation updates post submission / consent (2014)	Approach to assessment of impacts in the Moray East ES 2012	New / updated sources of data / research, guidance / assessment methodologies emerging post ES submission (2012) / consent (2014)
Physical environment and sediment processes (ES Chapters 3.1 – 3.5 and 6.1 and 6.2)			
Physical Processes Baseline Assessment (MORL, 2012a) Metocean survey of the Moray Firth Round 3 Zone (Partrac, 2010a) Geophysical survey of the Moray Firth Round 3 Zone (Osiris Projects, 2011) Sediment grab survey of the Moray Firth Round 3 Zone (Emu, 2011a)	No additional site specific studies or surveys carried out Inclusion of BOWL in baseline	Metocean and coastal processes numerical modelling including sediment plume dispersion modelling (MORL, 2012b) Metocean and physical processes impact assessment (MORL, 2012c)	No new / updated relevant sources of data identified
Underwater noise (ES Chapter 3.6)			
Underwater noise modelling and technical report (MORL, 2012d)	Additional underwater noise modelling carried out as part of the Piling Strategy (Moray East, 2016) Inclusion of BOWL in baseline	Results incorporated into relevant assessments on marine mammals and fish	No new / updated relevant sources of data identified
Benthic ecology (Moray East ES 2012 Chapters 4.2 and 7.1)			
Benthic ecology characterisation survey including seabed sampling, video surveillance and scientific trawling (MORL, 2012e)	No additional site specific studies or surveys carried out Inclusion of BOWL in baseline	Desk based assessment based on results from benthic ecology characterisation survey and in accordance with Guidelines for Ecological Impact Assessment in Britain and Ireland. Marine and Coastal (IEEM, 2010)	Designation of Noss Head Nature Conservation Marine Protected Area (NCMPA) for horse mussel beds (Wick, north coast Moray Firth)
Fish and shellfish ecology (Moray East ES 2012 Chapters 4.3 and 7.2)			

Key site characterisation studies and surveys included in the Moray East ES 2012	Site characterisation updates post submission / consent (2014)	Approach to assessment of impacts in the Moray East ES 2012	New / updated sources of data / research, guidance / assessment methodologies emerging post ES submission (2012) / consent (2014)
Underwater noise modelling (MORL, 2012d)) Benthic ecology characterisation survey report (MORL, 2012e) Fish and shellfish ecology technical report (MORL, 2012f) Salmon, sea trout and fisheries technical report (MORL, 2012g) Sandeel surveys (MORL, 2012h) Electromagnetic Fields (EMF) modelling (MORL, 2012i) Commercial Fisheries Technical Report (MORL, 2012u)	BOWL sandeel surveys 2014 (BOWL, 2014a) Moray East cod surveys 2013 (Brown and May Marine Limited, 2013) BOWL cod surveys 2014 (BOWL, 2015a) BOWL herring surveys 2014 and 2015 (BOWL, 2014b, BOWL, 2016b) Additional underwater noise modelling and fish ecology assessment carried out as part of the Piling Strategy (Moray East, 2016) Inclusion of BOWL in baseline	Desk studies based on outcome from various studies and modelling Noise modelling based on three construction scenarios (with regard to piling activities). These based on the following build programmes: • 2-year x 6 vessel; • 3-year x 2 vessels; and • 5-year x 1 vessel build programme	Updated Fisheries Sensitivity Maps in British Waters report and maps published by Scottish Government in 2014 (Scottish Government, 2014)
Marine mammals (Moray East ES 2012 Chapters 4.4 and 7.3)			
Two years of boat based surveys (2010 – 2012) (MORL, 2012j) Collaborative studies undertaken by Aberdeen University and Sea Mammal Research Unit (SMRU) including: • Harbour seal telemetry and habitat association modelling • Harbour seal abundance at haul-out sites and at sea • Grey seal telemetry	Marine mammal monitoring in the Zone commence in 2014 as part of the Marine Mammal Monitoring Programme (Thompson, 2014) Ongoing seal monitoring carried out by SMRU as part of the Moray Firth Seal Management Plan. Monitoring commenced in 2005 Additional underwater noise modelling and marine mammal	Various technical studies were carried out to inform the assessment of impacts on marine mammals including: Marine mammal impact assessment technical report (MORL, 2012k) Framework for assessing the impacts of pile-driving noise from offshore wind farm construction on Moray Firth harbour seal populations (MORL, 2012l)	New evidence relating to cause of corkscrew injuries (Scotland Government, 2015) Publication of Management Units (MUs) for cetaceans (IAMMWG, 2015) Designation of Inner Hebrides and the Minches candidate Special Area of Conservation (cSAC) for harbour porpoise (SNH, 2016) Designation of Southern North Sea cSAC for harbour porpoise (JNCC, 2017)

Key site characterisation studies and surveys included in the Moray East ES 2012	Site characterisation updates post submission / consent (2014)	Approach to assessment of impacts in the Moray East ES 2012	New / updated sources of data / research, guidance / assessment methodologies emerging post ES submission (2012) / consent (2014)
• Passive acoustic monitoring to examine cetacean spatial and temporal variation across the Moray Firth • Cetacean habitat association modelling • Estimation of harbour porpoise density • Estimation of bottlenose dolphin density	assessment carried out as part of the Piling Strategy (Moray East, 2016) Inclusion of BOWL in baseline	SAFESIMM impact assessment for seals and cetaceans (MORL, 2012m) A comparison of behavioural responses by harbour porpoise and bottlenose dolphin to noise (MORL, 2012n) Identification of appropriate noise exposure criteria for assessing auditory injury on pinnipeds using offshore wind sites (MORL, 2012p) Noise propagation and SAFESIMM model outputs (MORL, 2012q) Noise modelling based on three construction scenarios (with regard to piling activities): • 2-year x 6 vessel; • 3-year x 2 vessels; and • 5-year x 1 vessel build programme	Avoidance of wind farms by harbour seals is limited to pile driving activities (Russell *et al*., 2016) Framework for assessing impacts of pile-driving noise from offshore wind farm construction on a harbour seal population (Thompson *et al*., 2013)
Ornithology (Moray East ES 2012 Chapters 4.5 and 7.4)			
Surveys (2009 to 2012) to inform the baseline assessment (MORL, 2012s) including: • Monthly boat–based surveys (2010 to 2012); • Aerial surveys (seven surveys completed during 2009 and 2010 and a further six surveys during 2011);	Tracking of large gulls (great black backed gull and herring gull) 2014 breeding season (Archibald at al., 2015) BOWL pre-construction aerial surveys (BOWL, 2016c) Inclusion of BOWL in baseline	Ornithological baseline and impact assessment (MORL, 2012r) Assessment based on Guidelines for Ecological Impact Assessment in Britain and Ireland. Marine and Coastal (CIEEM, 2010). Included: • Displacement modelling; • Collision risk modelling (based on revised Band model (Band, 2012)	Identification of 15 proposed Special Protection Areas (pSPAs) including on the east coast of Scotland / Orkney (SNH, 2017): Moray Firth pSPA; Ythan Estuary, Sands of Forvie and Meikle Loch pSPA; Outer Firth of Forth and St Andrews Bay Complex pSPA; Pentland Firth pSPA; Scapa Flow pSPA; and North Orkney pSPA.

Key site characterisation studies and surveys included in the Moray East ES 2012	Site characterisation updates post submission / consent (2014)	Approach to assessment of impacts in the Moray East ES 2012	New / updated sources of data / research, guidance / assessment methodologies emerging post ES submission (2012) / consent (2014)
• Migration surveys (Autumn 2010 to Spring 2011); and • Seabird tracking study (2011 breeding season). Results presented in Ornithological baseline and impact assessment (MORL, 2012r)		and British Trust Ornithology (BTO) avoidance rates (Cook *et al.*, 2014); Population Viability Analysis (PVA) Seabird tracking and modelling report (MORL, 2012t)	There are also three pSPAs in Shetland. The remaining six pSPAs are located on the west coast of Scotland. In 2014, SNH also designated the East Caithness Cliffs NCMPA – for black guillemot. With regard to guidance there have been a number of updates to, and publications of new guidance, since 2012. This includes revised guidance on avoidance rates (JNCC *et al.*, 2014) following the Marine Scotland Science Avoidance Rate Review (Cook *et al.*, 2014) and guidance from Wade *et al.*, (2016) on vulnerability of seabirds to marine renewable energy developments. Moray Firth Offshore Wind Developers Group Cumulative Impact Assessment Discussion Document (ERM, 2011) A comprehensive list of all relevant updated and new guidance is presented in Chapter 8.
Commercial fisheries (Moray East ES 2012 Chapters 5.1 and 8.1)			
Salmon, sea trout and fisheries technical report (MORL, 2012g) Commercial fisheries technical report (MORL, 2012u)	No additional site specific studies or surveys carried out Inclusion of BOWL in baseline	Assessment of impacts on commercial fisheries was based on CEFAS (2004) Guidelines Assessment of impacts on salmon and sea trout based on Guidelines for Ecological Impact Assessment in Britain and Ireland. Marine and Coastal (CIEEM, 2010)	Updated landings data available for ICES rectangle 45E7 for 2011 to 2015

Key site characterisation studies and surveys included in the Moray East ES 2012	Site characterisation updates post submission / consent (2014)	Approach to assessment of impacts in the Moray East ES 2012	New / updated sources of data / research, guidance / assessment methodologies emerging post ES submission (2012) / consent (2014)
Shipping and navigation (Moray East ES 2012 Chapters 5.2 and 8.2)			
Navigational Risk Assessment (NRA) (MORL, 2012v) including: • Hazard Identification Workshop AIS and radar (non–AIS) survey of vessels operating during spring / summer (April to July 2010) and winter (November 2010 to January 2011) Fishing surveillance satellite data (2009) and over flight data (2005 to 2009)	No additional site specific studies or surveys carried out Inclusion of BOWL in baseline	Assessment of impacts based on following guidance: • Maritime and Coastguard Agency (MCA) Marine Guidance Notice 371 (MGN 371 M+F) (2008) • Department of Energy and Climate Change (DECC) Risk Assessment Methodology 2005 • Assessment based on three layouts: • Scenario 1: Max number of turbines (339) in diamond layout (3.6 MW turbine in one site and 5 MW turbines in two sites) • Scenario 2: 291 turbines in diamond layout (5 MW in each wind farm site) • Scenario 3: 249 turbines in grid layout (5 MW turbines in two sites and 7 MW in one site) Formal Safety Assessment (FSA) based on International Maritime Organisation (IMO) FSA process 2007 and DECC guidance with respect to Navigational Risk, Search and Rescue (SAR) Operations and Helicopter Operations Beatrice and Moray Offshore Wind Farms Helicopter Impact Assessment (MORL, 2012x)	Updated AIS tracking data available for post ES submission period to date New MCA Marine Guidance Notice 543 (MGN 543 (M+F) Safety of Navigation: Offshore Renewable Energy Installations (OREIs) (2016)

Key site characterisation studies and surveys included in the Moray East ES 2012	Site characterisation updates post submission / consent (2014)	Approach to assessment of impacts in the Moray East ES 2012	New / updated sources of data / research, guidance / assessment methodologies emerging post ES submission (2012) / consent (2014)
Civil and military aviation (Moray East ES 2012 Chapters 5.3 and 8.3)			
Moray Firth Offshore Wind Farm: Initial Aviation Assessment Report (MORL, 2012w) Beatrice and Moray Offshore Wind Farms Helicopter Impact Assessment (MORL, 2012x) Radar Propagation Modelling (MORL, 2012y)	Moray Firth Transponder Mandatory Zone (TMZ) Airspace Change Proposal. Detailed application and letter of approval from CAA for TMZ over Moray East. Inclusion of BOWL in baseline	Consultation with aviation stakeholders in accordance with Civil Aviation Authority (CAA) publication CAP 764 Policy and Guidelines on Wind Turbines Assessment of potential impacts with regard to flight characteristics and procedures published in UK Integrated Aeronautical Information Package (IAIP) and Military Aeronautical Information Package (Mil AIP)	Windfarms Phase 1 Scoping Study (Aquila, 2016): Analysis of potential mitigation solutions at Lossiemouth PSR.
Seascape, landscape and visual assessment (SLVIA) (Moray East ES 2012 Chapters 5.4 and 8.4)			
SLVIA Methodology (MORL, 2012z)	No additional site specific studies or surveys carried out Inclusion of BOWL in baseline	Assessment carried out in accordance with the Landscape Institute (LI) Guidelines for the Assessment of Landscape and Visual Impacts (2003) Second Edition SNH's Visualisation of Windfarms, Good Practice Guidance, 2006 SNH, 2005, Cumulative Effects of Windfarms (Version 2) Assessment based on five layouts with various scenarios for each layout resulting in a total of 10 scenarios. These varied depending on diamond or grid layout, combined with varying turbine sizes (3.6	Updated assessment guidance including: Landscape Institute and IEMA, 2013, Guidelines for Landscape and Visual Impact Assessment of Landscape and Visual Impacts: Third Edition. SNH, 2014, Visual Representation of Wind Farms (Version 2.1). SNH, 2014, Siting and designing wind farms in the landscape - Version 2. The Highland Council, 2016, Visualisation Standards for Wind Energy Developments. SNH (TBC currently draft 2016) Guidance on Coastal Character Assessment

Key site characterisation studies and surveys included in the Moray East ES 2012	Site characterisation updates post submission / consent (2014)	Approach to assessment of impacts in the Moray East ES 2012	New / updated sources of data / research, guidance / assessment methodologies emerging post ES submission (2012) / consent (2014)
		MW, 5 MW or 7MW), varying turbine numbers within the Telford, Stevenson and MacColl wind farm sites and varying spacing between turbines in each site Total number of viewpoints assessed as part of the EIA = 22 based on Zone of Theoretical Visibility (ZTV) for 10 development scenarios	
Archaeology and visual receptors (Moray East ES 2012 Chapters 5.5 and 8.5)			
Archaeological Technical Report (MORL, 2012aa) including: • Review of marine geophysical data (sidescan sonar, multi-beam echosounder (bathymetry), sub-bottom profiler and magnetometer); and • Review of marine geotechnical data (25 boreholes across Moray East)	No additional site specific studies or surveys carried out Inclusion of BOWL in baseline	Desk based assessment based on information presented in the Archaeological Technical Report	Updated assessment guidance including: Chartered Institute for Archaeologists (CIfA) standards and guidance for historic environment desk-based assessment updated in 2014; Historic Scotland (2016) Managing Change in the Historic Environment – Setting. Scottish National Marine Plan (Scottish Government, 2016) Scottish Historic Environment Policy (SHEP) (2016)
Socio-economics, recreation and tourism (Moray East ES 2012 Chapters 5.6 and 8.6)			
Socio-economics Technical Report (MORL, 2012bb) relating to GVA and employment ratios	No additional site specific studies or surveys carried out Inclusion of BOWL in baseline	Desk based assessment informed by Socio-economic Technical Report	Updated statistics available relating to GVA and employment (local and regional) New guidance published by the Marine Management Organisation (MMO) on assessing the socio-economic implications of the

Key site characterisation studies and surveys included in the Moray East ES 2012	Site characterisation updates post submission / consent (2014)	Approach to assessment of impacts in the Moray East ES 2012	New / updated sources of data / research, guidance / assessment methodologies emerging post ES submission (2012) / consent (2014)
			implementation of marine planning policies (2014) Updated guidance published by the Homes and Communities Agency's Additionality Guide (4th edition, 2014)
Other human activities (Moray East ES 2012 Chapters 5.7 and 8.7)			
UXO Risk Assessment Report	No additional site specific studies or surveys carried out Inclusion of BOWL in baseline	Desk based assessment only	Anticipated decommissioning of Beatrice oil field and Jacky platform. Number of additional projects (consented and planned) in region including Hywind Floating Offshore Wind Pilot Park; Dounreay Tri Floating Offshore Wind Farm; Kincardine Offshore Wind Project; Caithness Moray Interconnector, Eastern HVDC Link and NorthConnect Interconnector.

4.4 Validation of site characterisation data

The following section presents findings from an appraisal of the potential implications of changes in, and updates to, site characterisation data presented in the Moray East ES 2012 in terms of whether the data remains valid for informing this scoping report and an assessment of impacts associated with the proposed wind farm consent application.

4.4.1.1 Physical environment and sediment processes

As identified in Table 4.1 there have been no changes or updates to the site characterisation data presented in the Moray East ES with respect to the physical environment and sediment processes other than the inclusion on BOWL in the baseline.

Based on results from the Moray East ES 2012 CIA it was concluded that there would be no significant cumulative impacts associated with development of BOWL in conjunction with the consented Telford, Stevenson and MacColl wind farms. This conclusion was based on the assessment of 277 turbines (WCS). While the presence of BOWL will present a change in the characteristics of the area, given that the total number of turbines to be installed is now 84, it can be concluded that inclusion of BOWL in the baseline will not affect the conclusions presented in the Moray East ES 2012 with regard to impacts on physical environment and sediment dynamics. Therefore, no further assessment is required as a result of BOWL being included in the baseline.

4.4.1.2 Benthic ecology

As identified in Table 4.1, in 2014, Scottish Ministers designated the Noss Head NCMPA, which is located on the north coast of the Moray Firth. This NCMPA has been designated specifically for horse mussel beds and covers an area of approximately 8 km^2 immediately off the coast at Wick.

In terms of potential implications for the Moray East ES 2012 assessments, given that the site is located approximately 24 km from the Moray East site, there would be no potential for any direct impacts on the benthic features associated with this site.

With regard to indirect impacts (e.g. re-deposition of suspended sediment associated with seabed disturbance) it was concluded in both the physical environment and sediment processes assessment and benthic ecology impact assessment that, taking into account water depth and local tidal conditions, suspended sediment concentrations would reduce to 10 mg / l within 3,000 m (3 km) of the point of disturbance. These levels (10 mg / l) are considered to be well within the natural variation in suspended sediment concentrations that benthic communities in the Moray Firth are already exposed to through natural processes e.g. extreme wave events. Therefore, given that suspended sediment concentration levels will have already reduced to acceptable levels at 3 km from the point of disturbance, the potential for any indirect impacts on benthic features located at 24 km from the point of disturbance is highly unlikely.

It can therefore be concluded that while designation of Noss Head NCMPA does alter the wider regional characteristics of the area from a benthic ecology perspective, it does not affect the local site characteristics or conclusion of the impact assessment presented in the Moray East ES 2012. Therefore, with respect to the Noss Head NCMPA, the baseline information presented in the Moray East ES 2012 with respect to benthic ecology (Chapters 4.2 and 7.1) remains valid for the purpose of informing this scoping report.

With regard to the inclusion of the final as built BOWL wind farm within the baseline, it was concluded in the Moray East ES 2012 CIA that, potential cumulative impacts from the development of BOWL (based on 277 turbines) in conjunction with the Telford, Stevenson and MacColl wind farms would be minor adverse and not significant. The final as built BOWL wind farm will comprise 84 turbines compared to the 277 turbines assessed in the Moray East ES 2012 CIA. Therefore, while its presence will present a change in the characteristics of the area, its inclusion as part of the baseline will not affect the conclusions presented in the Moray East ES 2012 with regard to impacts on benthic ecology. Therefore, no further assessment is required as a result of BOWL being included in the baseline.

4.4.1.3 Fish and shellfish ecology

As noted in Table 4.1, prior to and since submission of the Moray East ES in 2012 a number of surveys and studies have been undertaken with respect to fish and shellfish ecology.

In 2012 Moray East carried out sandeel surveys, results from which were included in the Moray East ES 2012 (Chapter 7.2 and Technical Appendix 4.3 C). In 2014, sandeel surveys were carried out by BOWL (BOWL, 2014a). These surveys reported similar findings to the Moray East 2012 survey which indicates that sandeel distribution associated with the Moray East site is patchy and sandeels are only present in relatively low numbers (BOWL, 2014a).

Moray East also carried out spawning cod surveys in 2013. Results from these surveys found spawning cod densities to be very low across the Moray East site, with spawning concentrated (although still at very low concentrations) within the south east corner of, and further to the south of, the Moray East site. Additional cod surveys carried out by BOWL in 2014 report similar findings to the Moray East surveys (BOWL, 2015a).

With respect to herring spawning, data from Coull *et al*., 1998 presented in the Moray East ES 2012 indicated that although the Moray East site does not lie within a spawning ground there are herring spawning grounds both to the north and south of the Moray East site (Orkney-Shetland) and (Buchan). The Coull *et al*., 1998 data also indicate that herring larvae has been recorded in the Moray East area, although not in high densities. In terms of nursery grounds, data from Ellis *et al*., 2010 indicates that nursey grounds across the entire Moray Firth are of high intensity, including within the Moray East site.

As noted in Table 4.1, in 2014, Scottish Government published their Updated Fisheries Sensitivity Maps in British Waters maps and report. Spatial data on spawning grounds is available to download as part of this updated report. This data uses the probability of finding aggregations of 0 group fish (fish in their first year) to identify potential spawning grounds for a number of key fish species including herring. A review of the data for herring suggests that the probability of presence of 0 group fish in the Moray East site is low. This corresponds with the Coull *et al*., 1998 data presented in the Moray East ES 2012 and it consistent with the findings from the pre-construction herring spawning surveys carried out by BOWL in 2014 and 2015 (BOWL 2014b; BOWL, 2016b) which also concludes that herring spawning occurs to the north of the Moray East site.

Although there is limited evidence of herring spawning grounds within the Moray East site, due to potential concerns relating to noise from piling activities, Moray East is committed, to carrying out pre-construction herring spawning surveys in the August / September prior to construction commencing.

Moray East is also committed to carrying out monitoring surveys which would aim to increase the knowledge on the behaviour of Atlantic salmon and sea trout in the Moray Firth. This monitoring will also contribute to the wider National Strategy for Monitoring of Diadromous Fish.

Findings from both the additional surveys and the review of updated Fisheries Sensitivity Maps data, support the original site characterisation information presented in the Moray East ES 2012. It can therefore be concluded the site characterisation data in the Moray East ES 2012 remains valid for the purpose of informing this scoping report.

With regard to the inclusion of the final as built BOWL wind farm within the baseline, it was concluded in the Moray East ES 2012 CIA that potential cumulative impacts of BOWL in conjunction with the consented Telford, Stevenson and MacColl wind farms could be moderate to minor adverse with respect to impacts of underwater noise from piling on cod and herring and impacts on sandeel habitat. Given that BOWL will be constructed before either the consented Telford, Stevenson and MacColl wind farms or this proposed wind farm consent and is much reduced in size (reduced to 84 turbines from 277) its inclusion in the baseline will remove any potential for cumulative impacts to occur as a result of underwater noise from piling.

With regard sandeels; inclusion of BOWL as built in the baseline could change the baseline with regard to sandeels. However, as discussed above, BOWL and Moray East are both required to carrying out pre and

post construction sandeel surveys as part of the conditions on the Section 36 consents for both BOWL and the Telford, Stevenson and MacColl wind farms. The purpose of these surveys is to understand better the distribution and abundance of sandeels across the BOWL and Moray East sites and monitor changes in this distribution and abundance following construction. Given these requirements are already in place it can be concluded that no further assessment will be required with regard to sandeels.

Therefore, while the presence of BOWL will present a change in the characteristics of the area, its inclusion in the baseline will not affect the conclusions presented in the Moray East ES 2012 with regard to impacts on fish and shellfish. Therefore, no further assessment is required as a result of BOWL being included in the baseline.

4.4.1.4 Marine mammals

As indicated in Table 4.1 extensive baseline data was collected between 2010 and 2012 by Moray East as part of the marine mammal baseline characterisation for the Moray East ES 2012. There have also been an extensive number of other studies and surveys carried out in the Moray Firth and surrounding waters both prior to, and post, submission of the ES in 2012.

Specific monitoring in the Moray Firth relating to the Moray East site commenced in 2014 following consent award. This forms part of the Moray Firth Marine Mammal Monitoring Programme (Thompson, 2014). Additional seal monitoring has also been undertaken in the Moray Firth by the Sea Mammal Research Unit (SMRU) as part of the Moray Firth Seal Management Plan. These surveys commenced in 2005 (SMRU undated). This observed that harbour seal numbers have fluctuated over a number of years with numbers of seals in some haul out sites increasing and other decreasing (SCOS, 2015).

Continued monitoring in the Moray Firth has shown some changes in baseline, with numbers of bottlenose dolphin increasing. However, there has been no sign of recovery in the harbour seal population. With regard to the seal assessment framework included in the Moray East ES 2012, this considered scenarios relating to both an increasing harbour seal population and stable population levels. The scenarios for stable population levels indicate that long term population trends were dominated by other external drivers rather than the wind farm construction.

In addition to the monitoring, since submission of the Moray East ES in 2012, a number of studies have been carried out in the Moray Firth and other regions (e.g. Russell *et al*., 2016) and Thompson *et al*., 2013). These studies conclude that assumptions about the scale of disturbance to marine mammals from piling noise was highly conservative.

In 2015, Joint Nature Conservation Committee (JNCC) published management units (MUs) for the seven most common cetacean species in UK waters. These published areas are based on initial areas proposed in 2013. The MUs provide an indication of the spatial scales at which impacts of plans and projects alone, cumulatively and in-combination, need to be assessed for the key cetacean species in UK waters, with consistency across the UK (IAMMWG, 2015). With regard to the three key cetacean species considered in the Moray East ES 2012 the following changes in species distribution relating to the introduction of the MUs are noted:

Table 4-2: MUs for harbour porpoise, bottlenose dolphin and minke whale

Cetacean species	Spatial distribution described in Moray East ES 2012	Revised MUs (source: IAMMWG, 2015)
Harbour porpoise	Based on the outcome from a population workshop held between ASCOBANS* and HELCOM** it was concluded that although there is some population structure in the North Sea there is insufficient evidence to define boundaries between any sub-populations at the time (ASCOBANS, 2009). For the purpose of conservation and the assessment of impacts in the Moray East ES 2012, harbour porpoise in the North Sea are considered to represent a single population.	Three MUs have been identified for harbour porpoise in UK waters: • North Sea (NS) - North Coast of Scotland (Pentland Firth) south across the entire UK North Sea area to the English Channel and Cherbourg on the North Coast of France • West of Scotland (WS) – entire West Coast of Scotland out to 200 nm. Includes north and east coast Northern Ireland • Celtic and Irish Seas (CIS) – Ireland, Irish Sea, North West UK, Wales and South West UK It is also noted that the shelf between northern and western boundary of NS MU and WS MU is narrow. Therefore, there could be an interchange of animals between MUs at this point.
Bottlenose Dolphin	No specific management area defined. Noted in ES that Moray Firth population is generally coastal in nature.	Seven MUs have been identified for bottlenose dolphin in UK waters. Those most relevant to the Moray East site include: • Coastal East Scotland - coastal waters out to 12 nm; and • Greater North Sea beyond 12 nm (north of Shetland to English Channel). However, it is noted that very few bottlenose dolphin are seen in the Greater North Sea area and, although there is no conclusive evidence, those seen are thought to belong to the Coastal Scottish group.
Minke whale	Generalised distribution throughout North Sea and North Atlantic.	Only one MU defined for minke whale – Celtic and Greater North Sea. This extends across all UK waters.
*Agreement on the Conservation of Small Cetaceans in the Baltic, North-East Atlantic, Irish and North Seas (ASCOBANS) **Helsinki Commission - The Baltic Marine Environment Protection Commission		

Further to the identification of the MUs in 2015, in January 2017, JNCC submitted the Southern North Sea Candidate Special Area of Conservation (cSAC) for harbour porpoise to the European Commission (EC) for approval (JNCC, 2017). Covering an area of 36,951 km^2, this is now the largest designated cSAC in UK and European Waters. The cSAC, which is located on the east coast of England, extends south from the central North Sea (north of Dogger Bank) to the Straits of Dover. Although the site is located more than 300 km from the Moray East site, it lies within the MU for harbour porpoise. Harbour porpoise were also noted as being sensitive to noise from piling. However, given that the design parameters for the proposed wind farm consent application will remain within the WCS design parameters for jacket foundations and associated piling activities assessed as part of the Moray East ES 2012 it is unlikely that this new designation this will affect the conclusions from the assessment of impacts on harbour porpoise. See Chapters 5 and 6 for further information on validation of project specific and cumulative impacts.

However, it is expected that this new site will need to be considered as part of the separate HRA process (see Chapter 13).

Similarly, in August 2016 the Scottish Government submitted the Inner Hebrides and Minches cSAC for harbour porpoise to the European Commission (EC) for approval (Scottish Government, 2016a). Although this cSAC is located off the north west coast of Scotland and therefore in a different MU to the proposed wind farm consent application, it has been identified that there is potential for animals to interchange between the two MUs (WS and NS) (IAMMWG, 2015). Therefore, while this is not expected to affect the validity of the conclusions from the Moray East ES 2012, this additional site may also need to be considered as part of the separate HRA for the proposed wind farm consent application.

In addition to this, the Scottish Government has also identified a possible NCMPA (North East Lewis) for the protection of Risso's dolphin. As with minke whale, the MU for Risso's dolphin also covers the entire Celtic and Greater North Sea area. Therefore, animals associated with this site could pass through the Moray East site. However, Risso's dolphin was not identified as one of the key sensitivity species in the Moray East ES 2012. Therefore, for the reasons outlined above with respect to their being no change in piling activities for the proposed wind farm consent application, it can be concluded that the identification of this possible NCMPA would not affect the conclusions from the Moray East ES 2012 and the site characterisation data presented in the Moray East ES 2012 remains valid for the purpose of informing this scoping report.

With regard to the inclusion of BOWL within the baseline, the CIA presented in the Moray East ES 2012 identified potential significant short term impact on marine mammals as a result of underwater noise from piling. These significant impacts were based on construction (and therefore piling) activities associated with BOWL and the consented Telford, Stevenson and MacColl wind farms occurring concurrently. However, given that BOWL will be constructed before this proposed wind farm consent and is much reduced in size (reduced to 84 turbines from 277), the potential for any potential cumulative impacts to occur as a result of underwater noise from piling will have been removed.

Therefore, while the presence of BOWL will present a change in the characteristics of the area, its inclusion in the baseline will not affect the conclusions presented in the Moray East ES 2012 with regard to impacts on marine mammals. Therefore, no further assessment is required as a result of BOWL being included in the baseline.

4.4.1.5 Ornithology

As discussed in Table 4.1 a number of studies and surveys were carried out as part of the Moray East ES 2012 in relation to ornithology. The aim of these studies and surveys was to increase the knowledge and understanding of seabird distributions within the Moray East site and surrounding areas.

Further tracking of large gulls (great black-backed gull and herring gull) was carried out for the East Caithness Cliffs SPA during the 2014 breeding season (Archibald *et al*., 2015). Results from this tracking confirmed that there was no connectivity between either species and the Moray East site during the period monitored during the breeding season.

At the time of the assessment (2012) it was also agreed that the reference population for the key designated sites included in the Moray East ES and HRA should be based on Seabird 2000 data.

Since submission of the Moray East ES in 2012 further monitoring has been carried out by SNH at a number of the key designated sites. In 2013 monitoring plots were completed for both the East Caithness Cliffs SPA and North Caithness Cliff SPA (Swan, 2016a). Population counts for the East Caithness Cliffs SPA were completed in 2015 (Swan, 2016b). Results from this monitoring found that while populations of most species with presence in the Moray East site had remained constant (only slight fluctuations within +/- 10%), there had been declines in number of both puffin and kittiwake and an increase in the numbers of great black-backed gull.

In light of these changes, it is concluded that, the site characterisation data for the Moray East site remains valid for the purpose of informing the EIA and this been confirmed by SNH (MS-LOT email of 18th February

2017). However, further work will be required to assess in more detail, from both an EIA and HRA perspective, the implications of both the new Design Envelope and the 2015 population counts for the East Caithness Cliffs SPA and North Caithness Cliffs SPA on the impacts presented in the Moray East ES 2012 and HRA 2012.

In addition to this, since submission of the Moray East ES 2012, Scottish Government in 2016 and 2017 carried out consultation on proposals for designation of 15 Special Protection Areas (SPAs) for the protection of at-sea habitats for a number seabird species (SNH, 2017). Of the 15 proposed SPAs (pSPAs), six are located on the east coast of Scotland / Orkney. These include:

- Moray Firth pSPA;
- Ythan Estuary, Sands of Forvie and Meikle Loch pSPA;
- Outer Firth of Forth and St Andrews Bay Complex pSPA;
- Pentland Firth pSPA;
- Scapa Flow pSPA; and
- North Orkney pSPA.

There are also three pSPAs in Shetland. The remaining six pSPAs are located on the west coast of Scotland. These additional pSPA sites will require further assessment as part of the HRA with respect to ornithology. Impacts on key qualifying species associated with these sites will also be assessed as part of the EIA. The proposed approach to the ornithology assessment is presented in Chapter 8. Further information on the approach to the HRA is provided in Chapter 13.

In 2014, SNH also designated the East Caithness Cliffs NCMPA for black guillemot. This aim of this NCMPA, which extends 2 km out to sea is to protect nearshore feeding grounds for black guillemot. The site extends along the north coast of the Moray Firth from Helmsdale to Wick. Potential implications on this site are discussed in Chapter 8.

The assessment of cumulative impacts presented in the Moray East ES 2012 concluded that, there is potential for development of BOWL in conjunction with the consented Telford, Stevenson and MacColl wind farms to have a potential significant cumulative impact on three key species of seabird (gannet, herring gull and great-black backed gull) as a result of collision risk. Although BOWL as built is much reduced in size (84 turbines compared to 277) and will be constructed prior to this proposed wind farm consent application, the source of potential impact (collision with turbine rotor blades) still remains. Further assessment is therefore required to determine potential cumulative impacts associated with BOWL and this proposed wind farm consent application. Detail on the approach to the CIA for ornithology is provided in Chapter 8.

4.4.1.6 Commercial fisheries

Moray East has continued to engage with the fishing industry since submission of the Moray East ES in 2012 and has agreed a Draft Mitigation Strategy to be implemented during the construction and operation of the consented Telford, Stevenson and MacColl wind farms.

With regard to site characterisation for commercial fisheries, key target species were identified based on the value of landings for target species in ICES rectangle 45E7. At the time the Moray East ES 2012 was submitted, the most recent landings data available for ICES rectangle 45E7 were for 2010. Information presented in the Moray East ES 2012 was based on average landing values derived from data between 2001 and 2010. Since submission of the Moray East ES 2012, additional landings data have been published, with the most recent data available for 2015.

As it is not known at this stage if there are any changes to the site characterisation data, and thus potentially the impact assessment, it is proposed that an analysis of the more recent fisheries data be carried out as validation to confirm that if the results and conclusions of the Moray East ES 2012 remain valid.

The data validation will involve analyses of the most recent fisheries data alongside the data that was used to inform the Moray East ES 2012 in order to understand fisheries trends in the Moray East area, as well as a consideration of how the presence of BOWL will impact fisheries in the area. This will be supplemented by consultation with fisheries organisations. The results of this will be included in the ES for the proposed wind farm consent application.

In terms of commercial fisheries, it was concluded in the Moray East ES 2012 CIA that there is potential for development of the BOWL site in conjunction with the consented Telford, Stevenson and MacColl wind farms to have moderate impacts during construction, operation and decommissioning due to restricted access on scallop, squid and *Nephrops* fisheries. Given that the final as built BOWL project will comprise a reduced number of turbines (84 compared to the 277 included in the Moray East ES 2012 CIA) and that construction will be undertaken prior to construction of this proposed wind farm consent application the potential for cumulative impacts remains the same or is reduced. It can therefore be concluded that while the presence of BOWL will present a change in the characteristics of the area, its inclusion in the baseline will not affect the conclusions presented in the Moray East ES 2012 with regard to impacts on commercial fisheries. Therefore, no further assessment is required as a result of BOWL being included in the baseline.

Provided that the data validation shows no significant differences to fisheries, it is proposed no further fisheries assessment work will be carried out.

4.4.1.7 Shipping and navigation

With respect to shipping and navigation, the marine traffic survey data (the main component of the baseline) included in the Moray East ES 2012 met the Maritime and Coastguard Agency (MCA) requirements as detailed in MGN 371 in terms of age, geographical coverage and comprehensiveness. MGN 371 was subsequently updated in 2016 and renamed as MGN 543. With regards to the proposed wind farm consent application the data, given its age, does not meet the current MCA requirements specified within MGN 543. As well as amendments to the marine traffic survey requirement, MGN 543 also includes updates to minimum build and Search & Rescue Requirements standards for offshore renewables development. Although these changes, aside from the marine traffic data, should not influence the findings from the impact assessment included in the Moray East ES 2012, a data comparison shall be undertaken in line with MGN 543.

As it is not known at this stage if there are any changes to the site characterisation data, and thus potentially the impact assessment, it is proposed that an analysis of the baseline shipping data be carried out as validation to confirm that the results and conclusions remain valid. This survey will consist of 28 days of AIS shipping data covering both summer and winter periods. It is noted that MGN 543 states that AIS alone does not constitute a marine traffic survey, therefore a dispensation (from radar and visual data) shall be sought from the MCA. This dispensation would be based around the existing baseline data, the existing consent approval and shall demonstrate the extensive consultation that has taken place with fishing and recreational users who are not mandatorily required to carry AIS. Provided that the marine traffic survey (AIS) shows no significant differences to the data collected in 2011, then it is proposed that no further Navigation Risk Assessment work will be carried out.

A validation between the Moray East ES 2012 site characterisation survey data and recent AIS survey data (within 1 year of submission) will be included in the ES for the proposed wind farm consent application.

In terms of shipping and navigation, it was concluded in the Moray East ES 2012 CIA that there is potential for development of the BOWL site in conjunction with the consented Telford, Stevenson and MacColl wind farms to have moderate impacts on commercial vessels and fishing vessels due to the risk of collision with construction vessels. Given that the final as built BOWL project will comprise a reduced number of turbines (84 compared to the 277 included in the Moray East ES 2012 CIA) and that construction will be undertaken prior to construction of this proposed wind farm consent application the potential for cumulative impacts as a result of collision with construction vessels is much reduced.

It can therefore be concluded, that while the presence of BOWL will present a change in the characteristics of the area, its inclusion in the baseline will not affect the conclusions presented in the Moray East ES

2012 with regard to impacts on shipping and navigation. Therefore, no further assessment is required as a result of BOWL being included in the baseline.

4.4.1.8 Civil and military aviation

As identified in Table 4.1 there have been no changes or updates to the site characterisation data presented in the Moray East ES 2012 with respect to civil and military aviation other than the inclusion of BOWL in the baseline.

In terms of the Moray East ES 2012 CIA, it was identified that although there is potential for significant impacts associated with the development of BOWL in conjunction with the consented Telford, Stevenson and MacColl wind farms on two aviation stakeholders (NERL - Allanshill PSR and MoD - RAF Lossiemouth PSR), measures are available to reduce these potential impacts. However, although BOWL is reduced in size, its inclusion in the baseline means that, while it is no longer a consideration in terms of potential cumulative impacts, its presence will still need to be taken into account as part of the assessment of potential impacts associated with the proposed wind farm consent application. Further information on the approach to the assessment of impacts on civil and military aviation is presented in Chapter 11.

4.4.1.9 Seascape, landscape and visual assessment

As identified in Table 4.1 there have been no changes or updates to the site characterisation data presented in the Moray East ES 2012 with respect to the landscape character and visual amenity other than the inclusion of BOWL in the baseline.

Of the 22 viewpoints included in the Moray East ES 2012 SLVIA, significant cumulative impacts occurring as a result of the development of BOWL in conjunction with the Telford, Stevenson and McColl wind farms were only identified for two viewpoints. As with ornithology, although BOWL is now included in the baseline the source of potential cumulative impacts on views due to the presence of the turbines still remains. Potential impacts and cumulative impacts on views associated with the proposed wind farm consent application will therefore need to be assessed in the context of the presence of the BOWL turbines. Further information on the approach to the assessment of impacts on views including BOWL in the baseline is presented in the approach to the SLVIA (Chapter 9).

4.4.1.10 Cultural heritage

As identified in Table 4.1 there have been no changes or updates to the site characterisation data presented in the Moray East ES with respect to cultural heritage other than the inclusion of BOWL in the baseline.

Based on results from the Moray East ES 2012 CIA it was concluded that there would be no significant cumulative direct impacts on marine archaeology assets (known wrecks and geophysical targets or submerged archaeology and landscapes) associated with development of BOWL in conjunction with the consented Telford, Stevenson and MacColl wind farms. This conclusion was based on the assessment of 277 turbines (WCS). While the presence of BOWL will present a change in the characteristics of the area, given that the total number of turbines to be installed is now 84, and that turbine locations will have already been identified to avoid any sites of archaeological importance, it can be concluded that inclusion of BOWL in the baseline will not affect the conclusions presented in the Moray East ES 2012 with regard to impacts on marine archaeology. Therefore, no further assessment of direct impacts on marine archaeology assets is required as a result of BOWL being included in the baseline.

In terms of impacts on the setting of cultural heritage sites, although there were no significant cumulative impacts identified in the Moray East ES 2012, it has been identified that design changes associated with the proposed wind farm consent application could have potential impacts on different cultural heritage sites (e.g. not included in the Moray East ES 2012). As with the SLVIA, although the potential for cumulative impacts on these sites will be reduced with BOWL included in the baseline and the reduced size of BOWL (84 turbines compared to 277) its presence in the baseline means that any impacts on the setting of cultural heritage sites will need to be assessed in the context of the presence of the BOWL

turbines. Further information on the approach to the assessment of impacts on setting of cultural heritage sites is provided in Chapter 10.

4.4.1.11 Socio-economics, recreation and tourism

With regard to socio-economics, recreation and tourism, key data, in particular data relating to key statistics on population, business demographics, employment rates, GVA, labour force, average earnings etc., as well as other data, is updated annually. Therefore, whilst general patterns across the region associated with employment etc., may not have changed significantly, it will be necessary to review data for 2015 and 2016 as part of the EIA in order to confirm that the data included in the Moray East ES 2012 remains valid. Further information on the approach to updating socio-economic characteristics for the proposed wind farm consent application is provided in Chapter 12.

As with key data on socio-economic indicators discussed above, inclusion of the final as built BOWL wind farm within the baseline will need to be taken into account in terms of number of jobs created, supply chain opportunities in order to understand the potential implications for the impacts included in the Moray East ES 2012. Further information on the approach to the assessment of impacts on socio-economics, recreation and tourism is provided in Chapter 12.

4.4.1.12 Other human activities

Since submission of the Moray East ES in 2012 there have been a number of changes to other human activities within the Moray Firth and surrounding area, including the consent of BOWL (at the same time as the consent award for the Telford, Stevenson and MacColl wind farms) and planned start of construction in April 2017. With regard to the activities included the Moray East ES 2012, it is understood that work has been undertaken since 2012 examining options for decommissioning the Beatrice oil field. At present it is understood that decommissioning works could commence this year (2017) for completion in 2021. Preparatory works have also been carried out for decommissioning the Jacky platform, with removal of the platform anticipated to take place in 2018.

In addition to the planned decommissioning, it is also noted that UKCS Blocks 12/21 and 12/23 (which slightly overlap the Moray East site) have been made available in recent UK Government oil and gas licencing rounds (the 28th and 29th Rounds) and have been previously licenced (licences now either expired or surrendered). Although currently no licence awards have been made for these blocks as a result of the 28th and 29th rounds, it does indicate potential future oil and gas interest in the area.

While decommissioning of the Beatrice field and Jacky platform, and any future oil and gas exploration, would alter the existing characteristics in the Moray Firth in terms of other human activities it is unlikely that these changes would affect the validity of the conclusions from the impact assessment presented in the Moray East ES 2012.

As noted in Table 4.1, in addition to the planned decommissioning of the Beatrice field and Jacky Platform and oil and gas interest in the area, a number of new projects have either been consented or are now proposed (in the north east of Scotland) since submission of the Moray East ES in 2012. These include the consented Hywind Scotland Pilot Park, a multi-turbine (five) floating offshore wind project located 12 nm off the coast of Peterhead; and the consented Caithness Moray Interconnector which passes to the east of the Moray East site. Other projects for which consent applications have been submitted or EIAs ongoing include the Kincardine Offshore Wind Farm project located off the coast near Aberdeen and the Dounreay Tri Floating Offshore Wind Demonstration project located in the Pentland Firth off the North Coast of Scotland. There is also the Eastern HVDC Link interconnector which runs north south along the east coast of Scotland, with the northern landfall at Peterhead. The NorthConnect Interconnector (Norway to UK) also has a landfall at Peterhead.

As highlighted above BOWL has been consented and is due to start construction in April 2017. Moray East and BOWL have agreed that each will maintain a separation distance from the boundary between their respective sites based on five times the rotor diameter that each developer selects for their own site. BOWL has selected Siemens SWT-7.0-154 for use on its site which has a rotor diameter of 154 m. Accordingly, no turbines will be located within 770 m of the Moray East site / BOWL boundary on the

BOWL site as detailed within BOWL's DSLP (BOWL, 2016c). In terms of the consented Telford, Stevenson and MacColl wind farms the permitted turbine rotor diameter is between 150 m and 172 m and therefore the separation distance would be between 750 m and 860 m. For the proposed wind farm consent application there would be an increase in rotor diameter (up to 250 m as detailed in chapter 3) and therefore the separation distance would increase to up to 1,250 m.

In terms of other human activities, all of these additional / new projects will need to be included in the updated CIA which will be carried out as part of the EIA for the proposed wind farm consent application. This updated information will therefore also be relevant for validating the site characterisation for other human activities.

No significant cumulative impacts where identified in the Moray East ES 2012 CIA with respect to other human activities other than impacts on oil and gas licence block holders within the Moray Firth. In addition to UKCS Blocks 12/21 and 12/23 which are discussed above, the southern part of the Moray East site also extends over Blocks 12/26b and 12/27 which are associated with the Niobe field. It is understood that in 2015 Suncor carried out exploration activity in these blocks. However, following these explorations, the licences were surrendered in December 2015 (DECC, 2016).

Although, both BOWL and the consented Telford, Stevenson and MacColl wind farms are located within the licensed oil and gas blocks there are currently no plans available on future exploration activities. With BOWL included in the baseline, the potential for cumulative impacts on these licence block holders is reduced. However, BOWL will still be present, although on reduced scale (84 turbines compared to 277 included in the Moray East ES 2012).

It can therefore be concluded, that whilst presence of the BOWL wind farm will present a change in the characteristics of the area, its inclusion in the baseline will not affect the conclusions presented in the Moray East ES 2012 with regard to impacts on other human activities. Therefore, no further assessment is required as a result of BOWL being included in the baseline.

4.5 Validation of impact assessment methods

Based on a review of the assessment methods used in the Moray East ES 2012 it can be concluded that, for the majority of EIA topics, there have been no significant updates or major changes in the approaches to the assessment of potential impacts. Therefore, for those topics, where there have been no changes, the previous assessment methods remain valid for the purpose of informing this scoping report.

With regard to marine mammals, one of the key changes relate to 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) indicate 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 impacts therefore no longer need to be included in the impact assessment.

As identified in Table 4.1, new and updated assessment guidance has been produced in relation to ornithology; seascape, landscape and visual impact assessment; cultural heritage (setting) and socio-economics impacts. These changes and updates in guidance would need to be considered as part of the EIA for the proposed wind farm consent application. Further information on new and updated guidance is discussed in the relevant chapters of this scoping report (Chapters 8, 9, 10 and 12).

4.6 Summary of conclusions from validation of site characterisation data and impact assessment methods

A summary of the key findings from the validation of site characterisation data and impact assessment methods is presented in Table 4.3 below.

Table 4-3: Summary of conclusions from validation of site characterisation data and impact assessment methods

EIA topics	Is site characterisation included in the Moray East ES 2012 still valid?	Are impact assessment methods used in the Moray East ES 2012 still valid?	Comments
Physical environment and sediment processes	✓	✓	There have been no changes in site characterisation data or assessment methods. Therefore, no further assessment is required with respect to site characterisation data or assessment methods. Conclusions from Moray East ES 2012 not affected by inclusion of BOWL in baseline.
Benthic ecology	✓	✓	Although Noss Head NCMPA was not included in Moray East ES 2012, potential impacts on this designated site are highly unlikely (see Section 4.4.2.1). Conclusions from Moray East ES 2012 not affected by inclusion of BOWL in baseline.
Fish and shellfish ecology	✓	✓	Although additional surveys (cod) have been completed since submission of the Moray East ES in 2012 and updated information has been made available on sandeel and herring spawning grounds, this data does not change the 2012 site characterisation. Therefore, this data remains valid. The impact assessment methods also remain valid. Conclusions from Moray East ES 2012 not affected by inclusion of BOWL in baseline
Marine mammals	✓	✓	Additional data on marine mammals collected since submission of the Moray East ES in 2012 confirms that there have been no significant changes with regard to the site characterisation for marine mammals. Therefore, this data remains valid. The impact assessment methods also remain valid. In 2015 MUs were introduced for key cetacean species. These are not expected to affect the outcome from the Moray East ES on the basis that the impacts associated with piling and underwater noise will remain valid. However, due to the extent of the MUs there may be a need to consider the recently designated Southern North Sea cSAC in the HRA. Conclusions from Moray East ES 2012 not affected by inclusion of BOWL in baseline.

EIA topics	Is site characterisation included in the Moray East ES 2012 still valid?	Are impact assessment methods used in the Moray East ES 2012 still valid?	Comments
Ornithology	×	×	There has been additional data collected since submission of the Moray East ES in 2012 which indicates that there have been changes in population levels for certain species in the East Caithness Cliffs SPA. Additional assessment will therefore be required as part of the EIA to understand the implication of these changes on the proposed wind farm consent application. The impact assessment methods also remain valid. However, there have been a number of new and updated guidance documents published which will require consideration as part of the EIA. New sites (pSPAs) will also need to be considered in the HRA. Potential impacts associated with the proposed wind farm consent application will need to be assessed in context of BOWL as change in baseline.
Commercial fisheries	×	✓	There has been no change in assessment methods. As it is not known at this stage if there are any significant changes to the site characterisation data since submission of the Moray East ES in 2012, a review of the most recent fisheries data will be undertaken in order to understand fisheries trends in the Moray East area. Results from this validation exercise will be presented in the ES. Conclusions from Moray East ES 2012 not affected by inclusion of BOWL in baseline.
Shipping and navigation	×	✓	There has been no change in assessment methods. Although it is unlikely that shipping traffic within the Moray Firth has changed significantly since submission of the Moray East ES in 2012, in accordance with requirements of MGN 543, it will be necessary to carry out a data validation exercise involving a review of AIS data for the Moray East site and surrounding area. Results from this validation exercise will be presented in the ES. Conclusions from Moray East ES 2012 not affected by inclusion of BOWL in baseline.

EIA topics	Is site characterisation included in the Moray East ES 2012 still valid?	Are impact assessment methods used in the Moray East ES 2012 still valid?	Comments
Military and civil aviation	✓	✓	Although there have been no changes in site characterisation data or assessment methods. Further assessment will be required to assess impacts of the proposed wind farm consent application in context of BOWL as change in baseline in terms of turbine presence. It should be noted, that a Transponder Mandatory Zone (TMZ) has been approved over Moray East.
Seascape, landscape and visual receptors	✓	×	Although there have been no changes in site characterisation data, there have a number of new / updated guidance documents have been published since submission of the Moray East ES in 2012 relating to assessment methodologies. This updated guidance will be included in the SLVIA, the scope of which is presented in Chapter 9 and is based on advice received from SNH on 23rd February 2017 (Appendix B).
Archaeology and cultural heritage	✓	✓	There have been no changes in site characterisation data or assessment methods with regard to marine archaeology. Therefore, no further assessment is required with respect to site characterisation data or assessment methods. With regard to setting of cultural heritage sites, further assessment will be required to assess impacts of the proposed wind farm consent application in context of presence of BOWL in baseline. Information on updated guidance is provided in Chapter 10.
Socio-economics, recreation and tourism	×	×	With respect to socio-economics there have been changes to both site characterisation data with availability of more up to date data (e.g. 2015/2016) and publication of new assessment guidance, which, although this relates to marine planning policy, still requires further review to confirm that the assessment methods in the Moray East ES in 2012 remain valid for the purpose of the proposed wind farm consent application. Presence of BOWL in baseline will also need to be considered in context of changes to local job numbers, labour force etc.

EIA topics	Is site characterisation included in the Moray East ES 2012 still valid?	Are impact assessment methods used in the Moray East ES 2012 still valid?	Comments
Other human activities	✓	✓	Although, there are a number of recently consented and planned developments that have been identified in the area, due to their location or nature they are not expected to be impacted by the proposed wind farm. However, these will be addressed as part of the CIA. Therefore, no further assessment is required with respect to site characterisation data or assessment methods. Conclusions from Moray East ES 2012 not affected by inclusion of BOWL in baseline.
✓= yes: baseline data and / or assessment methods are still valid × = no: baseline data and / orassessment methods are no longer valid			

Scoping Question 4.1

Does Marine Scotland agree that no further work is required for validation of site characterisation data and impact assessment methods as part of the EIA (HRA is dealt with separately in Section 13) with regards to the following:

- Physical environment and sediment processes;
- Benthic ecology;
- Fish and shellfish ecology;
- Marine mammals;
- Civil and military aviation;
- Archaeology and cultural heritage, and
- Other human activities?

Scoping Question 4.2

Does Marine Scotland agree with the proposed approach for validation of site characterisation data for commercial fisheries and shipping and navigation?

4.7 References

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5 Validation of project specific impacts based on changes to Design Envelope

5.1 Introduction

This chapter focuses specifically on the validation of project specific impacts presented in the Moray East ES 2012 in light of proposed changes to the consented Design Envelope associated with the proposed wind farm consent application.

The appraisal of project specific impacts involves the following:

- For each EIA topic and each impact, identification of the WCS design parameters that were assessed for the consented Telford, Stevenson and MacColl wind farms; and
- Determination of whether the design parameters associated the Design Envelope for the proposed wind farm consent application are within or outwith the WCS assessed design parameters for the consented Telford, Stevenson and MacColl wind farms (based on information from the Design Envelope comparative assessment presented in Chapter 3).

Key information on specific impacts assessed in the Moray East ES 2012, the WCSs defined for those impacts, and the conclusions from the impact assessment is provided in Appendix A.

Where the WCS design parameters for the proposed wind farm consent application fall outside the assessed WCS for the consented Telford, Stevenson and MacColl wind farms, it is assumed that the changes in the design parameters could have potential implications on the conclusions presented in the Moray East ES 2012 in terms of project specific impacts.

Where the WCS design parameters for the proposed wind farm consent application are within the assessed WCS for the consented Telford, Stevenson and MacColl wind farms, it is assumed that there will be no change to the project specific impacts predicted in the Moray East ES 2012.

Where changes in the Design Envelope could have potential implications on the project specific impacts predicted in the Moray East ES 2012, the relevant EIA topics are assigned a '✓' in Table 5.1. For these topics, further assessment will be required as part of the EIA to determine the precise nature of the changes and implications on impacts predicted in the Moray East ES 2012.

Where it is determined that there will be no change in the project specific impacts predicted in the Moray East ES 2012, the relevant EIA topics in Table 5.1 are assigned a '✗'. Given that there will be no changes to the predicted project specific impacts in the Moray East ES 2012, it can be concluded that no further assessment will be required for these EIA topics. Additional information to support these conclusions is provided in Section 5.3.

5.2 Impact appraisal summary table

Key findings from the appraisal of project specific impacts assessed as part of the Moray East ES 2012 are presented in Table 5.1. The purpose of this table is to identify those topics where changes in the WCS Design Envelope for the consented Telford, Stevenson and MacColl wind farms identified in Chapter 3 (Table 3.1) warrant further assessment to be carried out as part of the EIA. The information presented in Table 5.1 is based on the detailed appraisal of project specific impacts which is provided in Appendix A.

Table 5-1: Impact appraisal summary table – project specific impacts

EIA topics	Design Envelope changes – implications for assessed project specific impacts presented in the Moray East ES 2012?			
	Increase size of WTG (rating, tip height and rotor diameter)	Increase spacing between turbines	Reduction in number of turbines	Inclusion of suction buckets
Physical environment and sediment processes	×	×	×	×
Benthic ecology	×	×	×	×
Fish and shellfish ecology	×	×	×	×
Marine mammals	×	×	×	×
Ornithology	✓	×	×	×
Commercial fisheries	×	×	×	×
Shipping and navigation	×	×	×	×
Seascape, landscape and visual assessment (SLVIA)	✓	✓	✓	×
Civil and military aviation	✓	×	×	×
Archaeology and cultural heritage	✓	✓	✓	×
Socio-economics, recreation and tourism	×	×	✓	×
Other human activities	×	×	×	×

5.3 Project specific impact validation

5.3.1 EIA topics requiring further assessment as part of the EIA due to design changes

Based on the outcome from the validation of impacts with respect to the changes in Design Envelope presented in Table 3.1 and Appendix A, the following topics have been identified as requiring further assessment as part of the EIA:

- Ornithology;
- Seascape, landscape and visual impact assessment;
- Archaeology and cultural heritage (visual setting only);
- Civil and military aviation; and
- Socio-economics.

The proposed approach to, and methods for, assessing potential impacts of the proposed wind farm consent application on the EIA topics listed above are described in Chapters 8 to 12.

5.3.2 EIA topics requiring no further assessment

Based on information presented in Table 5.1 and detailed in Appendix A the following topics have been identified as not requiring any further assessment with respect to the EIA on the basis that proposed design changes will not alter the conclusions from the impact assessment presented in the Moray East ES 2012.

- Physical environment and sediment processes;
- Benthic ecology;
- Fish and shellfish ecology;
- Marine mammals;
- Commercial fisheries;
- Shipping and navigation; and
- Other human activities.

Evidence to support these conclusions is provided below. Detailed analysis of each individual impact predicted in the Moray East ES 2012 is set out in Appendix A.

5.3.3 Physical environment and sediment processes

Table 5.2 presents a summary of the key impacts, mitigation and consent conditions relating to physical environment and sediment processes.

As illustrated in Table 5.2 the design parameters considered in the Moray East ES 2012 for physical environment and sediment processes related specifically to the foundation structures and the inter-array cables. Although Moray East is considering the inclusion of an alternative foundation structure in the proposed wind farm consent application (suction buckets) the design parameters for these structures are within the WCS design parameters assessed in the Moray East ES 2012 for GBS foundations (see Chapter 3 - Table 3.1). Therefore, given that there will be no change in the assessed WCS design parameters associated with the inclusion of suction bucket foundations for the proposed wind farm consent application, the impact assessment presented in Moray East ES 2012 – Chapters 6.1 and 6.2 and summarised in Table 5.2 remains valid.

No significant impacts were identified with regard to the physical environment and sediment processes

The Section 36 consents for the Telford, Stevenson and MacColl wind farms do not include any specific conditions relating to mitigating impacts on physical environment and sediment processes, nevertheless there is a requirement to monitor seabed scour and local sediment deposition through Condition 26: Project Environmental Monitoring Programme (PEMP).

Table 5-2: Physical environment and sediment processes impact appraisal

Impacts assessed in the Moray East ES 2012	Key receptors	WCS design parameters assessed for the consented Telford, Stevenson and MacColl wind farms	Mitigation	Predicted residual impact (post mitigation) [2]	Relevant consent conditions
Construction and decommissioning					
Increase in suspended sediment concentrations due to foundation installation activities	Smith Bank	GBS foundations In particular dredging overspill	None identified	Minor	Condition 26: Project Environmental Monitoring Programme (PEMP)
Accumulation of sediment and change of sediment type at seabed due to foundation installation activities	Smith Bank	Jacket foundations (drill arisings)	None identified	Minor	
Increased suspended sediment concentrations due to inter-array cable installation activities	Smith Bank	Jet trenching installation techniques Cable trench 1 m deep x 3 m wide	None identified	Negligible	
Indentations on seabed due to jack up vessels and large anchors	Smith Bank	Four legged jack up with 100 m^2 footprint. Anchors 1.5 m to 3 m length	None identified	Negligible	
Operation and maintenance					
Changes to sediment transport regime and geomorpohology due to foundation presence, exposure of inter-array cables and cable protection measures	Smith Bank	GBS and jacket foundations (based on layouts with maximum number of turbines)	None identified	Not significant	Condition 26: PEMP
	Designated coastal habitats		None identified	Negligible	
Scour effects due to presence of turbine foundations	Smith Bank	GBS and jacket foundations	Scour protection	Minor	Condition 26: PEMP

[2] The impact rankings presented in the tables throughout this section are as reported in the Moray East ES 2012 ES.

Impacts assessed in the Moray East ES 2012	Key receptors	WCS design parameters assessed for the consented Telford, Stevenson and MacColl wind farms	Mitigation	Predicted residual impact (post mitigation) [2]	Relevant consent conditions
Scour effects due to exposure of inter-array cables and cable protection measures	Smith Bank	Inter-array cables and cable protection measures	Scour protection	Negligible	Condition 26: PEMP
Changes to tidal regime due to presence of turbine foundations	Smith Bank Designated coastal habitats Stratification Fronts Recreational surfing venues	GBS foundations	None identified	Negligible	None identified
Changes to wave regime due to presence of turbine foundations		GBS foundations	None identified	Negligible	None identified

5.3.4 Benthic ecology

Table 5.3 presents a summary of the key impacts, mitigation and consent conditions relating to benthic ecology.

As with the physical environment and sediment processes, the design parameters considered in the Moray East ES 2012 for benthic ecology also relate specifically to the foundation structures and the inter-array cables (see Table 5.3 and Appendix A. As discussed above, the design parameters for suction bucket foundation structures will be within the WCS design parameters for GBS foundations. There will be no change in the design parameters for the inter-array cables. It can therefore be concluded that the conclusions from the assessment of impacts on benthic ecology presented in the presented in Moray East ES 2012 – Chapter 7.1 and summarised in Table 5.3 will remain valid.

Most of the impacts on benthic ecology were assessed as minor and not significant. However, significant impacts (moderate to major adverse) were identified with respect to long term habitat and community change and seabed contamination. These potential significant impacts will be minimised where possible through adherence with the Environmental Management Plan (EMP) which will be implemented through Condition 14 of the Section 36 consents for the Telford, Stevenson and MacColl wind farms (see below). Resulting residual impacts (see Table 5.3) are therefore assessed as minor and are not significant. Although it is concluded that there will be no changes to the conclusions from the impact assessment presented in the Moray East ES 2012, and therefore no further assessment is required, these significant impacts will be reported in the ES.

In accordance with Condition 14 of the Section 36 consent the EMP must be prepared setting out over-arching requirements for environmental management during construction with respect to implementation of specific mitigation measures identified in the Moray East ES 2012, pollution prevention measures and measures to prevent the introduction of invasive non-native marine species. It is expected that this condition will also be applied to any future consent for the proposed offshore wind farm in order to manage potential impacts on benthic ecology. This will ensure conclusions from the assessment of impacts on benthic ecology presented in the Moray East ES 2012 remain valid with respect to this proposed wind farm consent application.

Table 5-3: Benthic ecology impact appraisal

Impacts assessed in the Moray East ES 2012	Key receptors	WCS design parameters assessed for the consented Telford, Stevenson and MacColl wind farms	Mitigation	Predicted residual impact (post mitigation)	Relevant consent conditions
Construction and decommissioning					
Temporary direct seabed disturbance	Sand and gravel sediment habitats and communities (biotopes)	GBS foundations; Inter-array cables (572 km); Jack-up vessel spud cans; Anchors; and Met mast.	Adherence to EMP	Minor	Condition 14: Environmental Management Plan (EMP); and Condition 26: PEMP
Temporary indirect (sediment) disturbance	Sand and gravel sediment habitats and communities (biotopes)	Seabed preparation based on maximum number of turbines (339) and maximum length of inter-array cables (572 km).	Adherence to EMP	Not significant – Minor	
Deposition of sediment arisings from drilling of jacket pin piles	Sand and gravel sediment habitats and communities (biotopes)	Jacket foundations - drill arisings and four pin piles; Maximum number of turbines (339)	Adherence to EMP	Minor	
Seabed contamination as a result of accidental chemical release (construction)	Sand and gravel sediment habitats and communities (biotopes)	No specific information on design parameters available.	Adherence to EMP	Minor	
Operation and maintenance					
Net reduction of area of seabed habitat	Sand and gravel sediment habitats and communities (biotopes)	Maximum number of turbines (339) with GBS foundations. Inter-array cables (572 km).	None identified	Minor significance	Condition 26: PEMP

Impacts assessed in the Moray East ES 2012	Key receptors	WCS design parameters assessed for the consented Telford, Stevenson and MacColl wind farms	Mitigation	Predicted residual impact (post mitigation)	Relevant consent conditions
Habitat and associated community change due to introduction and colonisation of new hard structures on seabed	Sand and gravel sediment habitats and communities (biotopes) Indigenous populations	Maximum footprint of 2.63 km^2 (0.89% total area of the Moray East site). Includes scour protection, max number of turbines (339) with GBS foundations (WCS).	Adherence to EMP Adoption of protocol to minimise risk in relation to spread of non-indigenous species Monitoring arrangements to be put in place	Minor significance	Condition 14: EMP; and Condition 26: PEMP
Effects on physical processes and related biological changes	Sand and gravel sediment habitats and communities (biotopes)	Secondary scour; Change in tidal flow and sediment transport rates (see Chapter 6 Physical Processes); Change in wave climate.	None identified	Not significant – minor	
Temporary direct seabed disturbances during operation	Sand and gravel sediment habitats and communities (biotopes) Physical processes (scour)	Maximum footprint of 0.71 km^2 (0.24% total area of Moray East site) based on max number of turbines (339) and total area of spud cans associated with jack-up vessels (O&M).	Adherence to EMP	Not significant	
Seabed contamination as a result of accidental chemical release (operation)	Sand and gravel sediment habitats and communities (biotopes) Water quality	No specific information on design parameters available.	Adherence to EMP	Minor significance	

5.3.5 Fish and shellfish ecology

Table 5.4 presents a summary of the key impacts, mitigation and consent conditions relating to fish and shellfish ecology.

As identified in Table 5.4 key impacts on fish and shellfish ecology identified in the Moray East ES 2012 included habitat loss (in particular in relation to sandeel), underwater noise impacts on herring, Atlantic salmon and cod, and EMF impacts. Most impacts were assessed to be minor and therefore not significant. However, the impact of underwater noise generated during piling on salmon, cod and herring was assessed as moderate and therefore considered to be significant.

In terms of seabed impacts and habitat loss, given that the design parameters for suction bucket foundations will be within the assessed WCS for GBS foundations and that there will be no change in design parameters for the inter-array cables, impacts on the seabed and potential habitat loss presented in the Moray East ES 2012 will remain valid. These impacts were all assessed to be minor and not significant.

With regard to underwater noise impacts, the assessed WCS design parameters relate to the number and diameter of pin piles required for the jacket foundations. The assessment of impacts from noise on fish also considered the WCS in terms of the maximum number of simultaneous piling operations. Given that there will be no change in any of the design parameters associated with the jacket foundations it can be concluded that conclusions from the assessment of impacts on fish from piling noise included in the Moray East ES 2012 will remain valid.

Although impacts from underwater noise were assessed as being significant, through implementation of a range of mitigation measures it was concluded that the residual impacts would be minor and not significant. These mitigation measures have since been incorporated into the conditions that are attached to the Section 36 Consents for the Telford, Stevenson and MacColl wind farms. Relevant conditions are listed in Table 5.4.

With regard to underwater noise the most relevant consent condition is Condition 11, Piling Strategy (PS). The PS, which has recently received approval from Scottish Ministers, was prepared for the first phase of development of the consented Telford, Stevenson and MacColl wind farms (described as Project 1 in the PS).

As part of the PS additional noise propagation modelling was carried out in order to determine, in more detail, potential impacts of piling noise on herring, cod and salmon. The re-assessment of impacts considered a range of piling scenarios with varying numbers of simultaneous drilling events. The re-assessment was based on the installation of up to 100 turbines within any location of the Moray East site over a 24-month period.

As part of the re-assessment different scenarios were also considered in relation to blow energy levels. This included an increase in the maximum blow energy across 17% to 39% of the Moray East site where blow energies would need to be in excess of the WCS blow energy of 1,080 kJ assessed in the Moray East ES 2012 (due to the nature of the seabed). The PS also describes in detail the key mitigation protocols e.g. procedures for soft start piling that will be implemented in order to ensure that there are no significant impacts on fish arising from the piling activities.

Results from the re-assessment presented in the PS conclude that even with an increase in blow energy, predicted impacts from piling on Atlantic salmon, cod and herring will remain within those assessed in the Moray East ES 2012 and are therefore still considered to be not significant.

In addition to the PS, Moray East is also required to participate in monitoring requirements with respect to Atlantic salmon (Condition 30) and undertake further herring and cod surveys (as required) under Conditions 33 (Telford and Stevenson wind farms – cod and MacColl wind farm - herring) and 34 (Telford and Stevenson wind farms – cod). Sandeel surveys are also required under Conditions 34 (MacColl wind farm) and 35 (Stevenson wind farm).

A Cable Plan (CaP) is also required under Condition 18 ‘to ensure all environmental and navigational issues are considered for the location and construction of the inter array cables’. A desk based assessment of attenuation of electo-magnetic field (EMF) strengths and shielding will need to be produced as part of the CaP in order to ensure that EMF levels are within those assessed within the Moray East ES 2012.

Most of the above conditions (apart from the cod and sandeell surveys) are required to mitigate impacts on fish and shellfish ecology presented in the Moray East ES 2012. It is expected that these conditions will also be attached to any future consent for the proposed wind farm consent application in order to manage potential impacts on fish and shellfish ecology. This will ensure conclusions from the assessment of impacts on fish and shellfish ecology presented in the Moray East ES 2012 remain valid with respect to this proposed wind farm consent application.

Although it is concluded that the impacts presented in the Moray East ES 2012 remain valid, and therefore no further assessment is required, those impacts associated with underwater noise from piling reported as being significant in the absence of mitigation, will be reported in the ES.

Table 5-4: Fish and shellfish ecology impact appraisal

Impacts assessed in the Moray East ES 2012	Key receptors	WCS design parameters assessed for the consented Telford, Stevenson and MacColl wind farms	Mitigation	Predicted residual impact (post mitigation)	Relevant consent conditions
Construction and decommissioning					
Temporary disturbance to seabed	Fish and shellfish Herring Sandeel	WCS for both GBS and jacket foundations (based maximum number of turbines (339)), inter-array cables (maximum length 572 km and maximum cable trench width and depth (6 m by 1 m))	None identified	Minor	Condition 14: EMP; Condition 26: PEMP - pre-construction herring and sandeel surveys; Condition 35 (Stevenson) and 34 (MacColl): Sandeel surveys
Noise	Plaice Salmon and sea trout Cod Whiting Herring Larvae and glass eels Shellfish	Maximum number of turbines (339). Maximum pile diameter for jacket pin piles (2.5 m); Maximum number of pin piles = four per foundation; Maximum number of simultaneous piling operations = six; Met mast monopile diameter = 4.5 m.	Soft start piling Monitoring / survey work	Minor	Condition 11: PS (Herring); Condition 26: PEMP – salmon, cod and herring surveys; Condition 34 (Telford and Stevenson) and Condition 33 (MacColl): Cod surveys; Condition 33 (Telford and Stevenson only): Herring surveys and mitigation
Operation and maintenance					

Impacts assessed in the Moray East ES 2012	Key receptors	WCS design parameters assessed for the consented Telford, Stevenson and MacColl wind farms	Mitigation	Predicted residual impact (post mitigation)	Relevant consent conditions
Loss of habitat	Fish and shellfish Spawning Herring Sandeel	Maximum net reduction of seabed habitat of 3.76 km^2 (1.27 %) based on max GBS foundation diameter (65 m), scour protection, cable protection measures for maximum number of turbines (339) and maximum length of inter-array cable (572 m)	None identified	Not significant to minor	Condition 26: PEMP – Herring and sandeel surveys
Introduction of new habitat	Fish and shellfish	Maximum footprint of 2.63 km^2 (0.89% total area of the Moray East site). Includes scour protection, maximum number of turbines (339) with GBS foundations (WCS) and inter-array cable protection	None identified	Minor (positive)	None identified
	Edible crab		None identified	Minor (positive)	None identified
EMF	Elasmobranchs	Inter-array cable parameters: AC cables, maximum voltage 66 kV, maximum inter-array cable length of 572 km and trench depth 1 m	Cable burial / protection	Minor	Condition 18: CaP
	River and sea lamprey		Cable burial / protection	Minor	Condition 18: CaP
	Salmon and sea trout		Cable burial / protection	Minor	Condition 18: CaP Condition 26: PEMP - salmon monitoring Condition 30: Participation in Scottish Atlantic salmon, sea trout and European eel monitoring strategy
	European eel		Cable burial / protection	Minor	Condition 18: CaP
	Other fish species		Cable burial / protection	Minor	Condition 18: CaP

Impacts assessed in the Moray East ES 2012	Key receptors	WCS design parameters assessed for the consented Telford, Stevenson and MacColl wind farms	Mitigation	Predicted residual impact (post mitigation)	Relevant consent conditions
EMF	Shellfish species	See above	Cable burial / protection	Minor	Condition 18: CaP
Operational noise	All fish	Maximum number of turbines (339)	None identified	Minor	None identified
	Cod		Monitoring / survey work	Minor	Condition 26: PEMP – cod surveys
Changes to fishing activities	All fish	Maximum number of turbines (339)	None identified	Minor	Condition 31: Commercial Fisheries Mitigation Strategy

5.3.6 Marine mammals

Table 5.5 presents a summary of the key impacts, mitigation and consent conditions relating to marine mammals.

Key impacts on marine mammals assessed in the Moray East ES 2012 include underwater noise impacts (pile driving and vessel noise generated during construction and vessels involved in O&M activities) and collision risk (vessel presence). Therefore, given that there will be no change in the assessed WCS design parameters relating to jacket foundations (pile numbers and diameters), number of simultaneous piling operations, or number of vessels involved in construction or O&M activities, it can be concluded that impacts on marine mammals presented in the Moray East ES 2012 will remain valid.

However, as with fish and shellfish ecology, impacts associated with underwear noise, were assessed to have a moderate and significant impact on marine mammals. Residual impacts on marine mammals were also assessed to be significant in the short term. In order to minimise potential significant impacts, various conditions were attached Telford, Stevenson and MacColl wind farm consent.

One of the key conditions relating to marine mammals is the preparation of the PS discussed previously. Implementation of this PS is required to ensure that there are no significant impacts on marine mammals, in particular bottlenose dolphin and harbour seal, as a result of noise from piling. The results from the re-assessment of impacts included in the PS concluded that, with regard to bottlenose dolphin and harbour seal, even with an increase in blow energy, impacts would be no worse than assessed in the Moray East ES 2012 and are still considered to be not significant. Moray East also included harbour porpoise in the considerations for mitigation and monitoring set out in the PS. This was in response to a request from the Moray Firth Regional Advisory Group (MFRAG) Marine Mammal (MM) Subgroup and in recognition that this is the most common European Protected Species (EPS) within the site.

In addition to the PS, under Condition 14 an EMP must be prepared which is required to set out key environment management measures to be implemented to prevent significant adverse impacts on environmental interests and in relation to pre-consent and pre-construction surveys. A Vessel Management Plan (VMP) (Condition 15) which provides detail on numbers, types and specifications of vessels required for the project, management of vessels and location of ports and vessel routes must also be submitted for approval. In part the aim of the VMP is to mitigate disturbance to marine mammals.

Overall, the proposed wind farm design changes will result in a significant reduction in the number of foundation structures installed within the Moray East site (reduced from 339 assessed in the Moray East ES 2012 to a maximum of 137) and an associated reduction in the total number of pin piles that would need to be installed in the event of piled jacket foundations.

Although impacts on marine mammals from underwater noise and vessel presence / collision were all previously assessed to be not significant in the long term (MORL ES 2012 – Chapter 7.3), significant residual impacts were identified in the short term. Although it is concluded that the impacts presented in the Moray East ES 2012 remain valid, and therefore no further assessment is required, those impacts associated with underwater noise from piling reported as being significant in the absence of mitigation, will be reported in the ES.

It is also assumed that the conditions attached to the Section 36 consents for the consented Telford, Stevenson and MacColl wind farms will also be attached to any future consent for the proposed offshore wind farm consent application. These conditions, in addition to mitigating significant impacts on marine mammals, will ensure conclusions from the assessment of impacts on marine mammals presented in the Moray East ES 2012 remain valid with respect to this proposed wind farm consent application.

Table 5-5: Marine mammal impact appraisal

Impacts assessed in the Moray East ES 2012	Key receptors	WCS design parameters assessed for the consented Telford, Stevenson and MacColl wind farms	Mitigation	Predicted residual impact (post mitigation) [3]	Relevant consent conditions
Construction and decommissioning					
Disturbance / displacement due to noise from construction activities (vessels and piling)	Harbour seal Grey seal Harbour porpoise Bottlenose dolphin Minke whale	Jacket foundations: Maximum number of turbines (339). Maximum pile diameter for jacket pin piles (2.5 m) Maximum number of pin piles = four per jacket (total maximum piles 1,356) Maximum number of simultaneous piling operations = six Met mast monopile diameter = 4.5 m Construction vessels (six)	JNCC protocol for minimising risks to marine mammals; and Designated vessel routes	No significant long term impact	Condition 11: PS Condition 14: EMP Condition 15: VMP Condition 26: PEMP Condition 27: MFRAG
Hearing damage due to noise from construction activities (vessels and piling)				No significant long term impact	
Collision risk with vessels involved in construction activities (note to add on ducted propellers)				No significant long term impact	
Reduction in prey sources			None identified	No significant long term impact	

[3] Potential significant short term impacts were identified as a result of piling (as discussed in the main text).

Impacts assessed in the Moray East ES 2012	Key receptors	WCS design parameters assessed for the consented Telford, Stevenson and MacColl wind farms	Mitigation	Predicted residual impact (post mitigation) [3]	Relevant consent conditions
Reduction in foraging ability (due to increased turbidity from seabed disturbance / sediment suspension)	See above	See above	None identified	No significant long term impact	**See above**
Operation and maintenance					
Barrier to movement / displacement due to noise from operational turbines	Harbour seal Grey seal Harbour porpoise Bottlenose dolphin Minke whale	Maximum number of turbines (339) Minimum spacing between turbines (840 m x 600 m) WCS based on 7 MW turbines	Designated vessel routes	Not significant	Condition 14: EMP Condition 15: Vessel Management Plan (VMP) Condition 26: PEMP Condition 27: MFRAG
Collision risk with vessels involved in O&M activities		Increase in vessel movements and presence during operation	Designated vessel routes	Not significant	
Stranding due to electromagnetic fields (EMF)		AC inter-array cables Maximum transmission voltage 66 kV Cable trench depth 1 m	Designated vessel routes	Not significant	
Long term changes in prey availability		Secondary effects due to changes in prey distribution or density due to habitat loss or avoidance due to operational noise	Designated vessel routes	Not significant	
Toxic contamination		Sacrificial nodes and anti-fouling coatings	Designated vessel routes	Not significant	

5.3.7 Commercial fisheries

Table 5.6 presents a summary of the key impacts, mitigation and consent conditions relating to commercial fisheries.

With regard to commercial fisheries, in terms of direct impacts on habitat for target species and impacts associated with restricted access for fishing vessels within the Moray East site (including issues with safety) the WCS design parameters assessed in the Moray East ES 2012 related specifically to the GBS foundations and inter-array cables. Given that, even with the inclusion of suction buckets, there will be

no change in the assessed WCS relating to direct impacts on habitat for target species it can be concluded these impacts remain valid for the proposed wind farm consent application.

In terms of access for fishing vessels, in addition to obstructions and safety issues associated with turbine foundations and inter-array cables, the WCS design parameters included in the Moray East ES 2012 related to turbine spacing and layout (WCS based on diamond layout).

In terms of changes to the turbine design parameters, while there will be an increase in turbine size, there will be no changes in the assessed WCS for spacing between turbines and turbine layout. However, it is likely, with the reduction in maximum number of turbines to 137 (which is within the previously assessed and consented Design Envelope for maximum and minimum number of turbines (339 and 186 respectively)), that there will be an increase in spacing between turbines. However, this will depend on location and layout. The minimum spacing (WCS) assessed in the Moray East ES 2012 was 840 m by 600 m. The minimum spacing included in the Design Envelope as consented for the Telford, Stevenson and MacColl wind farms and this proposed wind farm consent application is 1,200 m x 1,050 m which is within the assessed WCS. Therefore, there will be no change in the assessed WCS with regard to spacing.

In terms of layout, the proposed wind farm consent application will consider both a grid or diamond layout as was included in the Moray East ES 2012. Therefore, there will be no change in the assessed WCS with respect to layout.

In terms of the impacts predicted in the Moray East ES 2012, although impacts of habitat loss on target species were assessed to be of minor significance for all species, impacts associated with a loss of, or restricted, access to scallop and squid fishing grounds and displacement of scallop and squid fisheries were assessed as being moderate and therefore significant. Impacts on other whitefish fisheries were assessed to be of minor significance (Moray East ES 2012 – Chapter 8.1).

In order to minimise potential impacts on scallop and squid fisheries (assessed as moderate), a number of conditions were attached to the Section 36 consents for the Telford, Stevenson and MacColl wind farms relating to commercial fisheries. These are listed in Table 5.6 and included for example the PS (in relation to impacts on noise on cod and herring stocks), EMP, Navigational Safety Plan (NSP) and PEMP.

Other conditions relating specifically to mitigating impacts on commercial fisheries include:

- Condition 9: Construction Programme (CoP). This is required to set out information on start dates for construction, mobilisation of vessels, duration of construction activities etc.;
- Condition 10: Construction Method Statement. This plan is required to ensure the construction management takes into account mitigation measures to protect the environment and other users of the marine area;
- Condition 12: Development Specification and Layout Plan (DSLP). This is required to provide information on the specific location of individual turbines, turbine spacing and associated infrastructure and will be essential for fishermen that target fish in the area in terms of ground accessibility and navigational safety;
- Condition 15: Navigational Safety Plan (NSP). This plan is required to minimise risk to navigation including fishing vessels and is required to include information on navigational safety, construction exclusion zones, notices to mariners and radio warnings, anchorage areas, temporary construction lighting and markers and emergency response procedures;
- Condition 18: Cable Plan (CaP). The CaP is important for commercial fisheries as it sets out specific requirements for the burial and protection of subsea cables. This will help to reduce long term impacts on fisheries associated with the snagging of gear and overall ground accessibility;
- Condition 27: participation in MFRAG meetings. Moray East is required to participate in Moray Firth Regional Advisory Group (MFRAG) meetings to provide advice on monitoring and

mitigation programmes that are being developed with respect to a number of key receptors including commercial fisheries;

- Condition 31: Commercial Fisheries Mitigation Strategy. Moray East is required to continue its involvement in the Moray Firth Offshore Wind Developer Group – Commercial Fisheries Working Group (MFOWDG-CFWG) in order to define and finalise the Commercial Fisheries Mitigation Strategy dated 13 July 2013 (CFMS) and investigate alternative gear for the scallop fishing industry in the Moray Firth; and
- Condition 32: Fisheries Liaison Officer (FLO). Prior to the commencement of the Development, a Fisheries Liaison Officer (FLO) approved by Scottish Ministers, must be appointed by the Company for the period from commencement of development until final commissioning. This is important for establishing and maintaining effective communication between Moray East and fishermen whilst also ensuring compliance with best practice guidance.

Moray East has continued to engage with the fishing industry since submission of the Moray East ES in 2012 and will continue to engage with the fishing industry with respect to this proposed wind farm consent application.

Although it is concluded that the impacts presented in the Moray East ES 2012 will remain valid, and therefore no further assessment is required, potential significant impacts associated with a loss of, or restricted, access to scallop and squid fishing grounds and displacement of scallop and squid fisheries, will be reported in the ES.

It is assumed that the conditions listed in Table 5.6 will also apply to the proposed wind farm consent application. These conditions, in addition to mitigating impacts on commercial fisheries, will therefore also ensure that any changes associated with the proposed wind farm consent application remain within the parameters of the consented Telford, Stevenson and MacColl wind farms and that all predicted impacts on commercial fisheries remain valid.

It should be noted that the above conclusions assume that the proposed data validation exercise (Chapter 4) identifies no significant changes to fisheries that would alter the conclusions of the impact assessment presented in the Moray East ES 2012. Should this not be the case, the fisheries impact assessment may need to be revisited. However, this will be confirmed during the EIA.

Table 5-6: Commercial fisheries impact appraisal

Impacts assessed in the Moray East ES 2012	Key receptors	WCS design parameters assessed for the consented Telford, Stevenson and MacColl wind farms	Mitigation	Predicted residual impact (post mitigation)	Relevant consent conditions
Construction and decommissioning					
Adverse effects on target species (commercial fish and shellfish populations)	All target species	WCS for both GBS and jacket foundations (based maximum number of turbines (339)), inter-array cables (maximum length 572 km and maximum cable trench width and depth (6 m by 1 m))	None identified	Minor	Condition 14: EMP Condition 11: PS (cod and herring) Condition 26: PEMP (cod,

Impacts assessed in the Moray East ES 2012	Key receptors	WCS design parameters assessed for the consented Telford, Stevenson and MacColl wind farms	Mitigation	Predicted residual impact (post mitigation)	Relevant consent conditions
Adverse effects on recreational fish populations	All target species	WCS for both GBS and jacket foundations (based maximum number of turbines (339)), inter-array cables (maximum length 572 km and maximum cable trench width and depth (6 m by 1 m))	None identified	Minor - moderate	herring and sandeel) Condition 31: Commercial Fisheries Mitigation Strategy
Complete loss or restricted access to traditional fishing grounds	Scallop	WCS for GBS foundations (diameter 65 m) Maximum number of turbines (339) Maximum number of met masts (2) Diamond layout Minimum spacing (840 m x 600 m) Maximum inter-array cable length (572 km) Maximum number of construction vessels (six) each with 500 m exclusion zone Maximum number of incomplete infrastructure with safety zones (50 m)	None identified	Moderate	Condition 12: DSLP Condition 18: CaP Condition 27: participation in MFRAG meetings Condition 31: Commercial Fisheries Mitigation Strategy Condition 32: FLO
	Squid			Moderate	
	White fish			Minor	
Safety issues for fishing vessels	All fisheries	WCS based on: Maximum number of turbines (339) Maximum inter-array cable length (572 km) Incomplete installation of inter-array cables	Application of operational safety zones and ongoing consultation to reduce risks to acceptable limits	Within acceptable safety limits	Condition 12: DSLP Condition 17: NSP Condition 18: CaP Condition 31: Commercial Fisheries Mitigation Strategy Condition 32: FLO
Increased steaming time to fishing grounds	All fisheries	Maximum of six safety zones (based on maximum of six construction vessels) Each safety exclusion zone = 500 m Additional 50 m safety exclusion zone applied to installed infrastructure	None identified	Minor	

Impacts assessed in the Moray East ES 2012	Key receptors	WCS design parameters assessed for the consented Telford, Stevenson and MacColl wind farms	Mitigation	Predicted residual impact (post mitigation)	Relevant consent conditions
Displacement of fishing vessels into other areas	Scallop	WCS for GBS foundations (diameter 65 m) Maximum number of turbines (339) Maximum number of met masts (2) Diamond layout Minimum spacing (840 m x 600 m) Maximum inter-array cable length (572 km) Maximum number of construction vessels (six) each with 500 m exclusion zone Maximum number of incomplete infrastructure with safety zones (50 m)	None identified	Moderate	Condition 31: Commercial Fisheries Mitigation Strategy Condition 32: FLO
	Squid			Moderate	
	White fish			Minor	
Interference with fishing activities	All fisheries except crab and lobster	Location of port of construction Maximum number of construction vessels (six)	Construction management programme	Minor	Condition 10: CMS Condition 17: NSP Condition 18: CaP Condition 32: FLO
	Crab and lobster			Minor	
Temporary disturbance to seabed	Salmon and sea trout	See Table 7.2-2 Design Envelope Parameters Relevant to the Fish and Shellfish Ecology Assessment in the Moray East ES 2012 for more information.	None identified	Assessed in Chapter 7.2	See fish and shellfish ecology (Section 5.3.5)
Noise	Salmon and sea trout		Monitoring / survey work	Assessed in Chapter 7.2	See fish and shellfish ecology (Section 5.3.5)
Operation and maintenance					
Adverse effects on target species (commercial fish and shellfish populations)	All target species	WCS for both GBS and jacket foundations (based maximum number of turbines (339)), inter-array cables (maximum length 572 km and maximum cable trench width and depth (6 m by 1 m)	None identified	Minor	Condition 14: EMP Condition 11: PS Condition 26: PEMP Condition 31: Commercial Fisheries Mitigation Strategy

Impacts assessed in the Moray East ES 2012	Key receptors	WCS design parameters assessed for the consented Telford, Stevenson and MacColl wind farms	Mitigation	Predicted residual impact (post mitigation)	Relevant consent conditions
Adverse effects on recreational fish populations	All target species	WCS for both GBS and jacket foundations (based maximum number of turbines (339)), inter-array cables (maximum length 572 km and maximum cable trench width and depth (6 m by 1 m)	None identified	Minor	Condition 14: EMP Condition 11: PS Condition 26: PEMP
Complete loss or restricted access to traditional fishing grounds	Scallop	WCS for GBS foundations (diameter 65 m) Maximum number of turbines (339) Maximum number of met masts (2) Diamond layout Minimum spacing (840 m x 600 m) Maximum inter-array cable length (572 km) Maximum unburied sections of inter-array cable protected by concrete mattresses Minimum burial of inter-array cable	Ongoing development of mitigation proposals such as gear modification trials. However, no specific mitigation defined at time of submission.	Minor to moderate	Condition 12: DSLP Condition 18: CaP Condition 27: participation in MFRAG meetings Condition 31: Commercial Fisheries Mitigation Strategy
	Squid			Moderate	
	White fish			Minor	
Safety issues for fishing vessels	All fisheries	WCS based on: Maximum number of turbines (339) Maximum inter-array cable length (572 km) Maximum unburied sections of inter-array cable protected by concrete mattresses Minimum burial of inter-array cable	Application of operational safety zones and ongoing consultation to reduce risks to acceptable limits	Within acceptable safety limits	Condition 12: DSLP Condition 17: NSP Condition 18: CaP Condition 31: Commercial Fisheries Mitigation Strategy

Impacts assessed in the Moray East ES 2012	Key receptors	WCS design parameters assessed for the consented Telford, Stevenson and MacColl wind farms	Mitigation	Predicted residual impact (post mitigation)	Relevant consent conditions
Increased steaming time to fishing grounds	All fisheries	Maximum of six safety zones (based on maximum of six construction vessels) Each safety exclusion zone = 500 m Additional 50 m safety exclusion zone applied to installed infrastructure	None identified	Minor	Condition 12: DSLP Condition 17: NSP Condition 18: CaP Condition 31: Commercial Fisheries Mitigation Strategy
Obstacles on the seabed post construction	All fisheries	Any construction related obstacles and changes to seabed conditions, including cable burial and protection.	Standard industry practice	Within acceptable safety limits	Condition 17: NSP
Displacement of fishing vessel into other areas	Scallop	WCS for GBS foundations (diameter 65 m) Maximum number of turbines (339) Maximum number of met masts (2) Diamond layout Minimum spacing (840 m x 600 m) Maximum inter-array cable length (572 km) Maximum number of construction vessels (six) each with 500 m exclusion zone Maximum number of incomplete infrastructure with safety zones (50 m)	None identified	Minor to moderate	Condition 31: Commercial Fisheries Mitigation Strategy
	Squid			Moderate	
	White fish			Minor	
Interference with fishing activities	All fisheries	Location of port of construction Maximum number of construction vessels (six)	Extension of construction management programme to include operations	Minor	Condition 9: CoP Condition 10: CMS Condition 17: NSP Condition 18: CaP

Impacts assessed in the Moray East ES 2012	Key receptors	WCS design parameters assessed for the consented Telford, Stevenson and MacColl wind farms	Mitigation	Predicted residual impact (post mitigation)	Relevant consent conditions
Loss of habitat	Salmon and sea trout	See Table 7.2-2 Design Envelope Parameters Relevant to the Fish and Shellfish Ecology Assessment in the Moray East ES 2012 for more information.	See fish and shellfish ecology (Section 5.3.5 above)	See fish and shellfish (Section 5.3.5 above)	See fish and shellfish ecology (Section 5.3.5 above)
Introduction of new habitat					
EMFs					
Operational noise	Salmon and sea trout				
Changes to fishing activities	Salmon and sea trout				

5.3.8 Shipping and navigation

Table 5.7 presents a summary of the key impacts, mitigation and consent conditions relating to shipping and navigation.

Potential impacts on shipping and navigation were identified through a series of hazard identification workshops. Based on the outcome from these workshops it was concluded that the key potential impacts associated with the consented Telford, Stevenson and MacColl wind farms include disruption / change to routes used by commercial, fisheries and recreational vessels and potential increased risk of collusion on those route; impacts on search and rescue (SAR) activities and helicopter access and potential impacts on marine based radar.

It was concluded in the Moray East ES 2012 that the consented Telford, Stevenson and MacColl wind farms are located in an area of relatively low commercial shipping densities with the main shipping route passing at a mean distance of 4 nm north east of the Telford site boundary (the Pentland Firth route). There is available sea room to re-route around turbines. All potential impacts were assessed to be minor and not significant.

On the basis that there will be no change in the assessed WCS design parameters relating to maximum numbers of construction vessels, turbine numbers and topside (above sea surface) dimensions of the jacket foundation structures, it can be concluded that the impacts on shipping and navigation presented in the Moray East ES 2012 will remain valid.

Although no significant impacts were identified with respect to shipping and navigation, there is still a requirement to implement various industry standard mitigation measures to ensure developers meet requirements of MGN 543 Guidance and lighting / marking as advised by Northern Lighthouse Board (NLB) based on International Association of Lighthouse Authorities (IALA) standards (IALA, 2008). Key industry standard mitigation measures identified in the Moray East ES 2012 (Chapter 8.2) include:

- Marine Aids to Navigation (AtoNs) will be provided in in accordance with NLB requirements, which will comply with IALA standard O-139 on the Marking of Offshore Wind Farms (IALA, 2008);
- Marking of wind farm structures (and cabling) on appropriate scale admiralty charts by the United Kingdom Hydrographic Office (UKHO);

- Promulgation of information and appropriate liaison. This ensures information on the wind farm projects and special activities is circulated in Notices to Mariners, Navigation Information Broadcasts and other appropriate media to allow vessels to effectively and safely navigate around the proposed Telford, Stevenson and MacColl wind farms;
- The SAR ERCoP will be developed and put in place for the construction, operation and the decommissioning phases of the wind farms; and
- An Active Safety Management System (ASMS) will be developed to ensure the effective co-ordination of emergency response at the proposed sites. It will be designed to ensure that the risks related to marine operations (construction, operation / maintenance and decommissioning) specific to the Telford, Stevenson and MacColl wind farms are managed carefully and over the long term.

In addition to this industry standard mitigation measures, other best practice mitigation was also identified to further limit impacts on navigational safety. These include for example Notices to Mariners, radio navigation warnings, safety and exclusions zones.

In order to ensure that these measures are implemented, various conditions have been attached to the Section 36 consents for each of the consented Telford, Stevenson and MacColl wind farms. These include Condition 9: Construction Programme (CoP), Condition 10: Construction Method Statement (CMS), Condition 12: Development Specification and Layout Plan (DSLP) and Condition 16: Operation and Maintenance Programme (OMP), Condition 17: Navigational Safety Plan (NSP) and Condition 19: Lighting and Marking Plan (LMP). Most of the industry practice mitigation measures listed above are included within the NSP and LMP. In addition to this there is a requirement to notify the UKHO of the final layout of the turbines to ensure the wind farm is added to nautical charts.

As discussed above for commercial fisheries, it should be noted that, in the event that the proposed data validation exercise (Chapter 4) indicates that there have been significant changes to shipping and navigation associated with the Moray East site since submission of the Moray East ES 2012, further assessment may be required. However, this will be confirmed during the EIA.

Table 5-7: Shipping and navigation impact appraisal

Impacts assessed in the Moray East ES 2012	Key receptors	WCS design parameters assessed for the consented Telford, Stevenson and MacColl wind farms	Mitigation	Predicted residual impact (post mitigation)	Relevant consent conditions
Construction					
Effects on Vessel Routing and Collision During Construction	Commercial Shipping	Maximum loss of navigable sea area based on: Maximum number of construction vessels (six) and support vessels Increased level of vessel activity (1,355 vessel movements per construction period within each wind farm site).	Industry standard measures (see Moray East ES 2012 Chapter 8,2) Safety zones	Minor significance	Condition 9: CoP Condition 10: CMS Condition 12: DSLPCondition 17: NSP Condition 19: LMP Condition 24: Charting windfarm (UKHO)

Impacts assessed in the Moray East ES 2012	Key receptors	WCS design parameters assessed for the consented Telford, Stevenson and MacColl wind farms	Mitigation	Predicted residual impact (post mitigation)	Relevant consent conditions
Effects on Fishing Vessels During Construction	Fishing Vessels	Maximum loss of navigable sea area based on maximum number of construction vessels and associated support traffic within the proposed sites.	Industry standard measures Safety zones and guard vessels	Minor significance	Condition 9: CoP Condition 10: CMS Condition 12: DSLPCondition 17: NSP Condition 19: LMP Condition 24: Charting windfarm (UKHO)
Effects on Recreational Routing During Construction	Recreational Vessels	Maximum loss of navigable sea area based on maximum number of construction vessels and associated support traffic within the proposed sites.	Industry standard measures Safety zones and guard vessels	Minor significance	
Operation and maintenance					
Effects on Commercial Ship Routing During Operation and Maintenance	Commercial Shipping	Maximum loss of navigable sea area based on presence of jacket foundations (45 x 45 m diameter topside / above sea level) for 339 turbines.	Industry standard measures Min air draft of 22m Marine control centre	Minor significance	Condition 16: OMP Condition 17: NSP Condition 19: LMP Condition 24: Charting windfarm (UKHO)
Effect on Commercial Shipping Collision Risk During Operation and Maintenance	Commercial Shipping	Collision between passing vessel and fixed structure within the wind farm (turbines and / or substation) Maximum loss of navigable sea area based on presence of jacket foundations (45 x 45 m diameter topside / above sea level) for 339 turbines.	Industry standard measures Min air draft of 22m Marine control centre	Minor significance	

Impacts assessed in the Moray East ES 2012	Key receptors	WCS design parameters assessed for the consented Telford, Stevenson and MacColl wind farms	Mitigation	Predicted residual impact (post mitigation)	Relevant consent conditions
Effect on Fishing Vessels During Operation Including Collision and Displacement During Operation and Maintenance	Fishing Vessels	Collision between passing fishing vessel and fixed structure within the wind farm (turbines and / or substation) Maximum loss of navigable sea area based on presence of jacket foundations (45 x 45 m diameter topside / above sea level) for 339 turbines.	Industry standard measures Min air draft of 22m Marine control centre	Minor significance	Condition 16: OMP Condition 17: NSP Condition 19: LMP Condition 24: Charting windfarm (UKHO)
Effect on Recreational Vessels Including Collision (Blade and Structure) and Displacement During Operation and Maintenance	Recreational Vessels	Collision between passing recreational vessel and fixed structure within the wind farm (turbines and / or substation) Maximum loss of navigable sea area based on presence of jacket foundations (45 x 45 m diameter topside / above sea level) for 339 turbines.	Industry standard measures Min air draft of 22m Marine control centre	Minor significance	Condition 12: DSLP Condition 16: OMP Condition 17: NSP Condition 19: LMP Condition 24: Charting windfarm (UKHO)
Effect on Search and Rescue - increase in events or reduced capability During Operation an Maintenance	Casualties and Search And Rescue Responders (surface craft)	Maximum loss of navigable sea area for SAR operations, based on presence of jacket foundations (45 x 45 m diameter topside / above sea level) for 339 turbines.	Industry standard measures Min air draft of 22m Marine control centre	Minor significance	
Effect on Helicopter Operations in Line with Regulatory Guidance During Operation and Maintenance	Helicopter Search and Rescue Responders	Placement of largest turbine jacket foundation of 45 x 45 m diameter topside / above sea level for maximum number of turbines (339).	Industry standard measures Min air draft of 22m Marine control centre	Minor significance	

Impacts assessed in the Moray East ES 2012	Key receptors	WCS design parameters assessed for the consented Telford, Stevenson and MacColl wind farms	Mitigation	Predicted residual impact (post mitigation)	Relevant consent conditions
Effect on Marine Radar Systems During Operation and Maintenance	All Vessels	Placement of largest turbine jacket foundation of 45 x 45 m diameter topside / above sea level and maximum number of turbines (339).	None	Minor significance	Condition 16: OMP Condition 17: NSP Condition 19: LMP Condition 24: Charting windfarm (UKHO) Condition 12: DSLP

5.3.9 Other human activities

Table 5.8 presents a summary of the key impacts, mitigation and consent conditions relating to other human activities.

In terms of potential impacts on other human activities, these occur where there is potential for an interaction between the consented Telford, Stevenson and MacColl wind farms and other human activities occurring within the Moray Firth. Interactions with other human activities were identified as most likely to occur where there is a physical overlap (spatial) in activities or where activities and specific design parameters associated with the consented Telford, Stevenson and MacColl wind farms have potential to influence other activities.

The BOWL wind farm is located adjacent to the north east boundary of the consented Telford and Stevenson wind farms. However, it was concluded in the Moray East ES 2012 that, given both projects had already been working together on a number of studies and would continue to do so, there would be no significant impacts on activities associated with the BOWL project, this remains the case for the proposed wind farm consent application. It is also worth noting that, at the time of the assessment (2012) it was understood that the BOWL and consented Telford, Stevenson and MacColl wind farms could be constructed concurrently. However, this is now not the case on the basis BOWL construction is programmed to commence in April 2017.

In terms of impacts on the Beatrice Demonstrator Project, these were assessed to be not significant on the basis that the demonstrator project is located several kilometres south west of the Moray East site, therefore the potential for any interactions is very limited. Given that there will be no change in the assessed WCS relating to overall footprint and turbine numbers associated with the proposed wind farm consent application, the impacts presented in the Moray East ES 2012 remain valid.

Where other activities occur within the Moray East site (e.g. abandoned subsea infrastructure associated with oil and gas operations), or where the proposed wind farm consent application is located within an area used by other humans (e.g. military practice area D809) it was identified that there is potential for interaction to occur. However, the impact of these interactions was assessed to be not significant. With regard to the proposed wind farm consent application there will be no change in the assessed WCS relating to Moray East site boundaries. Although there will be an increase in turbine size, and associated reduction in turbine numbers, there will be no change in the assessed WCS design parameters relating to turbine numbers and seabed footprint (foundations and inter-array cable lengths) included in the Moray East ES 2012.

It is also likely that with a reduction in turbine numbers there will an in increase in spacing between turbines. However, for the purpose of the validation of these impacts, any changes in spacing will be within the assessed WCS for turbine spacing included in the Moray East ES 2012. Impacts on military

practice areas and abandoned oil and gas infrastructure located within the Telford, Stevenson and MacColl wind farm sites presented in the Moray East ES 2012 therefore remain valid.

In terms of potential impacts of the consented Telford, Stevenson and MacColl wind farms on activities associated with the Beatrice and Jacky oil fields, these relate mainly to vessel interactions and impacts on helicopter access and were assessed in detail as part of the shipping and navigation (Moray East ES 2012 Chapter 11.2) and civil and military aviation (Moray East ES 2012 Chapter 11.3) assessments respectively. In terms of the impacts on vessel movements, given that there will be no change in the assessed WCS relating to vessel numbers (for construction and operation), these impacts will remain valid. However, as identified in Table 3.1 there is potential that the change in turbine height could affect the impacts presented in the Moray East ES 2012 with regard to helicopter access. It is therefore proposed that helicopter access is assessed in more detail as part of the EIA (in the civil and military aviation assessment) for the proposed wind farm consent application. Further information on this is provided in Chapter 11.

However, it is noted that, since submission of the Moray East ES in 2012, work has progressed on the decommissioning of the Beatrice oil field. It is understood that decommissioning of the Beatrice oil field is anticipated to commence in 2017 for completion by 2021. It is also understood, from Ithaca Energy (pers. coms) that preparatory works for decommissioning of the Jacky platform is also anticipated to commence in 2017 and will involve removal of the platform. The implications of decommissioning of the Beatrice oil field will be considered in the civil and military aviation assessment with regard to helicopter access (see Chapter 11 for further detail on the approach to this assessment).

In terms of impacts on oil and gas block licence holders, these were assessed as being minor for construction and moderate, and therefore significant, during operation. Although two blocks (12/21b and 12/23 which partially overlap the Moray East site have been made available in recent UK Government oil and gas licencing rounds (the 28th and 29th Rounds) no awards have yet been made for these blocks. Suncor, in 2015, carried out exploration activities within blocks 12/26b and 12/27 which overlap southern sections of the Moray East site. However, this licence has since been surrendered (DECC, 2016).

It was acknowledged that there is oil and gas interest in the area in the Moray East ES 2012. This situation remains unchanged. Therefore, given that there will be no change in the assessed WCS design parameters in terms of overall footprint and the Moray East site boundaries, the previous impacts described above will remain valid (e.g. no worse) for the purpose of this scoping report. The position regarding the future plans of the licence block holders will continue to be monitored by Moray East through consultation with relevant operators.

As noted in Table 5.8 there are a number of conditions attached to the Section 36 consent for the Telford, Stevenson and MacColl wind farms that focus specifically on the implementation of measures and plans to manage offshore activities such as the CoP, CMS, DSLP, NSP, LMP and CaP in order to ensure the safety of and minimise impacts on other sea users. These conditions are expected to be attached to any future consent for the proposed wind farm consent application.

Table 5-8: Other human activities impact appraisal

Impacts assessed in the Moray East ES 2012	Key receptors	WCS design parameters assessed for the consented Telford, Stevenson and MacColl wind farms	Mitigation	Predicted residual impact (post mitigation)	Consent conditions
Construction and decommissioning					
Effect on other offshore wind farms	BOWL Beatrice demonstrator turbine	Maximum construction seabed footprint of 5.99 km^2 based on: maximum number of turbines (339), total dredged area for GBS foundations; inter-array cables (572 km with trench 1 m x 6 m); jack-up vessel spud cans; anchors; and met masts (2). Diamond layout with minimum spacing of turbines (840 m x 600 m). Maximum unburied sections of inter-array cable protected by concrete mattresses Maximum number of construction vessels (six) each with 500 m exclusion zone. Maximum buffer between the Moray East site and adjacent BOWL site of 600 m. Maximum construction window of up to 6 years	None identified	Not significant	Condition 5: Removal of redundant turbines and associated infrastructure Condition 9: CoP Condition 10: CMS Condition 12: DSLP Condition 17: NSP Condition 18: CaP Condition 19: LMP Condition 24: UKHO charting of turbine locations
Effect on military practice and exercise areas	Practice area D809		None identified	Not significant	
Effects on subsea cables	None present in Moray East site		None identified	No impact	
Effect on oil and gas operations and infrastructure including pipelines	Oil and gas block licence holders Jacky and Beatrice oil platforms associated with Beatrice field		Ongoing consultation and co–ordination with operators	Minor adverse	
Health and safety risk due to unexploded ordnance (UXO)	Offshore personnel		Pre–construction UXO survey; UXO safety plan	Not significant	
Operation					
Effect on other offshore wind farms	BOWL Beatrice demonstrator turbine	Maximum seabed footprint of 2.93 km^2 based on: GBS foundations, scour protection, cable protection and maximum number of turbines.	None identified	Not significant	Condition 5: Removal of redundant turbines and associated infrastructure Condition 9: CoP
Effect on military practice and exercise areas	Practice area D809		None identified	Not significant	

Impacts assessed in the Moray East ES 2012	Key receptors	WCS design parameters assessed for the consented Telford, Stevenson and MacColl wind farms	Mitigation	Predicted residual impact (post mitigation)	Consent conditions
Effects on subsea cables	None present in Moray East site	Maximum safety zone of 50 m around turbines Maintenance activities	None identified	No impact	Condition 10: CMS Condition 12: DSLP Condition 17: NSP Condition 18: CaP Condition 19: LMP Condition 24: UKHO charting of turbine locations
Effect on oil and gas operations and infrastructure including pipelines	Oil and gas block licence holders Jacky and Beatrice oil platforms associated with Beatrice field		Ongoing consultation and co–ordination with operators	Moderate adverse	
Health and safety risk due to unexploded ordnance (UXO)	Offshore personnel		None identified	Not significant	

Scoping Question 5.1:

Is Marine Scotland in agreement that the following disciplines do not require further assessment in the EIA to support the proposed wind farm consent application due to there being no changes in the conclusions on potential impacts presented in the Moray East ES 2012:

- Physical environment and sediment processes;
- Benthic ecology;
- Fish and shellfish ecology;
- Marine mammals;
- Commercial fisheries;
- Shipping and navigation; and
- Other human activities?

Scoping Question 5.2:

Does Marine Scotland agree this Chapter has identified correctly the specific significant effects predicted in the Moray East 2012 which should be reported in the ES for the proposed wind farm application?

6 Validation of whole project and cumulative impacts

6.1 Introduction

This section presents findings from an appraisal of the whole project impacts and cumulative impacts assessed in the Moray East ES 2012. The aim of this appraisal is to determine whether the conclusions from these assessments remain valid for the purpose of informing the proposed wind farm consent application.

6.2 Validation of whole project impacts

6.2.1 Overview of whole project assessment

With regard to the proposed wind farm consent application, the consented Telford, Stevenson and MacColl wind farm sites are being amalgamated into one wind farm area, the 'Moray East site'. The offshore and onshore transmission works; offshore substation platforms (OSPs), export cables, landfall and onshore cables, onshore substation and associated works (access roads etc.) remain separate will form part of the whole project assessment.

6.2.2 Outcome from appraisal of whole project impacts

As concluded in Chapter 5, the WCSs assessed in Moray East ES 2012 relating to the following EIA topics: physical environment and sediment processes; benthic ecology; fish and shellfish ecology; marine mammals; commercial fisheries; shipping and navigation; and other human activities will remain unchanged. Therefore, the conclusions from the assessment of impacts relating specifically to the offshore wind farm component of the project remain valid.

The proposed changes in Design Envelope for the proposed wind farm consent application will also not affect any of the assessed WCS design parameters associated with the Modified TI. Therefore, the impacts presented in the Moray East Modified TI ES 2014 for the topics listed above also remain valid.

On this basis, the WCSs for the whole project assessment will also remain unchanged. It can therefore be concluded that there will be no changes in the conclusions from the whole project assessment for these topics (physical environment and sediment processes; benthic ecology; fish and shellfish ecology; marine mammals; commercial fisheries; shipping and navigation and other human activities).

Those EIA topics identified as requiring further assessment as part of the EIA due to changes in site characterisation data, impact assessment methods or consented Design Envelope, will be subject to a more detailed whole project assessment as part of the EIA.

6.3 Validation of cumulative impacts – introduction

The following section presents findings from the appraisal of cumulative impacts presented in the Moray East ES 2012.

6.3.1 Approach to the validation of cumulative impacts

The validation of the cumulative impacts involves the following:

- Review of projects included in the Moray East ES 2012 CIA to identify any changes to those projects that might have implications on the conclusions from the 2012 CIA and identify any additional projects (consented or proposed) that could have an influence on the CIA relating to the proposed wind farm consent application; and
- Review of the Design Envelope for the consented Telford, Stevenson and MacColl wind farms to identify where proposed design changes could have implications on the cumulative impacts presented in the Moray East ES 2012.

6.3.2 Projects considered in the CIA carried out as part of the Moray East ES 2012

Projects considered in the CIA carried out for the Moray East ES 2012 are summarised below.

Table 6-1: Projects included in the Moray East ES 2012 CIA

Project	WCS design parameters assessed in the Moray East ES 2012	Changes to parameters post application / consent
Beatrice offshore wind farm (BOWL)	Maximum number of turbines = 227 GBS foundations with maximum total footprint of 11,690 km^2 Jacket foundations with four pin piles (2.4 m diameter) Length of inter-array cable = 325 km Length of export cable = 65 km	Section 36 Consent awarded March 2014 Marine Licence granted August 2014 Final 'as built' number of turbines = 84
Moray West Project	Maximum number of turbines = 139 Transmission Infrastructure	EIA Scoping Report submitted May 2016 Number of turbines included in scoping report = 90 Transmission infrastructure proposals in development
Projects in the Moray Firth		
SHETL hub and associated infrastructure	Offshore connection platform on Shetland, Moray, Caithness link. Located north Moray Firth (off the coast at Wick)	No longer being taken forward (cancelled in 2013) – http://ec.europa.eu/energy/eepr/projects/files/offshore-wind-energy/hvdc-hub_en.pdf
Beatrice Demonstrator Project	Two operational offshore wind farm demonstrator turbines in the outer Moray Firth	To be decommissioned – dates to be confirmed
SHEFA-2 telecommunications cables	Existing SHEFA-2 fibre optic submarine cable, running through the Moray Firth from the Faroe Islands via Shetland and Orkney to Banff	No change
Beatrice and Jacky oil platforms and associated infrastructure	Existing oil and gas infrastructure (platforms, wells and pipelines) in the outer Moray Firth associated with two operational oil fields (Beatrice and Jacky)	To be decommissioned – dates to be confirmed
Projects outside the Moray Firth		
European Offshore Wind Development Centre (EOWDC)-Aberdeen Bay	100 MW 11 turbines 2 km off the coast at Blackdog, Aberdeenshire	Section 36 consent March 2013 Marine Licence August 2014 Variation in 2013 increase in maximum tip height from 195 m to 198.5 m Variation in September 2016 (consented) relating to change in export cable route

Project	WCS design parameters assessed in the Moray East ES 2012	Changes to parameters post application / consent
Neart na Goithe offshore wind farm	105 km^2 75 – 125 turbines (3.6 MW to 6 MW turbine rating) Maximum capacity = 450 MW	Consented 2014 (Section 36 and Marine Licence (for up to 75 turbines)) Variation to Section 36 Consent – granted 2015 for increase in maximum turbine rating to 7 MW and increase in hub height from 107.5 m to 115 m
Inch Cape offshore wind farm	150 km^2 110 turbines Maximum capacity = 784 MW	Consented 2014 (Section 36 and Marine Licence) No known change in project parameters since project consent
Firth of Forth offshore wind farm (Seagreen Alpha and Bravo)	75 turbines (each site) Maximum capacity = 525 MW (each site)	Consented in 2014 (Section 36 and Marine Licence) No known change in project parameters since project consent
PFOW wave and tidal projects	Eleven wave and tidal lease sites in Pentland Firth and Orkney Waters, with a total potential capacity of 1,600 MW.	Number of projects cancelled / put on hold Meygen Phase 1 Tidal Array in Inner Sound Consented 2014 (Maine Licence) and installation completed 1Q 2017 Application submitted for Brims Tidal Array (2015) DP Energy Westray South Tidal Array EIA ongoing. Ongoing operations at the European Marine Energy Centre (EMEC) wave and tidal sites
Other infrastructure projects		
Port redevelopment opportunities (Nigg, Ardesier Buckie, Deephaven, Invergordon, Inverness, Wick)	Moray Firth ports are being / are expected to be redeveloped, primarily in order to support a growing marine renewable and offshore wind industry. Development projects are at various stages	Various developments taken forward

6.3.3 BOWL and Moray West

As noted in Table 6.1 both BOWL and Moray West were a key consideration in the CIA carried out as part of the Moray East ES 2012. However, for reasons discussed in Chapter 2, both projects have been scoped out of the CIA for the proposed wind farm consent application.

BOWL is due to commence construction in April 2017 and is consequently now considered as built. As such it will now be referred to as part of the baseline rather than a CIA project.

The Moray West application will not be determined before the determination of the applications for the Moray East site. Therefore, for the purpose of assessing cumulative impacts of the two wind farms this

will be undertaken as part of the Moray West Offshore Wind Farm application and will not be considered in the proposed wind farm consent application for the Moray East Offshore Wind Farm.

With regard to the validation of cumulative impacts presented in the Moray East ES 2012, no further reference will be made to either BOWL or Moray West Offshore Wind Farm on the basis that, with respect to this proposed wind farm consent application, these wind farms are no longer considered to be projects relevant to CIA.

6.3.4 Development scenarios

It was also noted in Chapter 2 that, depending on the outcomes from CfD bidding rounds, Moray East may look to develop part of the Moray East site under the consents granted for the Telford, Stevenson and MacColl wind farms, with the remaining parts of the Moray East site developed under this proposed wind farm consent application. Should this occur, at no point would the total capacity of the Moray East site of 1,116 MW be exceeded, irrespective of the proportions of the site developed under either the Telford, Stevenson and MacColl wind farms.

As discussed in Chapter 2 it has been concluded, that in terms of the assessed WCSs, the sum of the parts (e.g. WCS for part of the Telford, Stevenson and MacColl wind farms combined with WCS for part of the proposed wind farm consent application) will never exceed the WCS for each project as a whole. Consequently, on this basis it is concluded that, for those topics where there are expected to be no changes in the assessed WCS design parameters and therefore no changes in the conclusions from the CIA presented in the Moray East ES 2012, no further assessment of this development scenario is required.

For those projects where there is a change in the assessed WCS and therefore potential change to the conclusions from the CIA presented in the Moray East ES 2012, this proposed approach to development of the Moray East site will be considered in more detail as part of the CIA.

Where the entire Moray East site is to be developed under this proposed wind farm consent application it is possible that construction will be carried out in phases. Potential construction scenarios will also be considered as part of the CIA for those topics requiring more detailed assessment as part of the EIA and are not considered further as part of this CIA validation exercise.

6.3.5 Forth and Tay offshore wind farm projects

The Forth and Tay projects (Neart na Goithe, Inch Cape and the two Seagreen Firth of Forth Round 3 Zone projects Alpha and Bravo) were all considered in the CIA carried out for the Moray East ES 2012. However, potential cumulative impacts were only assessed qualitatively, not quantitatively on the basis that there was insufficient information about the projects available in the public domain at the time the CIA was carried out.

Although these projects all received consent in March 2014, they are subject of an ongoing legal challenge. Therefore, uncertainty remains as to what will be developed and when.

With regard to the assessment of cumulative impacts, consideration has been given to the CIAs that were included in the ESs prepared in support of the 2012 consent applications for these projects. It was concluded in these CIAs, that, there would be no significant cumulative impacts associated with the then proposed Telford, Stevenson and MacColl wind farms.

It is also noted that, although the current legal challenge of the Forth and Tay projects is associated with cumulative impacts, the challenge is specifically in relation to the cumulative impacts of those projects on birds. The consented Telford, Stevenson and MacColl wind farms are not affected by the legal challenge.

Given that CIAs carried out for the Forth and Tay projects have already concluded that there are no significant cumulative impacts associated with the consented Telford, Stevenson and MacColl wind farms, and that these consents are still in place, it is proposed that no further assessment work is required with respect to the Forth and Tay projects. This is on the basis that that the conclusions from the 2012 Forth and Tay CIAs will remain valid for the purpose of informing the appraisal of cumulative impacts.

In the event that a decision is made to re-submit consent applications for the Forth and Tay projects, the requirements for these to be considered in the CIA for those topics identified as requiring further assessment will depend on timings of the applications.

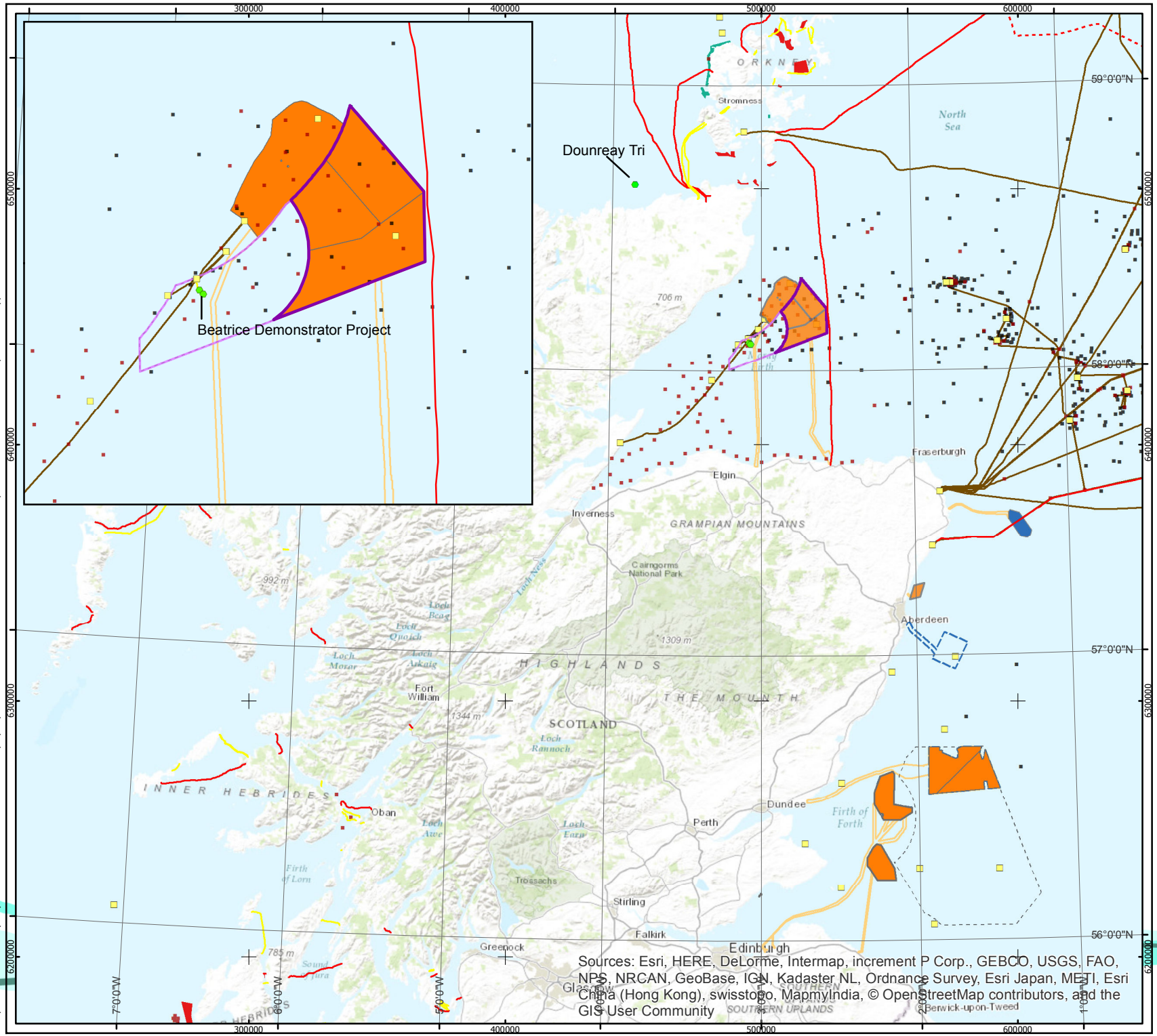
6.3.6 New projects to the considered with respect to the proposed wind farm consent application

New projects considered with respect to potential cumulative impacts associated with the proposed wind farm consent application are summarised below.

Table 6-2: Additional / new projects (post 2012) to be considered with respect to cumulative impacts associated with the proposed wind farm consent application

Project	Key design parameters	Status
Hywind Scotland Pilot Park Project	Floating offshore wind pilot park project located 12 nm off coast at Peterhead. 5 x 6 MW turbines with 30 MW maximum capacity	Consented October 2016
Dounreay Tri Demonstration Project	Floating offshore wind demonstration project 6 km off north coast of Scotland in Pentland Firth. 2 turbines on floating sub-structure 8 – 12 MW maximum capacity	Consent application submitted October 2016
Kincardine Offshore Windfarm Project	Floating offshore wind farm project off coast of Aberdeen 8 x 6 MW turbines installed on semi-submersible floating sub-structures	Consent application submitted April 2016
Forthwind Offshore Wind Farm Demonstration Array (Methil)	Demonstration project consented in December 2016 comprises 2 x turbines, each with installed capacity of up to 9 MW. Array project to deploy a further 7 turbines (9 in total) with overall project area of 15 km^2	Demonstration project consented December 2016 Scoping report for demonstration array project submitted December 2016
NorthConnect Interconnector	Interconnector between Norway and Scotland Landfall – Peterhead	Scoping report submitted April 2016
Caithness Moray Interconnector	Interconnector between Caithness (Noss Head) and south Moray Firth coast (Portgordon) – passes to east of the Moray East site	Consented April 2016
Eastern HVDC Link	East Coast Scotland Interconnector Landfall at Peterhead	Scoping report submitted March 2012
Aberdeen Harbour Expansion Project	Expansion of Aberdeen Harbour – Nigg Bay Development	Consent application submitted November 2015
Onshore projects	Included in Chapter 9 where relevant to the SLVIA.	Not applicable

Projects considered in the Moray East ES 2012 and additional projects to be considered in the proposed wind farm consent application are illustrated in Figure 6.1.



Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

MORAY EAST
OFFSHORE WINDFARM

KEY

- Moray East site
- Moray West site

Offshore Wind

- Under Construction
- Consented
- Pre-planning Application
- Area of Search
- Wind Export Cable Agreements
- Additional wind project (not in TCE database)

Other Renewables

- Crown Estate Tidal Lease
- Crown Estate Wave Lease

Oil and gas infrastructure

- Surface
- Subsurface
- Wells
- Pipelines

Offshore cables

- Power (Disused)
- Power (Proposed)
- Power (Active)
- Telecom (Active)
- Telecom (Disused)

Horizontal Scale: 1:2,000,000 A4 Chart
0 20,000 40,000 Meters
N

Geodetic Parameters: WGS84 UTM Zone 30N

Produced: JDM
Reviewed: SE
Approved: SE

Date: 3/3/2017 | Revision: A

REF: 8460001-PPV0010-MOR-MAP-001

Figure 6.1
CIA Projects

Moray Offshore Windfarm (East) Ltd

6.4 Cumulative impact appraisal summary table

With respect to the appraisal of cumulative impacts it is necessary to consider how impacts presented in the Moray East ES 2012 would be affected (and therefore potentially no longer remain valid for the proposed wind farm consent application) by the following:

- Changes in Design Envelope based on information presented in Table 3.1;
- Changes in site characterisation data (as discussed in Chapter 4); and
- Emergence of new / additional projects that could potentially affect the results from the CIA carried out for the Moray East ES 2012.

An appraisal of both design changes and new / additional projects has been carried out with respect to the cumulative impacts presented in the Moray East ES 2012. A summary of the key findings from this appraisal is provided in Table 6.3 below.

Table 6-3: Impact appraisal summary table – cumulative impacts

Topics	New projects requiring consideration in CIA	Design Envelope changes – potential implications on conclusions from the CIA presented in the Moray East ES 2012?			
		Increase size of WTG (rating, tip height and rotor diameter)	Increase spacing between turbines	Reduction in number of turbines	Inclusion of suction buckets
Physical environment and sediment processes	×	×	×	×	×
Benthic ecology	×	×	×	×	×
Fish and shellfish ecology	×	×	×	×	×
Marine mammals	×	×	×	×	×
Ornithology	✓	✓	×	×	×
Commercial fisheries	×	×	×	×	×
Shipping and navigation	×	×	×	×	×
Seascape, landscape and visual assessment (SLVIA)	✓	✓	✓	✓	×
Civil and military aviation	×	×	×	×	×

Topics	New projects requiring consideration in CIA	Design Envelope changes – potential implications on conclusions from the CIA presented in the Moray East ES 2012?			
		Increase size of WTG (rating, tip height and rotor diameter)	Increase spacing between turbines	Reduction in number of turbines	Inclusion of suction buckets
Archaeology and cultural heritage	✓	✓	✓	✓	×
Socio-economics, recreation and tourism	✓	×	×	✓	×
Other human activities	×	×	×	×	×
✓ = yes potential for new projects and / or changes in the Design Envelope to have implications on conclusions from the CIA presented in the Moray East ES 2012 × = No change to conclusions from CIA presented in the Moray East ES 2012					

6.5 Cumulative impact validation

6.5.1 EIA topics where further assessment is required with respect to CIA

As indicated in Table 6.3 above, based on the appraisal of cumulative impacts included in the Moray East ES 2012 with respect to the changes in Design Envelope (Table 3.1), and review of new / additional projects (Table 6.2) the following topics have been identified as requiring further assessment as part of the EIA with respect to cumulative impacts:

- Ornithology;
- Seascape, landscape and visual impact assessment;
- Archaeology and cultural heritage (visual setting only); and
- Socio-economics.

The proposed approach to assessing potential cumulative impacts associated with the proposed wind farm consent application on the EIA topics listed above are described in Chapters 8 to 12.

6.5.2 EIA topics where no further assessment is required with respect to CIA

Based on information presented in Chapter 4 (validation of site characterisation data and assessment methods) and Tables 6.1 and 6.2 it is proposed that the following topics do not require any further assessment with respect to potential cumulative impacts. Justification for the scoping out of these topics is provided below.

- Physical environment and sediment processes;
- Benthic ecology;
- Fish and shellfish ecology;
- Marine mammals;
- Commercial fisheries;

- Civil and military aviation;
- Sipping and Navigation; and
- Other human activities.

6.5.3 Physical environment and sediment processes

It was concluded in the Moray East ES 2012 CIA that potential cumulative impacts of the consented Telford, Stevenson and MacColl wind farms being developed in conjunction with other projects and activities on the physical environment and sediment processes are highly limited for the following reasons (Moray East ES 2012 – Chapters 13.1 and 13.2):

- All projects / activities are located more than one tidal excursion from the Moray East site;
- All projects / activities have no direct fetch for wave effects to interact with that from the Moray East site (i.e. there is no pathway connecting the Moray East site and other impact sources); and
- The dimensions of the infrastructure associated with the consented Telford, Stevenson and MacColl wind farms are so small that it will not conceptually have any measureable effect on the tidal, wave and sedimentary regimes.

With regard to new projects that have been consented or proposed since submission of the Moray East ES in 2012 (Table 6.2), all, except the Caithness Moray HVDC project, are located outside the Moray Firth. Therefore, for the reasons listed above, there is no potential for any cumulative interactions with any of these additional CIA projects.

Although the Caithness Moray HVDC cables will pass to within 1 km of the eastern boundary of the Moray East site, the potential for any cumulative impacts associated with the proposed wind farm in terms of physical environment and sediment processes are highly limited. This is on the basis that:

- Although there will be seabed disturbance associated with installation of the HVDC cables, this will be highly localised and short term;
- Based on the current installation programme for the Caithness Moray HVDC project, the cables will be installed by the end of 2017 (SHE -T, 2016), prior to any installation works commencing on the proposed wind farm consent application. Therefore, there is no potential for any cumulative impacts occurring from simultaneous activities e.g. suspended sediment;
- Where possible, the HVDC cables will be buried to a depth of at least 1 m reducing the potential for cumulative impacts associated with scour around cables laid on the seabed;
- It was concluded in the Caithness Moray HVDC Reinforcement Cumulative Impact Review (SHE-T, 2016) that although there will be direct seabed disturbance during installation of the cable there would be no cumulative impacts associated with the consented Telford, Stevenson and MacColl wind farms; and
- There will be no change in the WCS design parameters assessed as part of the physical environment and sediment processes CIA for the consented Telford, Stevenson and MacColl wind farms (e.g. in relation to GBS foundations or inter-array cables).

It can therefore be concluded that no further assessment is required as part of the CIA, with respect to additional consented and proposed projects since submission of the Moray East ES in 2012.

6.5.4 Benthic ecology

The projects assessed as part of the benthic ecology CIA carried out as part of the Moray East ES 2012 (excluding BOWL and Moray West) included:

- Proposed SHETL hub and associated transmission infrastructure;
- Beatrice Demonstrator project turbines;

- SHEFA-2 telecommunications cable; and
- Beatrice and Jacky oil platforms and associated infrastructure.

Potential cumulative impacts associated with the Beatrice Demonstrator project, SHEFA-2 telecommunications cable and Beatrice and Jacky oil platforms and associated infrastructure were all assessed to be not significant. This was on the basis that these projects are already operational therefore the potential for further seabed disturbance or habitat loss associated with these projects was assessed to be negligible. Potential cumulative impacts considering the consented Telford, Stevenson and MacColl wind farms in addition to these projects in terms of an increase in net habitat loss were also assessed to be not significant.

With respect to the SHETL Hub, at the time of the assessment (2012) the status of this project was unconfirmed. In 2013, the project was cancelled. However, the transmission infrastructure now forms part of the Caithness Moray HVDC project.

As with the physical environment and sediment processes assessment discussed above, it is expected that the Caithness Moray cables will be installed prior to the commencement of construction of the proposed wind farm consent application. Therefore, there is no potential cumulative impacts associated with simultaneous construction activities. Similarly, while there will be direct seabed disturbance and associated habitat loss during cable installation these impacts will be highly localised and short term, further reducing the potential for any cumulative impacts associated with this additional project. It can therefore be concluded that no further assessment will be required with regard to the Caithness Moray HVDC project.

In terms of the other recently consented and proposed projects, these are all located at a distance from the proposed wind farm consent application area beyond which there is no potential for there to be any cumulative impacts on benthic ecology. With respect to the potential for these projects to create stepping stones for the introduction on marine invasive non-native species (MINNS), this will be managed accordingly through project EMPs, the preparation of which is a condition of the consents. These EMPs are required to include specific management measures to prevent the introduction of MINNS.

6.5.5 Fish and shellfish ecology

With regard to fish and shellfish ecology, the key potential impacts identified as requiring assessment from a cumulative perspective included habitat disturbance and loss, underwater noise and EMF. Due to limited detailed information being available for the majority of the projects listed in Table 6.1 it was only possible to carry out a quantitative assessment of underwater noise for the BOWL, Moray West and European Offshore Wind Development Centre (EOWDC) projects.

BOWL and Moray West have been scoped out of the CIA for the proposed wind farm consent application, therefore the cumulative impacts presented in the Moray East ES 2012 are no longer relevant to the proposed consent application. Although the EOWDC project was also considered in the underwater noise modelling carried out to inform the Moray East ES 2012 CIA, its contribution in terms of potential cumulative impacts was limited. Therefore, given that there will be no change in the assessed WCS design parameters for the proposed wind farm consent application with respect to turbine numbers and pile diameters it can be concluded that, with regard to the EOWDC project and underwater noise, there would be no changes in conclusions from the CIA carried out for fish and shellfish ecology. The assessment presented in Moray East ES 2012 – Chapter 14.2 therefore remains valid for the proposed wind farm consent application.

With regards to new projects that have been consented or proposed projects since submission of the Moray East ES in 2012 (Table 6.2), the Hywind Scotland Pilot Park Project, Dounreay Tri and Kincardine Offshore Windfarm Project all involve floating offshore wind technologies. The potential for any of these projects to generate underwater noise during construction (other than vessel noise) is limited. Other impacts on fish and shellfish ecology associated with these projects such as habitat disturbance and loss and EMF are all assessed to be not significant. Given that there will be no change in the assessed WCS for the consented Telford, Stevenson and MacColl wind farms with respect to GBS foundations and inter-

array cables, it is concluded that no further assessment would be required from a CIA perspective with regard to these additional projects.

The only new project to be considered at a local level is the Caithness Moray HVDC project. However, as discussed previously with regard to benthic ecology, impacts associated with this project such as habitat disturbance will be short term and temporary. In terms of EMF, impacts associated with the HVDC cables will be mitigated using the similar measures to those identified for the consented Telford, Stevenson and MacColl wind farms in terms of cable burial, protection and protective casing to reduce EMFs. Given that there will be no change in the assessed WCS for the consented Telford, Stevenson and MacColl wind farms with respect to inter-array cables, it is concluded that no further assessment would be required with regard to cumulative impacts from the Caithness Moray HVDC project.

6.5.6 Marine mammals

Key potential cumulative impacts on marine mammals related to underwater noise from piling. However, as with fish and shellfish ecology, due to limited detailed information being available for the majority of the projects listed in Table 6.1 it was only possible to carry out a quantitative assessment of underwater noise for the BOWL, Moray West and EOWDC projects.

As discussed previously for fish and shellfish ecology, BOWL and Moray West have been scoped out of the CIA for the proposed wind farm consent application, therefore the cumulative impacts presented in the Moray East ES 2012 are no longer relevant to the proposed consent application.. There will also be no change in the conclusions from the assessment of cumulative impacts associated with the EOWDC project on the basis that there will be no change in the assessed WCS design parameters for the proposed wind farm consent application with respect to turbine numbers and pile diameters. The assessment presented in Moray East ES 2012 – Chapter 14.3 therefore remains valid for the proposed wind farm consent application.

As discussed for fish and shellfish ecology, with regards to new projects that have been consented or proposed since submission of the Moray East ES 2012 (Table 6.2), the Hywind Scotland Pilot Park Project, Dounreay Tri and Kincardine Offshore Windfarm Project all involve floating offshore wind technologies. The potential for any of these projects to generate underwater noise during construction (other than vessel noise) is therefore limited. In addition to this it is also noted that the CIA for the Hywind Pilot Park project concluded no significant impacts with respect to marine mammals.

The only new project to be considered at a local level is the Caithness Moray HVDC project. However, as discussed previously with regard to benthic ecology, impacts associated with this project such as underwater noise from cable installation activities will be short term and temporary. The cables are also scheduled to be installed by the end of 2017, prior to works commencing on the construction of proposed wind farm consent application. It is therefore concluded that there is no further assessment required with regard to cumulative impacts from the Caithness Moray HVDC project.

It was noted in Chapter 4 that since submission of the Moray East ES 2012, there has been a change in the way in which marine mammal populations are defined, with the introduction of marine mammal Management Units (MUs). Initial proposed areas were drafted in 2013 and published in 2015 (IAMMWG, 2015). These units now provide the reference point for considering potential impacts at a population level. The geographical extent of these units vary for different species, with the MUs for harbour porpoise and bottlenose dolphin (beyond 12 nm) extending across the entire North Sea region.

With respect to the CIA presented in the Moray East ES 2012 (which was undertaken prior to the drafting of the marine mammal MUs), the reference population for harbour porpoise was defined as the North Sea area (Moray East ES 2012, Appendix 7.3 A). However, while there are a number of other projects within this wider North Sea area, the CIA concluded that, any impacts on harbour porpoise from piling noise would be local to the areas surrounding the construction activities. It was also concluded that, given the generalised distribution of harbour porpoise, potential cumulative impacts over wide areas (e.g. Moray Firth and Firths of Forth and Tay) would be relatively low and that alternative foraging areas in the North Sea for harbour porpoise would likely to be available.

The MU for harbour porpoise published in 2015 extends to the south east coast of England (i.e. further than the North Sea area defined in the Moray East ES 2012). There are a number of additional offshore wind farms in this area (at various stages of development from pre-application to operational). However, based on the conclusions above, given the distance of these projects from the Moray Firth and the fact that there will be no change in the assessed WCS for the jacket foundations associated with the proposed wind farm consent application (e.g. no change in WCS for pin pile numbers and diameters) the potential for cumulative impacts with additional projects located off the east coast of England is very limited. It can therefore be concluded that no further assessment of these projects would be required as part of the CIA with respect to harbour porpoise.

With regard to bottlenose dolphin, although the MU published in 2015 covers the North Sea offshore area, the IAMMWG report notes that very few bottlenose dolphin are seen in the offshore area (beyond 12 nm) and, although there is no conclusive evidence, those seen are thought to belong to the Coastal Scottish group (Scottish East Coast out to 12 nm) (IAMMWG, 2015). This includes the Moray Firth population. Based on this it can be concluded that no additional projects (e.g. East of England offshore wind farms) would need to be considered with respect to potential cumulative impacts on bottlenose dolphin.

6.5.7 Commercial fisheries

In terms of the CIA for commercial fisheries, this focused specifically on cumulative impacts associated with the BOWL and Moray West projects with respect to loss of, or restricted access to fishing grounds; increased steaming times; safety issues; presence of obstacles on the seabed post construction; interference with fishing activities and displacement. Given that these projects are now scoped out of the CIA for the proposed wind farm consent application, the cumulative impacts presented in the Moray East ES 2012 are no longer relevant to the proposed consent application.

Although other plans and projects were identified in the CIA reported in Moray East ES 2012, there was insufficient information available for these projects for these to inform an assessment of potential significance. It was also noted that, certain fisheries e.g. scallop, are able to exploit grounds located at various locations around the UK, where as other fisheries operate on a more local to regional basis. This influences how projects are identified for inclusion in the CIA. On this basis, the CIA focused specifically on those grounds located within the Moray Firth for all fisheries. However, spatial distributions of different fisheries where taken into consideration when determining the importance of fishing grounds in the Moray East site for certain target species.

With regards to the new projects that have been consented or proposed (Table 6.2) since the Moray East ES 2012, i.e. the Hywind Scotland Pilot Park Project, Dounreay Tri and Kincardine Offshore Windfarm Project, these are all located outside of the Moray Firth and therefore do not require any further consideration with respect to the CIA for commercial fisheries.

The only new project located in the Moray Firth is the Caithness Moray HVDC project. In terms of potential impacts on commercial fisheries, the presence of the cables and associated cable protection measures could impact fisheries in the area, in particular trawls and scallop dredge fisheries. However, where possible the cables will be buried to at least 1 m depth in order to limit potential impacts on commercial fisheries associated with snagging and restricted activities. Given that there will be no change in the assessed WCS for the consented Telford, Stevenson and MacColl wind farms with respect to inter-array cables, it is concluded that no further assessment would be required with regard to cumulative impacts from the Caithness Moray HVDC project.

6.5.8 Civil and military aviation

With regards to civil and military aviation, the CIA included in the Moray East ES 2012, which focused on the consideration of BOWL and Moray West, concluded that in the absence of mitigation, significant cumulative impacts would occur on the National Air Traffic Services Plc (NERL) Allanshill and the Ministry of Defence (MoD) Royal Air Force (RAF) Lossiemouth Primary Surveillance Radar (PSR) systems. However, it was recognised that mitigation was under discussion with both NERL and MoD and that cumulative

mitigation solutions would be achievable within the required timescales. It was equally determined that, with suitable technological mitigation in place, there would likely be negligible residual impact on the NERL Allanshill and RAF Lossiemouth PSR systems. Consultations with these stakeholders are ongoing.

With regards to the new projects that have been consented and or proposed projects (Table 6.2) since the Moray East ES 2012, the closest offshore wind farm projects are the Hywind Scotland Pilot Park Project and Dounreay Tri Demonstration Project. Information available in the public domain on these projects (i.e. ES or scoping report) indicates that these projects will not affect the NERL Allanshill and RAF Lossiemouth PSR systems. It is therefore concluded that these projects do not do not require any further consideration with respect to the CIA for civil and military aviation. This will be confirmed through ongoing consultation with relevant stakeholders.

It is concluded that no further assessment will be required with regards to cumulative impacts from a civil and military aviation perspective on the bases that:

- Consultations are ongoing;
- BOWL and Moray West have been scoped out of the CIA for the proposed wind farm consent application; and
- Neither the Hywind Scotland Pilot Park nor the Dounreay Tri Demonstration Project will affect the NERL Allanshill and RAF Lossiemouth PSR systems.

6.5.9 Shipping and navigation

With regards to shipping and navigation, the CIA included in the Moray East ES 2012, concluded that there was limited potential for any cumulative impacts on commercial and non-commercial (fisheries and recreation) ship routing / collision risk. This is due to the low volumes of vessel traffic and availability of a large sea area for the safe deviation of vessels around the consented Telford, Stevenson and MacColl wind farms and other projects and activities within the Moray Firth such as Beatrice Demonstrator Project, and the Beatrice and Jacky oil platforms.

Since submission of the Moray East ES 2012, it has emerged that the Beatrice and Jacky platforms are due to be decommissioned. Decommissioning could commence as early as 2017. It is understood that the Beatrice Demonstrator Project will also be decommissioned at the same time. Given that there will be no change in the WCS design parameters (in particular construction vessels numbers, turbine numbers and topside jacket foundation structure dimensions) assessed as part of the shipping and navigation CIA it can be concluded that the assessment presented in Moray East ES 2012 – Chapter 15.2 therefore remains valid.

The only new project within the Moray Firth is the Caithness Moray HVDC project. Given that these cables are expected to be installed in 2017, there is no potential for any cumulative impacts on shipping and navigation as installation will be complete ahead of any installation associated with the proposed wind farm consent application. It is therefore concluded that no further assessment would be required with regard to cumulative impacts from the Caithness Moray HVDC project.

6.5.10 Other human activities

The CIA for other human activities considered potential impacts of the Telford, Stevenson and MacColl wind farms on and in conjunction with other plans, projects and other activities within the Moray Firth. In addition to the BOWL and Moray West projects which are scoped out of the CIA for the proposed wind farm consent application, projects considered in the other human activities CIA included the Beatrice Demonstrator Project; SHEFA-2 subsea cable and the Beatrice and Jacky oil infrastructure.

It was concluded that for all interactions between these projects and activities, potential cumulative impacts would be not significant, except for impacts on operators holding oil and gas licence blocks in the area where there is potential for longer term significant impacts on exploration activities where the Moray East site is located within licenced blocks. Although these significant impacts require no further

assessment, they will be reported in the ES. Potential impacts on civil and military aviation were considered separately (see above).

With regards to the new projects that have been consented or proposed projects, the majority of these are located outside of the Moray Firth and therefore do not require any further consideration as part of the CIA for the proposed wind farm consent application.

The only additional project within the Moray Firth is the Caithness Moray HVDC project. Given that the route of the cable has been designed to avoid or minimise interaction with other human activities in the Moray Firth, the potential for cumulative impacts is limited. As noted in the Moray East ES 2012 Chapter 15.8 where there is potential for interactions it is assumed that other projects e.g. Caithness Moray HVDC project will adhere to the same industry standards as Moray East with respect to cable and pipeline crossings, implementation of safety zones around seabed structures and use of buffer zones / easements. Potential cumulative impacts associated with this project therefore require no further assessment.

Scoping Question 6.1:

Is Marine Scotland in agreement with the list of new projects in Table 6-2 (excluding BOWL and Moray West) that need to be considered with respect to the CIA for the proposed windfarm consent application?

Scoping Question 6.2:

Is Marine Scotland in agreement that the following have been scoped out of the whole project and cumulative impacts for the proposed wind farm EIA due to their being no changes in the impacts predicted in the Moray East 2012 ES:

- Physical environment and sediment processes;
- Benthic ecology;
- Fish and shellfish ecology;
- Marine mammals;
- Commercial fisheries;
- Civil and military aviation;
- Sipping and Navigation; and
- Other human activities?

6.6 References

IAMMWG (2015). Management Units for cetaceans in UK waters (January 2015). JNCC Report No. 547, JNCC Peterborough.

SHE – T (2016). Caithness - Moray HVDC Reinforcement Offshore Installation Cumulative Impact Review

7 Proposed scope of the EIA

7.1 Introduction

The proposed scope of the EIA is summarised in Table 7.1. This reflects the key findings from Chapters 4, 5 and 6 with respect to:

- Validation of site characterisation data and assessment methods;
- Validation of project specific impacts: and
- Validation of whole project and cumulative impacts.

7.2 Scoped out EIA topics

Key EIA topics identified as requiring no further assessment as part of the EIA include:

- Physical environment and sediment processes;
- Benthic ecology;
- Fish and shellfish ecology;
- Marine mammals; and
- Other human activities.

7.3 Topics requiring further validation of site characterisation data

Due to changes that may have occurred post submission of the Moray East ES 2012, it has been identified that further validation of site characterisation data is required as part of the EIA with respect to:

- Commercial fisheries; and
- Shipping and navigation.

Results from this data validation exercise will be included in the ES.

7.4 EIA topics requiring further assessment in the EIA

Based on findings from Chapters 4 to 6 the following chapters have been identified as requiring further assessment in the EIA. Reason for these topics requiring further assessment are summarised in Table 7.1.

- Ornithology;
- Seascape, landscape and visual assessment;
- Archaeology and cultural heritage (impacts on setting only);
- Civil and military aviation; and
- Socio-economics.

7.5 Topics requiring consideration as part of the HRA

Based on information presented in Chapters 4 to 6, it has been identified that in addition to undertaking an HRA with respect to ornithology and SPAs (including recently designated pSPAs) consideration will also need to be given to the potential effects of the proposed wind farm consent application on SACs where marine mammals and / or migratory fish are a qualifying feature. Further information on the requirements for, and approach to, HRA is provided in Chapter 13.

Scoping Question 7.1:

Is Marine Scotland in agreement with the topics that require consideration as part of the proposed wind farm consent application with regards to:

- Baseline validation
- Project specific impact assessment
- Whole project and cumulative impact assessment; and
- HRA?

Table 7-1: Scope of EIA

EIA topics	Potential implications in terms of baseline data	Potential implications in terms of assessment methods	Design Envelope changes – implications for project specific impact assessment?				Implications for whole project and cumulative impact assessment?		HRA Considerations	Comments
			Increase size of turbines	Increase spacing between turbines	Reduction in number of turbines	Inclusion of suction buckets	New projects	Design changes		
Physical environment and sediment processes	×	×	×	×	×	×	×	×	×	No further assessment required as part of the EIA
Benthic ecology	×	×	×	×	×	×	×	×	×	No further assessment required as part of the EIA. Significant effects identified in the Moray East ES 2012 will be reported.
Fish and shellfish ecology	×	×	×	×	×	×	×	×	✓	No further assessment required as part of the EIA. However, fish SACs to be considered in the HRA. Significant effects identified in the Moray East ES 2012 will be reported.
Marine mammals	×	×	×	×	×	×	×	×	✓	Due to introduction of MMMUs in 2015 may be a need to consider potential impacts projects in English waters from a CIA perspective and additional cSACs in English waters from an HRA perspective (Chapter 13). Significant effects identified in the Moray East ES 2012 will be reported.

EIA topics	Potential implications in terms of baseline data	Potential implications in terms of assessment methods	Design Envelope changes – implications for project specific impact assessment?				Implications for whole project and cumulative impact assessment?		HRA Considerations	Comments
			Increase size of turbines	Increase spacing between turbines	Reduction in number of turbines	Inclusion of suction buckets	New projects	Design changes		
Ornithology	✓	✓	✓	×	×	×	✓	✓	✓	Further assessment required. See Chapter 8 for further detail on proposed approach to EIA. Information on HRA presented in Chapter 13.
Commercial fisheries	✓	×	×	×	×	×	×	×	×	Results from validation of site characterisation data for commercial fisheries to be presented in the ES. No further assessment of potential impacts required as part of the EIA on the basis that turbine spacing, layout and numbers will remain within the assessed WCS. Conclusions from the Moray East ES 2012 are therefore expected to remain valid. Significant effects identified in the Moray East ES 2012 will be reported.
Shipping and navigation	✓	×	×	×	×	×	×	×	×	Results from validation of AIS site characterisation to be presented in ES. No further assessment of potential impacts required as part of the EIA on the basis turbine spacing, layout and numbers will remain within the assessed WCS. Conclusions from the Moray East ES 2012 are therefore expected to remain valid.

EIA topics	Potential implications in terms of baseline data	Potential implications in terms of assessment methods	Design Envelope changes – implications for project specific impact assessment?				Implications for whole project and cumulative impact assessment?		HRA Considerations	Comments
			Increase size of turbines	Increase spacing between turbines	Reduction in number of turbines	Inclusion of suction buckets	New projects	Design changes		
Seascape, landscape and visual assessment (SLVIA)	✓	×	✓	✓	✓	×	✓	✓	×	Further assessment required. See Chapter 9 for further detail on proposed approach to assessment.
Civil and military aviation	×	×	✓	✓	✓	×	✓	✓	×	Further assessment required. See Chapter 10 for further detail on proposed approach to assessment.
Archaeology and visual receptors (setting only)	×	×	✓	✓	✓	×	✓	✓	×	Further assessment required with respect to impacts on setting only. No change in assessed WCS for foundation structures or turbine numbers / layout. Conclusions from the Moray East ES 2012 therefore remain valid with respect to impacts on marine archaeology.
Socio-economics, recreation and tourism	✓	✓	✓	×	✓	×	✓	✓	×	Further assessment required. See Chapter 12 for detail on proposed approach to assessment.
Other human activities	×	×	×	×	×	×	×	×	×	No further assessment required as part of the EIA

EIA topics	Potential implications in terms of baseline data	Potential implications in terms of assessment methods	Design Envelope changes – implications for project specific impact assessment?				Implications for whole project and cumulative impact assessment?		HRA Considerations	Comments
			Increase size of turbines	Increase spacing between turbines	Reduction in number of turbines	Inclusion of suction buckets	New projects	Design changes		
✓ Further assessment required as part of the EIA × No further assessment required. Topic to be scoped out for the relevant assessment										

8 Ornithology

8.1 Introduction

The following chapter presents the proposed approach to the assessment of potential impacts associated with the proposed wind farm consent application on ornithology. In developing the proposed approach, it has been necessary to take into consideration work completed for as part of the Moray East ES 2012 (including site characterisation studies; technical reports etc.; outcome from the impact assessment in terms of key sensitive receptors and potential impacts and their significance; and proposed mitigation measures) and additional information provided during the determination period. The proposed approach also takes into account stakeholder concerns and key issues raised during consultation (pre-application and post-application), and actions taken to address these concerns and issues. Where new data have become available to inform the baseline for the assessment and new impact assessment methodologies and guidance are available these have been recognised and considered as appropriate.

This scoping report provides details on both the approaches for EIA and HRA. Where more contemporary information (e.g. updated ornithological guidance or the proposed designation of new SPAs) has led to a revision in the methodological approach since submission of the Moray East ES 2012, these are identified.

Natural Power Consultants (NPC) undertook bird (and marine mammal) baseline surveys for the consented Telford, Stevenson and MacColl wind farm sites between April 2010 and March 2012. The ES sections for birds and a HRA report were subsequently produced by NPC to support the Moray East ES 2012. NIRAS have been commissioned to provide an ES chapter and HRA report for offshore ornithology with respect to the proposed wind farm consent application.

8.2 Work completed for Moray East ES 2012

Key sources of site characterisation data and assessment methods used to inform the ornithological assessment carried out as part of the Moray East ES 2012 are summarised in Chapter 4 of this scoping report and discussed in detail in Chapters 4.5 and 7.4 of the Moray East ES 2012 and associated Technical Appendices: Technical Appendix 4.5 A Ornithology Baseline and Impact Assessment, Technical Appendix 4.5 B Aerial Ornithology Surveys for the Moray Firth Zone and Technical Appendix 4.5 C Seabird Tracking and Modelling Report.

8.3 Key findings from the Moray East ES 2012

During construction and decommissioning, impacts were predicted to be limited to disturbance (arising from turbine installation / removal and associated vessel traffic) and the indirect impacts on prey species. These were expected to be of short–term duration and reversible. During operation, the two key likely significant impacts on species populations were predicted to be collision risk and disturbance / displacement. These were expected to be of long–term duration but potentially reversible. Impact magnitude was considered likely to vary during the year due to seasonal variation in site numbers.

The key findings of the Moray East ES 2012 are presented in Table 8.1. Significant cumulative impacts were identified for gannet, herring gull and great black-backed gull as a result of collision with turbines. A significant impact was only predicted for these species due to the inclusion of BOWL in the cumulative assessment together with the Moray East ES 2012 offshore wind farm sites contributing the highest number of collisions.

Table 8-1: Moray East ES 2012 ornithological impact assessment summary

Impact	Receptor	Consented Telford, Stevenson and MacColl wind farms (residual impact)	Cumulative impacts
Construction/Decommissioning			
Disturbance	All receptors	No significant impact	No significant impact
Operation			
Disturbance / Displacement	All receptors	No significant impact	No significant impact
Collision risk	Gannet	No significant impact	Significant impact
	Herring gull	No significant impact	Significant impact
	Great black-backed gull	No significant impact	Significant impact
	All other receptors	No significant impact	No significant impact
Barrier effects	All receptors	No significant impact	No significant impact

Post submission of the Moray East ES 2012, Marine Scotland Science agreed with the conclusions of no significant impact on the receptors detailed in Table 8.1 (and no a conclusion of no adverse effects on site integrity for HRA issues – see Chapter 13 of this scoping report). This also aligned with the conclusions reached by SNH and JNCC. There remained some uncertainty as to the appropriate metric to focus on to determine impacts through PVA. This is explored for the proposed approach to the EIA for the proposed wind farm consent application (Section 8.5).

8.3.1 Mitigation

Mitigation measures set out in the Moray East ES 2012 were limited detailing that during all phases, vessel traffic will be along set routes; thus reducing the area of disturbance and increasing the likelihood of habituation to disturbance.

In addition, a post-consent monitoring strategy has been developed through the Moray Firth Regional Advisory Group (MFRAG). Key components are detailed in Table 8.2.

Table 8-2: Proposed ornithology monitoring strategy for Moray East

Phase	Survey	Timings/duration	Data required
Pre-construction	Aerial	1 year of pre-construction survey	Seabird distributions; flight heights, flight directions
Construction / Post-construction	Aerial	Breeding season (e.g. May - July)	Post- construction seabird distributions: flight heights, flight directions.
	Gull tagging	Breeding season post construction (dependent on the results of the BOWL post-construction gull tagging)	Gull locations and movements; flight data; i.e. flight height and speed

8.4 Proposed wind farm consent application – site characterisation

8.4.1 Sources of data

Information to inform the proposed wind farm consent application will be consistent with that used to support the Moray East ES 2012 and the determination period consultation process. There is an extensive amount of ornithological data that has been collected in the Moray Firth. Much of this data was used within the Moray East ES 2012 with additional data collected since the submission of the Moray East ES 2012 (Table 8.3). In addition to these data, the proposed wind farm consent application will use information from the ornithology chapter of the Moray East ES 2012 (Chapter 4.5) and associated Technical Appendices: Technical Appendix 4.5A Ornithology Baseline and Impact Assessment, Technical Appendix 4.5 B Aerial Ornithology Surveys for the Moray Firth Zone and Technical Appendix 4.5 C Seabird Tracking and Modelling Report.

This approach has been confirmed to be appropriate by SNH, who advised on 16th February 2017 that no new site based surveys are required to characterise the ornithological assessments of east coast Scotland offshore wind farms (MS-LOT email correspondence, 2017).

Table 8-3: Datasets for the ornithology EIA

Dataset / technical report	Main content	Geographical coverage	Source	Date
Moray East boat-based surveys	Data from 28 boat-based surveys including population estimates and densities for key ornithological receptors	Moray East site plus 4 km buffer	Moray East	Apr 2010 – Mar 2012
Moray East aerial surveys	Six aerial surveys collecting relative abundance estimates of birds from relevant breeding colonies	Wide strip from the East Caithness Cliffs (ECC) and North Caithness Cliffs (NCC) SPAs to the Moray Coast	Moray East	May – July 2011
Tracking data for fulmar, kittiwake, guillemot and razorbill from the southern part of the ECC SPA	GPS data collected from a range of species at the ECC SPA	Moray Firth	Moray East	2011 breeding season
Migration surveys (during Moray East and BOWL boat-based surveys and at four coastal vantage points)	Additional data on migrating swans and geese flying through Moray East	Moray Firth	Moray East	Autumn 2010 and Spring 2011
BOWL boat-based surveys	Data from boat-based surveys including population estimates, densities and behavioural data	BOWL site plus a 4 km buffer	BOWL	Oct 2009 – Sep 2011

Dataset / technical report	Main content	Geographical coverage	Source	Date
Beatrice Demonstrator monthly vantage point watches (Talisman)	-	Moray Firth	Talisman	2005 – 2008
Aerial surveys (HiDef, WWT)	-	Wide area in Moray Firth including the entire Zone plus 4 km buffer	-	Breeding season 2009 and winter 2009/2010
Tracking of large gulls (great black-backed gull and herring gull) at ECC SPA	Tracking of 11 great black-backed gulls and 10 herring gulls	Moray Firth	Moray East	May – Jun 2014
Marine Scotland seabirds strategic surveys	-	East coast Scotland	MSS	2014 – 2015
BOWL pre-construction aerial surveys	-	Area between the ECC SPA and the BOWL site plus 10 km buffer	-	May – Aug 2015
Seabird 2000 census	Population counts for relevant breeding colonies	UK	-	1998-2002
East Caithness Cliffs SPA colony monitoring (SNH)	-	East Caithness Cliffs SPA	-	2015

8.4.2 Relevant guidance

It is proposed that the following guidance and published work will inform the ornithology assessment. Some guidance has been updated since the previous assessment for example SNH has issued revised guidance regards avoidance rates (JNCC *et al*., 2014) following the Marine Scotland Science Avoidance Rate Review (Cook *et al*., 2014) guidance on incorporating data uncertainty when estimating potential vulnerability of Scottish seabirds to marine renewable energy developments (Wade *et al*., 2016).

- A handbook on environmental impact assessment. Guidance for Competent Authorities, Consultees and others involved in the Environmental Impact Assessment Process in Scotland. Natural Heritage Management. Scottish Natural Heritage. 4th edition (SNH, 2013);
- Guidelines for Ecological Impact Assessment in Britain and Ireland. Marine and Coastal, Final Document (IEEM, 2010);
- Offshore Wind Farms. Guidance note for EIA in respect of FEPA and CPA requirements (CEFAS *et al*., 2004);
- Guidance on Environmental Considerations for Offshore Wind Farm Development (OSPAR, 2008);

- A review of assessment methodologies for offshore wind farms (Maclean *et al*., 2009);
- Assessing vulnerability of marine bird populations to offshore wind farms (Furness *et al*., 2013);
- Biologically appropriate, species-specific, geographically non-breeding season population estimates for seabirds (Furness, 2015);
- Incorporating data uncertainty when estimating potential vulnerability of Scottish seabirds to marine renewable energy developments (Wade *et al*., 2016);
- Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas (Thaxter *et al*., 2012);
- Using a collision risk model to assess bird collision risk for offshore wind farms (Band 2012);
- Developing an avian collision risk model to incorporate variability and uncertainty. (Masden, 2015);
- The avoidance rates of collision between birds and offshore turbines (Cook *et al*., 2014);
- Joint Response from the Statutory Nature Conservation Bodies to the Marine Scotland Science Avoidance Rate Review (JNCC *et al*., 2014);
- Seabird Displacement Impacts from Offshore Wind Farms (JNCC, 2015);
- Assessing the risk of offshore wind farm development to migratory birds designated as features of UK SPAs Special Protection Areas (Wright *et al*., 2012); and
- Developing guidelines on the use of Population Viability Analysis for investigating bird impacts due to offshore wind farms (WWT Consulting, 2012); and
- Towards a framework for quantifying the population-level consequences of anthropogenic pressures on the environment: The case of seabirds and windfarms (Cook and Robinson, 2016).

8.4.3 Inter-relationships

With respect to ornithology, no inter-relationships have been identified with regard to the proposed changes in the Design Envelope and other topics to be covered in the EIA.

8.4.4 Summary of key site characteristics and identification of key receptors

8.4.4.1 Key species

An extensive ornithological dataset exists for the Moray Firth (Table 8.3) with this indicating that the Moray Firth is an important area for seabirds in both the breeding season and non-breeding season (as evident from SPA designations in and around the Moray Firth area). Because of the mix of birds present, it is probable that the Moray East site is used at different times by birds (i) overwintering in the area; (ii) foraging from nearby breeding coastal colonies; and (iii) on post-breeding dispersal, migration and pre-breeding return.

As well as true pelagic seabirds (e.g. gannet, fulmars and auks), other species that spend part of their annual life cycle at sea (e.g. divers, gulls and seaducks) may also be present in particular months.

The Moray East ES 2012 identified significant cumulative impacts for gannet, herring gull and, great black-backed gull as a result of collision impacts. These three receptors are therefore considered to be key receptors for the EIA for the proposed wind farm consent application. In addition, consideration will also be given to those species that are features at either the East Caithness Cliffs SPA or the North Caithness Cliffs SPA and were considered in the Appropriate Assessments for the consented Telford, Stevenson and MacColl wind farms. The following species will therefore be considered as key receptors in the EIA for the proposed wind farm consent application:

- Gannet;
- Herring gull;
- Great black-backed gull;
- Fulmar;
- Kittiwake;
- Guillemot;
- Razorbill; and
- Puffin.

A further two species, pink–footed goose and greylag goose, were short–listed ornithological receptors for the Moray East ES 2012 based on numbers of species (and hence risk of collision) recorded through surveys of migratory species. Displacement / disturbance of geese from the site was considered not to be a risk, as agreed by JNCC and SNH. For the purposes of the EIA for the proposed wind farm consent application, the assessment will only consider pink–footed goose and greylag goose for barrier effects and collision risk.

8.4.4.2 Proposed Special Protection Areas (pSPAs)

Since the submission of the Moray East ES 2012, the Scottish Government has carried out consultation on the proposals for the designation of 15 proposed SPAs (pSPAs) in Scottish waters. These sites have all been identified to protect at sea foraging habitats for a number of seabird species (SNH, 2017). Of the 15 sites identified, six are located on the east coast of Scotland, including the Moray Firth pSPA.

Based on recent advice from SNH on the scope of the ornithological assessment (Appendix B), it can be concluded that there is no connectivity between the Moray Firth pSPA and the Moray East site. This is on the basis that the species of interest associated with this site have a coastal distribution and are recorded in greatest numbers within the pSPA (Appendix B). It is therefore concluded that the qualifying species associated with this site do not require consideration as part of the EIA.

With respect to the other east coast pSPAs, further consideration of these sites will be provided in the HRA. The proposed approach to the HRA is presented in Chapter 13.

8.4.4.3 Nature Conservation Marine Protected Areas (NCMPAs)

Since the submission of the Moray East ES 2012, Scottish Ministers have also designated 30 Nature Conservation Marine Protected Areas (NCMPAs) in the seas around Scotland, of which 13 are offshore (SNH 2016). NCMPAs complement other protection measures already in place including SPAs and SSSIs. Birds are a protected feature for six NCMPAs, though only for black guillemot with all sites within territorial waters (< 12 nautical miles from the coast). This includes the East Caithness Cliffs NCMPA.

Black guillemot forage close inshore, generally in waters less than 30 m deep, but up to 50 m in some places (Douse 2012). Moreover, black guillemot is typically distributed within 5 km of the coast, as suggested by a Caithness study (Douse 2012) and confirmed by SNH in their advice note (Appendix B). Therefore, as indicated by SNH, given that there is limited potential for black guillemot to be present in offshore waters and therefore limited potential for any connectivity between the NCMPA and the Moray East site it can be concluded that this species requires no further consideration as part of the EIA for the proposed wind farm consent application.

8.4.4.4 Species requiring consideration with respect to cumulative impacts

Alteration in the numbers and heights of turbines for the proposed wind farm consent application may also alter the cumulative impact assessment for an additional four species that were included only on this basis within the Moray East ES 2012. These four species, shag, Arctic skua, great skua and Arctic tern will therefore also be included within the cumulative impact assessment for the proposed wind farm consent application for the assessment of all potential impacts.

Detailed descriptions for all species requiring consideration as part of the EIA and CIA are provided in Chapter 4.5 of the Moray East ES 2012.

8.4.5 Data gaps

Table 8.3 summarises the data available to inform the EIA for the proposed wind farm consent application. The data available, despite the majority being in existence to inform the previous EIA, is extensive. Primary data involves 28 boat-based surveys with coverage comprising a full two-year period. There are therefore considered to be no relevant data gaps for the forthcoming assessment. This is also confirmed in advice from SNH provided on 23rd February 2017 (Appendix B).

8.5 Proposed wind farm consent application – impact identification

The Moray East ES 2012 assessed the potential effects on ornithological receptors from four impacts. The Design Envelope for the proposed wind farm consent application may change the conclusions drawn in relation to all four of these impacts in the Moray East ES 2012. These impacts and a justification for re-consideration in the EIA for the proposed wind farm consent application are included in Table 8.4.

Table 8-4: Potential impacts identified for consideration in the EIA

Impact	Justification
Construction and decommissioning	
Disturbance	The Design Envelope for the proposed wind farm consent application (Section 2.3) includes changes to the turbine size and a reduction in the number of turbines. During construction and decommissioning, this may have implications for prediction of the level of disturbance (arising from turbine installation / removal and associated vessel traffic) and the indirect impacts on prey species. Therefore, an assessment of disturbance will be required to determine the significance of resulting impacts on the populations of key ornithological receptors
Operation	
Collision risk	The Design Envelope for the proposed wind farm consent application (Section 2.3) includes changes to the turbine size and a reduction in the number of turbines. These changes will have consequences for the swept-area volume which directly influences collision risk through a change in bird occupancy within the CRM. This may affect the results of the collision risk modelling previously conducted and as a result the significance of resulting impacts on the populations of key ornithological receptors.
Barrier impact	The proposed changes to the Design Envelope (Section 2.3) may result in an increase in size of and spacing between turbines, and a reduction in the number of turbines. This may alter the magnitude of a species responses with respect to barrier impact for the Project. Therefore, assessment for barrier impacts will be required to determine the significance of resulting impacts on the populations of key ornithological receptors. Specific species requiring assessment are to be agreed through consultation with key stakeholders.
Disturbance / displacement	The Design Envelope for the proposed wind farm consent application may result in an increase spacing between turbines and a reduction in the number of turbines. This may have implications for the displacement analyses undertaken for a whole wind farm and individual turbine basis. Therefore, displacement analyses will be required to determine the significance of resulting impacts on the populations of key ornithological receptors. Specific species requiring assessment are to be agreed through consultation with key stakeholders.

8.6 Proposed wind farm consent application – approach to assessment of project specific impacts

The following section describes the approach that will be used to assess the potential impacts and their significance for the proposed wind farm consent application. This includes the proposed use of an update (Masden, 2015) to the Band (2012) offshore model used in the CRM to inform the Moray East ES 2012.

The impact assessment process to be applied for ornithology will be consistent with that used for the Moray East ES 2012 as described in Chapter 7.4 and supporting Technical Appendix 4.5A Ornithological Baseline and Impact Assessment.

As such the assessment will be based on the following guidance:

- Guidelines for ecological impact assessment in Britain and Ireland. Marine and Coastal, Final Document (CIEEM, 2010); and
- Guidance on Environmental Considerations for Offshore Wind Farm Development (OSPAR, 2008).

The impact assessment will consider the proposed phased development of the proposed windfarm consent application as appropriate.

8.6.1 Assessment methods

The Design Envelope for the proposed wind farm consent application leads to the need for a detailed update to the assessment of collision risk within the EIA. Assessments of other impacts (i.e. displacement/disturbance and barrier impacts) will also be updated where necessary in order to provide a comprehensive review of predicted impacts on ornithological receptors. This approach is consistent with advice provided from SNH on 23rd February 2017 (Appendix B).

To quantify the potential risk of additional mortality above the current baseline levels for each species resulting from collision with operational turbines, CRM will be undertaken using two versions of the Band (2012) offshore model, the basic and extended models. Moreover, the update to the Band collision risk model by Masden (2015) will be used. This update by Masden (2015) uses a simulation app roach to incorporate variability and uncertainty when producing collision estimates for the basic and extended versions of the Band collision risk model. Importantly the mechanistic details of the Band model have not been altered and form the core of the model update by Masden (2015).

For the most numerous species, collision risk will be modelled using both basic (Options 1 and 2) and extended versions of the model (Options 3 and 4). The extended model is prioritised as it provides the most refined interpretation of collision risk to seabirds with focus given to Option 4 prioritised where there are sufficient data (i.e. when there are over 50 records of flight height for a species taken from boat-based surveys). This option incorporates the detailed site-specific information on the height distribution of flying birds in relation to both the encounter rate and the collision probability with the rotors. The basic Band model assumes equal mean collision probability for all flights at rotor height. Generic flight height data will be sourced from Johnston *et al*. (2014) while a range of avoidance rates (+/- 2 standard deviations) will be presented. Focus avoidance rate will follow SNH advice comprising 99.5% (great black-backed gull and herring gull) and 98.9% (gannet and kittiwake) (Appendix B).

The basic Band model (Option 1) only, will be applied to the two species of migratory waterbirds to be assessed for the proposed wind farm consent application, greylag goose and pink-footed goose.

Assessment of displacement will follow the methodology outlined in the Moray East ES 2012 (see Section 5.2.2.3). A review will however be undertaken on the latest evidence for species-specific displacement rates and contemporary evidence on the likely fate of displaced birds. Moray East also is aware of the recent publication of joint SNCB guidance on displacement (January 2017) and notes that SNH consider that original displacement assessment in the 2012 Moray East ES is sufficiently precautionary (based on advice provided 23rd February 2017 – Appendix B).

The determination of population level effects will focus on the outputs and conclusions made in the previous ES. An overview will be presented in order to demonstrate that impacts for the proposed wind farm consent will not alter the conclusions of the Moray East ES 2012 and assessments undertaken during the determination period which led to consents being granted for the Telford, Stevenson and MacColl wind farms.

8.6.2 Assessment criteria

Specific criteria for defining receptor value and sensitivity (and vulnerability) and determining impact magnitude and significance will be based on the criteria included in Chapter 7.4 of the Moray East ES 2012. Where required, certain criteria will be updated to reflect changes in guidance and current research. For example, with regard to the sensitivity and vulnerability of ornithological receptors, the EIA for the proposed offshore wind farm consent application will follow updated species specific guidance from Furness *et al*., (2013) and Wade *et al*., (2016) in relation to ranking the vulnerability of Scottish seabird populations to offshore wind farms. However, the approach to the assessment will not change.

In terms of sensitivity and vulnerability, for each impact (e.g. habitat loss, disturbance, collision risk), this also takes into consideration how flexible the species is in its habitat use or susceptibility to disturbance, based on classification by Wade *et al*. (2016). Where species or impacts are not covered by Wade *et al*. (2016) other key sources on the impacts of offshore wind developments on birds will be referenced (i.e. Langston, 2010; Maclean *et al*., 2009; Garthe & Hüppop, 2004). In general, species will be determined to be of low, medium or high risk, based on their particular characteristics or requirements, relative to other seabird species.

The assessment of receptor sensitivity also considers the recoverability of a receptor population in terms of its ability to return to their former status once background conditions return (i.e., when the effects of a particular impact cease, e.g. upon completion of the construction phase, or as birds habituate to an impact). This requires consideration of a species' natural productivity rate and background population trend in the absence of the impact and the species' population status (e.g., stable, declining).

8.7 Proposed wind farm consent application - approach to assessment of cumulative impacts

The whole project and cumulative impact assessments (as described in Chapter 2) will require the consideration of the impacts of the proposed wind farm consent application together with impacts associated with:

- The Modified TI for Moray East (as presented in the Moray East Modified TI ES 2014);
- The projects that were considered in the Moray East ES 2012 (excluding BOWL and Moray West); and
- Other new relevant projects that have been consented or proposed since submission of the Moray East 2012 ES (as identified in Chapter 6, Table 6.2).

With regards to ornithology, the focus of the assessment will be the consideration of other offshore wind farm projects. The geographical scope of the cumulative assessment is principally focused in the Moray Firth area as presented in the previous ES in 2012. It is, however, recognised that some mobile species may spend varying periods of time outside the Moray Firth and, as a result, there is potential for these to be affected by other activities / developments further afield.

The CIA for ornithology will be based on the principles set out in King *et al*. (2012) with the assessment methodology presented in the cumulative impacts discussion document (Moray Firth Offshore Wind Developers Group Cumulative Impact Assessment Discussion Document (ERM, 2011)). Disturbance and displacement impacts will be assessed qualitatively and be based on the potential area of impact expected and geographic separation between projects. A quantitative approach to the assessment of collision risk impacts will be undertaken as far as possible based on publically available information (and other information that might be available from Marine Scotland).

Scoping Question 8.1:

Is Marine Scotland in agreement with the following with regards to the proposed windfarm EIA for ornithology?

- Have all the appropriate sources of data been identified to inform the site characterisation / baseline description?
- Is the method of project specific impact assessment proposed appropriate?
- Is the method of whole project and cumulative impact assessment proposed appropriate?

8.8 References

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9 Seascape, landscape and visual assessment

9.1 Introduction

The following chapter presents the proposed approach to the assessment of potential impacts associated with the proposed wind farm consent application with respect to seascape and landscape character and visual receptors. In developing the proposed approach, it has been necessary to take into consideration work completed for the Moray East ES 2012 (including landscape, coastal and seascape characterisation studies; baseline assessment of viewpoints and visual receptors; baseline photographs; the outcome from the impact assessment in terms of key sensitive receptors, potential impacts and their significance; and proposed mitigation measures) and any additional information provided during the determination period. The proposed approach also takes into account key stakeholder concerns and key issues raised during consultation, and actions taken to address these concerns and issues. Where new data have become available to inform the baseline for the assessment and new impact assessment methodologies and guidance are available these have been recognised and considered where appropriate.

The SLVIA of the consented Telford, Stevenson and MacColl wind farms was carried out by Optimised Environments Limited (OPEN). OPEN has been retained to undertake the assessment for the proposed wind farm consent application.

9.2 Work completed for the Moray East ES 2012

Key sources of site characterisation data and assessment methods used to inform the SLVIA and cumulative SLVIA (CSLVIA) carried out as part of the Moray East ES 2012 are summarised in Chapter 4 of this scoping report. These are discussed in detail in Chapters 5.4, 8.4, 11.4 and 15.4 of the Moray East ES 2012 and associated SLVIA methodology contained in Technical Appendix 5.4 A. The SLVIA Figures are contained in Volume 7 of the Moray East ES 2012.

9.3 Key findings from the Moray East ES 2012

Key findings from the Moray East ES 2012 are provided below.

The impacts of the consented Telford, Stevenson and MacColl wind farms were assessed as not significant on landscape/seascape character. The impacts of the consented Telford, Stevenson and MacColl wind farms were also assessed as not significant on the landscape designations and the Search area for Wild Land (SAWL) within the study area, including Gardens and Designed Landscapes (GDLs) and proposed Special Landscape Areas (pSLAs) all of which are located over 34 km from the consented Telford, Stevenson and MacColl wind farms. Such impacts were also assessed as not significant when the consented Telford, Stevenson and MacColl wind farms were considered as part of the whole project (Moray East ES 2012 Chapter 12). When the whole project was assessed as part of the Moray East Modified TI ES 2014 the SLVIA identified significant landscape effects on the landscape character of agricultural heartlands in Aberdeenshire (within a localised area) due to influence of the onshore substation in the rural context i.e. not as a result of the influence of the consented Telford, Stevenson and MacColl wind farms.

The viewpoint assessment included a baseline containing the operational and under construction onshore and offshore wind farms and identified significant impacts on the following seven viewpoints located in the closest section of Caithness between Wick and Dunbeath.

- Viewpoint 4: Wick Bay;
- Viewpoint 5: Sarclet (Sarclet Haven Info Board);
- Viewpoint 6: Hill O'Many Stanes;
- Viewpoint 7: Lybster (end of Main Street);
- Viewpoint 8: Latherton;
- Viewpoint 9: Dunbeath (nr Heritage Centre); and

- Viewpoint 15: Whaligoe Steps.

These viewpoints were located at distances of 22 – 34 km from the Moray East site. In addition, the impacts were assessed as being significant on receptors using the A9 between Berriedale and Latheron and on receptors using the A99 between Latheron and Thrumster.

The assessment assumes clear weather and optimum viewing conditions. This means that impacts that are assessed to be significant may be not significant under different, less clear conditions. The viewpoint assessment has identified that the impacts of the consented Telford, Stevenson and MacColl wind farms will be not significant on the remaining viewpoints in Caithness to the north of Wick and to the south of Berriedale. In these views, the consented Telford, Stevenson and MacColl wind farms would be more distant from the coast and located on the skyline within a part of the broad, open sea views. Generally, set apart from the visible landform of the coast, the consented Telford, Stevenson and MacColl wind farms would form a single, distinct feature in its own right on the skyline, surrounded by open sea.

In good visibility conditions, the threshold at which significant impacts diminish is assessed in the region of 30 – 35 km, depending on the specific characteristics of the view. Significant visual impacts arise from the closest locations of the Caithness coast as a result of the consented Telford, Stevenson and MacColl wind farms appearing to occupy a significant portion of the sea skyline, where it forms a wide horizontal feature in relation to the seascape in the view, in combination with the vertical effect of the turbines being notable due to the absence of any intervening features or landform between the viewpoints on the coastal edge and the development located in open sea.

Night-time impacts of the consented Telford, Stevenson and MacColl wind farms were assessed as being significant at Viewpoint 9: Dunbeath (nr Heritage Centre). Significant night-time impacts were assessed as being confined to a small geographical area between Wick and Dunbeath.

The cumulative impacts of the consented Telford, Stevenson and MacColl wind farms were assessed as being not significant in all operational (including under construction), consented and application scenarios except for:

- Viewpoint 9: Dunbeath (nr Heritage Centre) in the ‘application scenario’ in the context of the onshore wind farms and BOWL;
- Viewpoint 10: Berriedale (A9) in the ‘application scenario’ in the context of the onshore wind farms and BOWL; and
- Receptors using the A9 between Berriedale and Latheron in the ‘application scenario’ in the context of the onshore wind farms and BOWL.

The cumulative impact of the consented Telford, Stevenson and MacColl wind farms on all other viewpoints, visual receptors, landscape/seascape character receptors and landscape planning designations (and the SAWL) within the study area was assessed as being not significant in the context of the operational (including under construction), consented and application scenarios.

In general, the potential for cumulative impacts was limited by the location of the consented Telford, Stevenson and MacColl wind farms, which was visually separate from onshore wind farms, such that onshore and offshore wind farms are rarely seen in combination in the same portion of view. Coastal viewpoints are particularly focused towards the sea, or contained by coastal landforms, with limited inland visibility. The consented Telford, Stevenson and MacColl wind farms would have been generally seen in succession with onshore wind farms, visually separated from the pattern of onshore wind farm development.

The consented Telford, Stevenson and MacColl wind farms were located largely behind BOWL, which limited the cumulative influence and prominence of the consented Telford, Stevenson and MacColl wind farms. Although the consented Telford, Stevenson and MacColl wind farms increased the density of turbines visible in the array in combination with BOWL, the cumulative impact of BOWL with the consented Telford, Stevenson and MacColl wind farms was not much greater than BOWL alone, with the

exception of a limited area of Caithness around Dunbeath and Berriedale, where the consented Telford, Stevenson and MacColl wind farms increased the extent of the developed skyline in relation to BOWL and this was considered significant.

9.3.1 Mitigation

The likely visual impacts of different layout scenarios were investigated in the absence of embedded mitigation measures as part of the review of the worst case layout scenario for the Design Envelope. This approach necessitated an assessment of the likely worst case, in which the consented Telford, Stevenson and MacColl wind farms were assessed and illustrated at their largest size, in terms of turbine height, number, density and horizontal spread, and with the turbine rows set out in a worst case grid pattern that aligned towards the closest section of the Caithness coast (as illustrated and assessed for Scenario 4c), and no further specific mitigation measures are proposed.

Due to the Design Envelope approach, SNH and The Highland Council were keen to be kept informed during the post-consent design process once the turbine layout became clearer in later stages of the process. As a result, it was agreed that Moray East would provide a DS based on the approved DSLP which would include representative wind farm visualisations from key viewpoints and this was included as a condition of the consent.

9.4 Proposed wind farm consent application – site characterisation

9.4.1 Sources of data

Table 9.1 below details the data sources and technical reports that will be used to inform the impact assessment. The majority of these are based on the same sources as informed the previous assessment, updated where necessary. Where the use of updated data is not deemed necessary this has been justified.

Table 9-1: Sources of site characterisation data for SLVIA

Dataset / technical report	Main content	Geographical coverage	Source	Date
Moray East ES 2012 Chapters 5, 8 and 11 plus SLVIA Figures	SLVIA impacts of consented Telford, Stevenson and MacColl wind farms	50 km radius study area around Moray East site	Moray East	2012
Coastal character area assessment and data. Moray East ES 2012 Chapter 5, Section 5.4-4 and in Table 8.4-7 of Chapter 8.	Definition and descriptions of Coastal Character Areas	Consented Telford, Stevenson and MacColl wind farms SLVIA Study Area	Moray East (OPEN)	2012
Beatrice Offshore Wind Farm Environmental Statement	SLVIA impacts of BOWL	50 km radius study area around BOWL	BOWL	2012
BOWL Development Specification and Layout Plan	Details of construction stage layout of turbines and turbine dimensions	BOWL	BOWL	November 2016

Dataset / technical report	Main content	Geographical coverage	Source	Date
The Highland Council, Moray Council and Aberdeenshire Council Local Development Plans	Landscape Planning Designations and policy protection	Planning Authority boundaries	The Highland Council, Moray Council and Aberdeenshire Council	2016, 2015 and 2012 respectively
Historic Environment Scotland Inventory of Gardens and Designed Landscapes	List, plans and descriptions of gardens and designed landscapes included in the Inventory	Scotland	Historic Environments Scotland	various
SNH data sets and, where available citations, for National Scenic Areas and Wild Land Areas	Boundaries and descriptions of special qualities of NSAs and Wild Land Areas (WLAs)	Scotland	SNH	various
SNH Landscape character data set and Landscape Character Assessments for Caithness and Sutherland and Moray	Definition and description of landscape character areas, types and units	Caithness and Sutherland and Moray	SNH	various
An Assessment of the Sensitivity and Capacity of the Scottish Seascape in Relation to Wind Farms	Identification and analysis of Seascape Units at a strategic scale	Scotland	SNH	2005
Visibility Frequency Analysis report from Wick Airport weather station, based on hourly data from 01/01/2002 to 31/12/2011	Information about the range and frequency of visibility out to sea from Wick Airport	Moray Firth/Wick	Met Office	2012
Planning portals of The Highland Council, Moray Council and Aberdeenshire Council	Updated status of cumulative wind farm applications	The Highland Council area, Moray Council area, Aberdeenshire Council area	The Highland Council, Moray Council, Aberdeenshire Council	Search to be undertaken March 2017
Raster and DTM mapping and Seazone Bathymetry Data	Mapping of surface features, landform and sea depths	UK	Ordnance Survey	various
Coastal Character Assessment Orkney and Caithness	Coastal Character Area definition and descriptions	Orkney and Caithness	SNH	2016

9.4.2 Relevant guidance

The following guidance will be used to inform the current proposed SLVIA[4]. Some guidance has been updated since the previous assessment for example the Landscape Institute has issued revised guidance in relation to the assessment of landscape and visual impacts, SNH has issued revised guidance with regards to cumulative impact assessment and visual representation requirements and The Highland Council has issued new visualisation standards.

- DTI. (2005). Guidance on the Assessment of the Impact of Offshore Wind farms: Seascape and Visual Impact Report.
- Landscape Institute and IEMA. (2013). Guidelines for Landscape and Visual Impact Assessment: Third Edition.
- Landscape Institute. (2011) Use of Photography and Photomontage in Landscape and Visual Impact Assessment, Note 01/11.
- SNH. (2012). Assessing the Cumulative Impact of Onshore Wind Energy Developments.
- SNH. (2017). Visual Representation of Wind Farms (Version 2.2).
- SNH. (2014). Siting and designing wind farms in the landscape - Version 2.
- The Highland Council (2016). Visualisation Standards for Wind Energy Developments.
- Civil Aviation Authority (CAA). (August 2010). Policy Statement - The Lighting of Wind Turbine Generators in United Kingdom Territorial Waters.
- Met Office. (2012). Met Office Visibility Frequency Analysis report from Wick Airport weather station, based on hourly data from 01/01/2002 to 31/12/2011.
- Met Office. (2010). National Meteorological Library and Archive Fact sheet 17 - Weather Observations Over Land.

It is not considered necessary to obtain more recent data from the Wick Airport weather station as it is considered unlikely that this will have altered substantially and therefore the assumptions made would remain the same as for the Moray East ES 2012. A revised version of SNH's guidance on Assessing Impacts on Wild Land Areas may be published during the SLVIA assessment period and will be referred to in the SLVIA if deemed necessary by SNH.

9.4.3 Inter-relationships

With respect to SLVIA, the key inter-relationships requiring consideration with respect to the proposed design changes and other topics to be covered in the EIA is cultural heritage (visual setting).

9.4.4 Summary of site characteristics and identification of key receptors

Within the study area of the proposed wind farm consent application the key seascape, landscape and visual receptors are considered to occur along or near to the Caithness coast.

In relation to the value of the baseline landscape resource the SAWL is now superseded by the definition of a WLA at closer proximity to the consented Telford, Stevenson and MacColl wind farms. Namely WLA 36: Causeymire -Knockfin Flows. BOWL will be located at closer proximity to the WLA than the proposed wind farm consent application and the coastal character areas took account of wildness characteristics.

Aberdeenshire Council Local Development Plan 2012 does not currently include the designation of locally important landscapes for their scenic quality. Draft Supplementary Guidance now defines proposed Special Landscape Areas (rather than Areas of Landscape Significance). Part of the Aberdeenshire coast located within the study area has been proposed for such designation. However, it is considered that due

[4] The list excludes reference material used to inform the baseline or the basis / methodology of the Moray East ES 2012.

to the distance and cumulative context of the proposed wind farm consent application, this change will not have a material influence on the impacts of the proposed wind farm consent application.

The coastline is generally rural in character with a predominantly agricultural landuse and a strong association with the sea. There are numerous settlements along the coastline and these are connected by roads that generally run close to or on the coast.

Of key importance to the seascape, landscape and visual resource baseline is that the BOWL development is consented and due to start construction in April 2017 and will therefore be considered as part of the baseline within the SLVIA for the proposed wind farm consent application. Once operational it will have an influence on the views obtained from the receptors that would also be affected by the proposed wind farm consent application. Therefore, the operational (and under construction) scenario (where BOWL is assumed to be operational) along with other operational onshore and offshore wind farms, is considered to form the baseline to which the proposed wind farm consent application would be added.

The Moray East ES 2012 assessed a similar situation to this where BOWL formed part of an 'application scenario'. Whilst the 'application scenario' (including BOWL) also included all other onshore application stage cumulative wind farms within the study area it is considered that the key driver of the significant impacts identified was the influence of BOWL. Therefore, that assessment is considered to be a useful reference when considering the likely significant impacts of the proposed wind farm consent application in a context that contains BOWL as part of the baseline.

There are two key considerations in reviewing the receptors that may be significantly affected by the proposed wind farm consent application as follows:

- The proposed wind farm consent application 'worst case' is likely to have a smaller number of taller turbines with a wider spacing than was considered as the 'worst case' in the Moray East ES 2012; and
- BOWL now has a higher degree of certainty in terms of the location and size of the proposed turbines than was the case when the Moray East ES 2012 was prepared. BOWL will consist of 84no x 7 MW turbines with a blade tip height of 187 m above LAT, spaced at a distance of approximately 1,170 m apart in all directions. This represents a significantly lower number of turbines at a greater separation and a slightly smaller size than was assessed in the Moray East ES 2012.

It is helpful to reflect on the fact that the significant impacts assessed for the consented Telford, Stevenson and MacColl wind farms (singularly and cumulatively in the context of the application scenario containing BOWL) were limited to those which would occur at eight viewpoints located in the closest section of Caithness between Wick and Dunbeath and sections of the A9 and A99. These viewpoints and routes were located at distances of 22 – 34 km from the Moray East site. No significant impacts were identified for any other viewpoints, visual receptors, landscape character types, coastal character areas or landscape planning designations.

The baseline is now assumed to contain BOWL (at a closer distance within views from the Caithness coast). It is considered that the introduction of the Moray East to this context will have less impact than when considered in a context where there were no large offshore wind farms in the immediate context.

It is considered that due to the proposed changes (and assumed baseline) the key receptors that could potentially be affected to such an extent that a significant impact may arise, are largely restricted to those assessed as being significantly affected by the consented Telford, Stevenson and MacColl wind farms SLVIA and CSLVIA, i.e. along the Caithness coast between Wick and Berriedale and on sections of the A9 and A99 lying along parts of this same coast. SNH has suggested in its advice provided on 23rd February 2017 (Appendix B) that viewpoints at Keiss Pier and Duncansby Head should also be investigated.

It is proposed to scope out of the SLVIA/CSLVIA the assessment of the impacts on more distant viewpoints (in Caithness, Moray, Aberdeenshire or in the sea), landscape character types, the coastal character areas or designated areas within the study area.

9.4.5 Data gaps

There are no known data gaps that will constrain the assessment.

9.5 Proposed wind farm consent application – impact identification

Tables 9.2 and 9.3 set out the impacts to be assessed in the SLVIA and CSLVIA respectively.

Table 9-2: Impacts to be assessed in the SLVIA

Impact of proposed wind farm consent application requiring assessment	Change to design parameters	Changes to baseline	Implications of change
Change in views from closest viewpoints on the Caithness coast	Increased height and separation of turbines	Inclusion of BOWL. Changes to onshore wind farm baseline context	Impact of consented Telford, Stevenson and MacColl wind farms reduced due to BOWL context. However, changes to the design parameters associated with the proposed wind farm consent application may result in significant impacts on the ten viewpoints between Berriedale and Duncansby Head on the Caithness coast
Change in views from principal visual receptors between Wick Bay and Berriedale on the Caithness Coast.	Increased height and separation of turbines	Inclusion of BOWL. Changes to onshore wind farm baseline context	Impact of consented Telford, Stevenson and MacColl wind farms reduced due to BOWL context. However, changes to the design parameters associated with the proposed wind farm consent application, may result in significant impacts on the principal visual receptors between Wick Bay and Berriedale on the Caithness Coast

Table 9-3: Impacts to be assessed in the CSLVIA

Impact of proposed wind farm consent application requiring assessment	Change to design parameters	Changes to baseline	Implications of change
Cumulative change in views from viewpoints on the Caithness coast	Increased height and separation of turbines	Inclusion of BOWL	Cumulative impact of consented Telford, Stevenson and MacColl wind farms reduced due to BOWL context. However, changes to the design parameters associated with the proposed wind farm consent application may result in significant impacts on the ten viewpoints between Berriedale and Duncansby Head on the Caithness coast. Effects may alter

Impact of proposed wind farm consent application requiring assessment	Change to design parameters	Changes to baseline	Implications of change
Cumulative change in views from principal visual receptors between Wick Bay and Berriedale on the Caithness Coast.	Increased height and separation of turbines	Inclusion of BOWL	Cumulative impact of consented Telford, Stevenson and MacColl wind farms reduced due to BOWL context. However, changes to the design parameters associated with the proposed wind farm consent application may result in significant impacts on the principal visual receptors between Wick Bay and Berriedale on the Caithness Coast. Effects may alter

9.6 Proposed wind farm consent application – approach to assessment of project specific impacts

The following section describes the approach that will be used to assess potential impacts and their significance from the proposed changes to the Moray East Design Envelope.

9.6.1 Assessment criteria

The Guidelines for Landscape and Visual Impact Assessment (GLVIA) have been updated since the Moray East ES 2012 was undertaken with the revised guidance being GLVIA Version 3. Whilst it is not considered likely that the outcome of the assessments made in the Moray East ES 2012 will alter, the SLVIA methodology will be revised to take cognisance of this change. The full methodology used to carry out the previous SLVIA is described in detail in Technical Appendix 5.4 A of the Moray East ES 2012. Key changes to this are the criteria used to assess the baseline sensitivity and magnitude of change as follows:

The significance of effects will be assessed through a combination of two considerations; (i) the sensitivity of the landscape element, landscape character receptor, view or visual receptor, and (ii) the magnitude of change that will result from the introduction of the proposed wind farm.

Sensitivity is an expression of the ability of a landscape element, landscape character receptor, view or visual receptor to accommodate the proposed development, and is dependent on baseline characteristics including its susceptibility to change, value, quality, importance, the nature of the viewer, and existing character.

Magnitude of change is an expression of the scale of the change on landscape elements, landscape character receptors and visual receptors that will result from the proposed development. Geographical extent and duration/reversibility will also be taken into account.

With regard to the cumulative SLVIA methodology SNH has updated its guidance in this regard. This will be taken into account, where relevant, in any revised cumulative assessment.

9.6.2 Assessment method

The SLVIA for the proposed wind farm consent application will rely on the description of the baseline seascape, landscape and visual conditions of the identified receptors as set out in the Moray East ES 2012 SLVIA Chapters 5 and 8 and Sections 5.4 and 8.4 of these respectively, updated as necessary to take account of changed wind farm context and any changes to landscape planning designations/WLA policy.

The new SLVIA will take a Design Envelope approach to the assessment and be based on new 'worst case' scenario which will be agreed with MS, SNH, The Highland Council, Aberdeenshire Council and Moray Council. The maximum installed capacity across the Moray East will remain the same as the consented Telford, Stevenson and MacColl wind farms i.e. 1,116 MW.

The assessment will be based on the 'worst case' combination of the following parameters:

- Turbine blade tip height up to 280 m HAT and rotor diameter up to 250 m;
- Turbine rating of between 8.1 MW and 15 MW;
- Total number of turbines – maximum 137 turbines (for 8.1 MW rated turbine). For higher rated turbines (e.g. 12 MW to 15 MW) total number of turbines will reduce significantly to less than 100;
- Downwind and crosswind spacing minimum parameters to remain at 1,200 m downwind spacing and 1,050 m crosswind i.e. the same as consented Telford, Stevenson and MacColl wind farms; and
- The minimum clearance at Highest Astronomical Tide (HAT) at 22 m.

Using the highest turbine height under consideration (i.e. 280 m to tip height), comparative ZTVs are included as Figures 9.1 and 9.2 of this scoping report (Appendix C). Figure 9.1 illustrates the difference in the ZTV of the consented Telford, Stevenson and MacColl wind farms and the proposed wind farm consent application. In addition, Figure 9.2 illustrates the difference in the ZTV of BOWL and the proposed wind farm consent application. These show the additional areas that may experience views of the proposed wind farm consent application that would not have had visibility of the consented Telford, Stevenson and MacColl wind farms and the areas that would have visibility of the proposed wind farm consent application but not BOWL. In comparison with the consented Telford, Stevenson and MacColl wind farms the proposed wind farm consent application is shown to be theoretically visible from areas to the west and north-west of Wick in Caithness and north-east of Elgin in Moray. In comparison with BOWL the additional areas of theoretical visibility of the proposed wind farm consent application would be similar but with some additional theoretical visibility shown to occur in distant parts of Moray.

Comparative ZTVs and wirelines for each of 10 viewpoints located between Berriedale and Duncansby Head will be produced to enable a comparison of the consented Telford, Stevenson and MacColl wind farms in the context of BOWL and the proposed wind farm consent application in the context of BOWL. The figures will include photos used in the Moray East ES 2012. The field of view will be 65.5 degrees (which accords with The Highland Council guidance for panoramic views for landscape assessment purposes) and they will be presented on A3 sheets for comparative purposes. This suggested method of illustrating the proposed wind farm design change is in line with the early advice provided by SNH (Appendix B) which states that it considers 'photomontages are not required for considering these proposed design changes at MORL EDA' (now referred as Moray East site). Figures 9.4-9.6 in this scoping report (Appendix C) illustrate the comparative wireline views from Viewpoint 4: Wick, Viewpoint 7: Lybster and Viewpoint 17: Buckie in order to aid the understanding of the likely magnitude of change in views from the Caithness and Moray coasts.

A review of the cumulative wind farm context will be required and this along with fieldwork will assist in determining if any changes to the Caithness coastal viewpoints, included in the Moray East ES 2012, will be required. Such changes will be agreed with MS, The Highland Council, Moray Council and Aberdeenshire Council.

Blade tip, hub height and horizontal ZTVs will be included for the proposed wind farm consent application. The blade tip ZTV will be overlaid on the viewpoint and visual receptors plans illustrating the Caithness coast.

The SLVIA chapter will focus particularly on the likely key issues relating to the impacts of the proposed wind farm consent application as an addition to BOWL as shown on the ZTV for the proposed wind farm consent application in Figure 9.3.

It is proposed that the assessment of impacts will concentrate on the impact of the proposed wind farm consent application on the A9 and the A99 between Berriedale and Thrumster and assess the effects on ten viewpoints on the Caithness coast between Berriedale and Duncansby Head namely:

- Viewpoint 1: Duncansby Head;
- Viewpoint 2: Keiss Pier;
- Viewpoint 4: Wick Bay;
- Viewpoint 5: Sarclet (Sarclet Haven Info Board);
- Viewpoint 6: Hill O'Many Stanes;
- Viewpoint 7: Lybster (end of Main Street);
- Viewpoint 8: Latherton;
- Viewpoint 9: Dunbeath (nr Heritage Centre);
- Viewpoint 10: Berriedale (A9); and
- Viewpoint 15: Whaligoe Steps.

Although impacts on viewpoints 1 and 2 were assessed as not significant in the Moray East ES 2012, these have been included in the list above following advice from SNH (Appendix B). Where necessary to illustrate onshore cumulative wind farms, which may give rise to a significant cumulative impact, additional 90-degree field of view photographs and cumulative wirelines will be provided. Such a requirement will be agreed with MS, SNH, The Highland Council, Aberdeenshire Council and Moray Council.

It is considered that the night time impacts will be largely as assessed in the Moray East ES 2012 SLVIA or of lesser magnitude due to a lower number of lit turbines. Therefore, it is not proposed to assess the night time effects of the proposed wind farm or to prepare night time visualisations.

The visualisations will be presented within a separate standalone technical report to the ES.

The assessment of the significance of impacts will be based on the combination of the sensitivity to change of seascape, landscape and visual receptors and the magnitude of change upon it resulting from the development as set out in Section 9.6.2 of this scoping report. Effects will be checked involving field work through visits to the viewpoints and routes on the Caithness coast.

9.7 Proposed wind farm consent application - approach to assessment of cumulative impacts

The methodology will be broadly as set out in Technical Appendix 5.4 A of the Moray East ES 2012 which followed that outlined in the Moray Firth Offshore Wind Developers Group Discussion Document (ERM, 2011; see Technical Appendix 1.3 D of the Moray East ES 2012). The approach to the assessment of cumulative impacts will also accord with SNH, 2012, Assessing the Cumulative Impact of Onshore Wind Energy Developments.

The purpose of the CSLVIA 'is to describe, visually represent and assess the ways in which a proposed development will have additional impacts when considered in addition to other existing, under construction, consented or proposed developments. It should identify the significant cumulative impacts arising from the proposed windfarm.' (SNH, 2012, p12).

A review of the cumulative wind farm context will be undertaken and the revised onshore and offshore wind farms mapped within the study area along with their status. Cumulative wind farm development with turbines of greater than 50 m in height would be shown on a cumulative wind farm plan within the 50 km radius study area. This would show the proposed wind farm consent application in the context of footprints of operational and under construction windfarms, consented and undetermined applications and proposals subject to scoping requests and any other proposals deemed relevant in the public domain. This base plan would provide an understanding of the cumulative context. This information will be agreed with MS, SNH, The Highland Council, Aberdeenshire Council and Moray Council.

Cumulative ZTVs will be run and included in the proposed wind farm consent application SLVIA as agreed. Such information will be used to assess whether the changed context (of operational/under construction,

consented or application stage onshore wind farms) could result in any additional significant impacts arising through the addition of the proposed wind farm consent application to an assumed future wind farm context. Considering the fundamental influence of BOWL in the immediate context of the proposed wind farm consent application it is considered unlikely that further significant additional cumulative impacts would arise. The degree of assessment required to ascertain the cumulative impact of the proposed wind farm consent application in the context of onshore wind farm development will be agreed in consultation with MS, SNH, The Highland Council, Aberdeenshire Council and Moray Council.

The cumulative assessment will assess the proposed wind farm consent application in the context of different wind farm scenarios (operational/under construction, consented and application stage) in line with those considered in the Moray East ES 2012 as necessary following agreement with MS, SNH, The Highland Council, Aberdeenshire Council and Moray Council.

The inclusion of cumulative wind farms within the CSLVIA will be agreed with MS, SNH, The Highland Council, Aberdeenshire Council and the Moray Council and will take account of SNH's guidance (SNH, 2012, p15) which states that 'At every stage in the process the focus should be on the key cumulative impacts which are likely to influence decision making, rather than an assessment of every potential cumulative impact'. As described in Chapter 2 Moray West will not be included in the CSLVIA.

Scoping Question 9.1:

Is Marine Scotland in agreement with the following with regards to the proposed wind farm EIA for SLVIA:

- Have all the appropriate sources of data been identified to inform the site characterisation / baseline description?
- Is the method of project specific impact assessment proposed, including proposed VPs and approach to visualisations, appropriate?
- Is the method of whole project and cumulative impact assessment proposed appropriate?

9.8 References

Civil Aviation Authority (CAA). (August 2010). Policy Statement - The Lighting of Wind Turbine Generators in United Kingdom Territorial Waters.

DTI. (2005). Guidance on the Assessment of the Impact of Offshore Wind farms: Seascape and Visual Impact Report.

Landscape Institute and IEMA. (2013). Guidelines for Landscape and Visual Impact Assessment: Third Edition.

Landscape Institute. (2011). Use of Photography and Photomontage in Landscape and Visual Impact Assessment, Note 01/11.

Met Office. (2010). National Meteorological Library and Archive Fact sheet 17 - Weather Observations Over Land

Met Office. (2012). Met Office Visibility Frequency Analysis report from Wick Airport weather station, based on hourly data from 01/01/2002 to 31/12/2011.

SNH. (2012). Assessing the Cumulative Impact of Onshore Wind Energy Developments.

SNH. (2017). Visual Representation of Wind Farms (Version 2.2).

SNH. (2014). Siting and designing wind farms in the landscape - Version 2.

The Highland Council. (2016). Visualisation Standards for Wind Energy Developments.

10 Archaeology and cultural heritage (visual setting)

10.1 Introduction

The following chapter presents the proposed approach to the assessment of potential impacts associated with the proposed wind farm consent application on archaeology and cultural heritage (visual setting). In developing the proposed approach, it has been necessary to take into consideration work completed for the Moray East ES 2012 (including site characterisation studies; technical reports etc.; outcome from the impact assessment in terms of key sensitive receptors and potential impacts and their significance; and proposed mitigation measures) and any additional information provided during the determination period. The proposed approach also takes into account key stakeholder concerns and key issues raised during consultation, and actions taken to address these concerns and issues.

The archaeology and cultural heritage assessment for the consented Telford, Stevenson and MacColl wind farms was carried out by Headland Archaeology (Headland Archaeology, 2011) and is incorporated here as appropriate. The scope for and execution of the current EIA will be undertaken by Wessex Archaeology. Wessex Archaeology has long experience of supporting renewable offshore schemes from Scoping through to Retained Archaeology support during Construction phase and beyond.

With respect to archaeology and cultural heritage, it is identified in Appendix A that the proposed design changes are not expected to change the outcome from the previous assessment with respect to marine archaeology in general. This is on the basis that the proposed changes to the Design Envelope are within the WCS Design Envelope parameters assessed as part of the Moray East ES 2012 (based on use of gravity base structure foundations).

The seabed area affected by the physical footprint will be within the WCS assessed for the consented Telford, Stevenson and MacColl wind farms. There will be no change in the approach towards mitigation laid out in Chapter 8.5 of the Moray East ES 2012 which includes Archaeological Exclusion Zones around known assets, micro siting and implementation of the Offshore Renewables Protocol for Archaeological Discovery (ORPAD). The mitigation strategy will therefore guide the proposed positioning of turbines.

There have been no updates to the site characterisation data (based on previous geophysical data) or assessment methods used in the Moray East ES 2012. Therefore, conclusions from the Moray East ES 2012 remains valid overall.

However, there is potential that the change in Design Envelope could have implications with respect to the setting of designated cultural heritage assets sites onshore. Therefore, the remaining sections of this chapter are focused on the approach to assessing potential impacts on visual setting of historical sites, both in terms of the work completed for the Moray East ES 2012 and that proposed for the present EIA.

10.2 Work completed for Moray East ES 2012

Key sources of site characterisation data and assessment methods used to inform the archaeological assessment carried out as part of the Moray East ES 2012 are summarised in Chapter 4 of this scoping report and discussed in detail in Chapters 5.5 and 8.5 of the Moray East ES 2012 and associated Technical Appendices: Technical Appendix 5.5 A Archaeology.

10.3 Key findings from the Moray East ES 2012

Key findings from the Moray East ES 2012 are provided below.

The Moray East ES 2012 concluded that there were a large number of designated assets present within the setting study area. Having considered all the assets in light of the selection criteria listed above, a total of 19 assets were considered to be potentially subject to setting impacts and were assessed in the EIA. These are listed below (MORL, 2012).

Table 10-1: Designated assets within the Moray East site setting study area

Official Reference Number	Site Name and Type	Designation
SM 527	Borrowston Broch	Scheduled
SM 548	Garrywhin Fort	Scheduled
SM 599	Tulloch (Usshilly) Broch and field system	Scheduled
SM 2301	Wag of Forse settlement	Scheduled
SM 7242	Forse House settlement, field system and burnt mound	Scheduled
SM 696	Watenan Broch	Scheduled
SM 4289	Watenan Fort	Scheduled
SM 5073	Dunbeath Inver Fort	Scheduled
SM 5182	Latheronwheel promontory fort	Scheduled
SM 90048	Cairn of Get	Scheduled
SM 90065	Castle of Old Wick	Scheduled
SM 90162	The Hill o'Many Stanes	Scheduled
HB 7935	The Corr croft	Category A–listed
HB 7936	Dunbeath Castle	Category A–listed
HB 7946	Forse House Hotel	Category B–listed
HB 7945	Dunbeath Portomin Harbour	Category B–listed
HB 14070	The Whaligoe Steps	Category B–listed
–	Lybster	Conservation area
HB7954	Lybster Harbour	Category B–listed

The Moray East ES 2012 reviewed the impact of each of the consented Telford, Stevenson and MacColl wind farms separately.

It was concluded that the visibility of wind turbines can cause loss of cultural significance or affect the degree to which significance may be appreciated. However, the magnitude of the impact was considered negligible making the overall impact negligible. A detailed description of each potential setting impact can be found in Chapter 8.5.5 of the Moray East ES 2012.

The findings of the CIA concluded that there was limited potential for cumulative setting impacts to occur in relation to the cultural heritage assets. A summary of the impacts upon the setting of selected onshore

cultural heritage from the Moray East ES 2012 (Chapter 15.5) shows the basis for this judgement (Table 10.2).

Table 10-2: Cumulative impacts from Moray East ES 2012

Receptor	Predicted Significance	Summary
Dunbeath Castle (HB 7936)	Negligible	The proposed turbines will be seen from the castle itself and its immediate surroundings as part of the wider landscape. Key views of the castle will be unaffected.
Whaligoe Steps (HB 14070)	Negligible	The proposed turbines will be seen in the context of general views from the viewing platform and from the top of the stairs. They will not be visible in the dramatic cliff-framed views from the foot of the steps, which are relevant to the sense of place.
Lybster Conservation Area	Not significant	The proposed turbines will only be visible from the edges of the Conservation Area in general views of the surrounding area and no key views will be affected. The cultural significance of the Conservation Area will remain unchanged.
Lybster Harbour Complex	Not significant	The proposed turbines will be screened from view from the harbour. No key views from third locations will be affected and the cultural significance of the harbour will remain unchanged.
Yarrows Palimpsest Landscape (represented by SM 527, 548, 696 & 90048).	Not significant	The proposed turbines will be visible from elements of the landscape at a distance of over 23 km. They will not affect relevant visual relationships between assets or relevant landscape features or detract from sense of place.

For a detailed summary of cumulative impacts see Table 15.5-1 of the Moray East ES 2012.

10.3.1 Mitigation

Due to unavailability of feasible mitigation measures the visual impacts of different layout scenarios were investigated. This was done as part of the review of the WCS for the Design Envelope. The WCS design parameter assessed in the Moray East ES 2012 were based on the consented Telford, Stevenson and MacColl wind farms at their largest size, in terms of turbine height, number, density and spread. The assessment concluded that all impacts were not significant. Therefore, no mitigation was proposed.

10.4 Proposed wind farm consent application – site characterisation

10.4.1 Sources of data

Based on a review of baseline data sources included in the Moray East ES 2012 it can be concluded that there have been no significant changes to any of the original sources of data used to inform the EIA. Therefore, this scoping document drawing predominantly from the data sources used to inform the Moray East ES 2012, but updated where possible with more recent data, which it is worth noting does includes the revised DSLP for BOWL (which is a significantly reduced number of turbines to that are consented).

Table 10-3: Data sources

Dataset / technical report	Main content	Geographical coverage	Source	Date
Moray East ES 2012 Chapters 5, 8 and 15.	Headland Archaeology impact assessment of the consented Telford, Stevenson and MacColl wind farms	25 km Radius study area around Moray East site	Moray East	2012
Environmental Statement, Technical Appendix 5.5 A-Archaeology Technical Report	Headland Archaeology technical appendix on Archaeology and Cultural Heritage Assets	25 km Radius study area around Moray East site	Moray East	2012
Beatrice Offshore Wind Farm Environmental Statement	Setting impacts from BOWL	BOWL	BOWL	2012
BOWL Development Specification and Layout Plan	Revised Development Specification and Layout	BOWL	BOWL	2016
Historic Environment Scotland (HES) records of known cultural heritage receptors	Identification and location of known cultural heritage receptors held by HES	The Moray Zone	HES	2017
Offshore Sites and Monuments Record information derived from NMRS data	Identification and location of known cultural heritage receptors	The Moray Zone	HES	2017

10.4.2 Relevant guidance

The following guidance is based on the most recent version of all relevant documents. Some guidance and documents in particular have been updated since the original setting impact assessment was undertaken for the Moray East. This includes the CIfA (Chartered Institute for Archaeologists) Standard and guidance for historic environment desk-based assessment updated in 2014 and National Marine Plan by the Scottish Government updated in 2016. Relevant guidance includes:

- Institute for Archaeologists Standard and guidance for historic environment desk-based assessment (2014);
- Joint Nautical Archaeology Policy Committee (JNAPC) Code for Practice for Seabed Development (2008);
- COWRIE Historic Environment Guidance for the Offshore Renewable Energy Sector (2007);
- COWRIE Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy (2008);
- Historic Environment Scotland (2016) Managing Change in the Historic Environment –Setting;
- Scottish Historic Environment Policy (SHEP) (2016); and
- National Marine Plan, the Scottish Government (2016).

10.4.3 Inter-relationships

With respect to cultural heritage and impacts on setting, the key inter-relationships requiring consideration with respect to the proposed design changes and other topics to be covered in the EIA is SLVIA.

10.4.4 Summary of site characteristics and identification of key receptors

The identification of key receptors for the baseline of the setting impact assessment data will be drawn from the Moray East ES 2012, the Historic Environment Scotland Databases of designated assets as curated by HES and from updated records and information from the Highland Council local authority historic environment records. All datasets from the original development will be updated to ensure that the identification of key receptors is comprehensive, i.e., informed by SLVIA ZTV. Through the ZVT an assessment area of 25 km around the development area has been confirmed.

The long prehistoric record and history of settlement, agriculture and fishing within the area is well represented through archaeological and cultural heritage assets along the Caithness coast. There are a large number of designated assets within 25 km of the proposed wind farm consent application.

There are a number of prehistoric scheduled monuments, in particular close to Loch of Yarrows and Loch Watenan. Three of these are Properties in Care: Cairn of Get, Hill o'Many Stanes and Castle of Old Wick.

A large number of listed buildings are within the bounds of the Wick conservation area. It was concluded in the Moray East ES 2012 that these have no relationship with the sea or landscape beyond the town and will therefore also be scoped out for the proposed wind farm consent application.

While the key receptors remain constant, in the Moray East ES 2012 the BOWL development was in the application phase, but has since been consented and is now under construction. Once it is constructed it will have an impact on the setting of the archaeological and cultural heritage receptors identified within this chapter.

As BOWL is now in preparation for construction (expected to commence in April 2017), the location and size of the proposed turbines has become a key element of the baseline. BOWL will consist of 84 x 7 MW turbines with a blade tip height of 187 m above LAT, spaced at a distance of approximately 1,170 m apart in all directions. This is a significantly lower number of turbines with greater separation and a smaller size than was assessed in the Moray East ES 2012.

This in combination with the proposed changes in the number and size of the proposed turbines as well as spacing of the proposed wind farm consent application will affect the baseline as well as how key receptors may be affected.

Further, as BOWL is located closer to the identified archaeological and cultural heritage assets (compared to the Moray East site), it is possible that the changes in the consented Telford, Stevenson and MacColl wind farms Design Envelope will have less of an impact considering the presence of another offshore windfarm within the close proximity of the assets.

The list of all designated heritage assets included in Table 10.1 remains valid with respect to settings that could be affected by the proposed wind farm consent application. This list may be subject to change in the possibility that there are changes in the updated datasets received from the Historic Environment Scotland Databases of designated assets as curated by HES and from updated records and information from the Highland Council local authority historic environment records.

10.4.5 Data gaps

As a consequence of the updated turbine parameters, a review of designated cultural heritage assets that may now be within the ZTV of the proposed wind farm consent application will be undertaken. This will address any potential data gaps with regards setting impacts on specific designated cultural heritage assets. This will be established from statutory consultee responses, ZTVs (viewsheds), assessment of identified key views from specific archaeological and cultural heritage assets and will be informed by site

visits and wireline models. The WCS for the assessment of the impacts of the proposed wind farm consent application will be finalised in consultation with the SLVIA and agreed with relevant consultees. This will allow for a comprehensive assessment of the impact on the setting of the archaeological and cultural heritage assets.

10.5 Proposed wind farm consent application – impact identification

This section will define the possible impacts of the proposed wind farm consent application on the setting of designated onshore archaeological and cultural heritage assets. The possible impacts will be defined by the changes to the baseline and changes in the design parameters. Table 10.4 gives an overview of all setting related impacts arising from the proposed wind farm consent application that require assessment.

Table 10-4: Setting related impacts

Impact of proposed wind farm consent application requiring assessment	Change to design parameters	Changes to baseline	Implications of change
Setting of designated onshore receptors	Increased height and separation of turbines.	BOWL is consented and currently in preparation for construction in the vicinity of the Moray East site. It therefore changes the onshore wind farm baseline context.	Possibility of development area more visible than in the consented Telford, Stevenson and MacColl wind farms due to higher turbines and increased turbine spacing. Overall impact reduced due to BOWL context; however, the addition of the proposed wind farm consent application may result in significant impacts on the setting of designated onshore receptors.
Setting of designated onshore receptors	Reduced number of turbines	BOWL is consented and currently in preparation for construction in the vicinity of the Moray East site. It therefore changes the onshore wind farm baseline context.	Reduced number of turbines will lessen the impact compared to consented Telford, Stevenson and MacColl wind farms due to higher turbines and increased turbine spacing. Overall impact reduced due to BOWL context; however, the addition of the proposed wind farm consent application may result in significant impacts on the setting of designated onshore receptors.
Cumulative impact on setting of designated onshore receptors	Increased height and separation of turbines.	BOWL is consented and currently in preparation for construction in the vicinity of the Moray East site. It therefore changes the onshore wind farm baseline context.	Overall impact reduced due to BOWL context; however, the addition of the proposed wind farm consent application may result in significant impacts on the setting of designated onshore receptors.

10.6 Proposed wind farm consent application – approach to assessment of project specific impacts

The following sections describe the approach that will be used to assess potential impacts and their significance from the proposed changes to the Moray East Offshore Wind Farm Design Envelope.

10.6.1 Assessment method

As the physical impact on archaeological and cultural heritage assets has been scoped out the methodology in this chapter will only focus on the assessment method used for the setting impact. Although there have been some updates since the Moray East ES 2012 to guidance documents in regards to setting assessment, the basic methodology that will be adhered to throughout the EIA with regards to the impact assessment on the setting of archaeological and cultural heritage assets and designated onshore receptors has not changed.

The assessment method laid out in the Moray East ES 2012 (Chapter 8.5) in regards to sensitivity and magnitude will be adhered to and relevant adjustments to the baseline have been identified.

The new assessment will take a Design Envelope approach to the assessment and be based on the WCS (influenced by the new design parameters) which will be in line with SLVIA (Chapter 9 of this scoping report) and agreed with relevant consultees.

This will be based on the 'worst case' combination of the following parameters:

- Turbine blade tip height up to 280 m and rotor diameter up to 250 m;
- Turbine rating of between 8.1 MW and 15 MW;
- Total number of turbines – maximum 137 turbines (for 8.1 MW rated turbine). For higher rated turbines (e.g. 12 MW to 15 MW) total number of turbines will reduce significantly to less than 100;
- Downwind and crosswind spacing minimum parameters to remain at 1,200 m downwind spacing and 1,050 m crosswind i.e. the same as previous Moray East; and
- The minimum clearance at Highest Astronomical Tide (HAT) at 22 m i.e. the same as consented Telford, Stevenson and MacColl wind farms

The sensitive receptors affected by changes in the setting were previously identified in the Moray East ES 2012 and are summarised in Section 10.4.4. These receptors remain valid and following analysis of the ZTV prepared for the approach to the SLVIA (Chapter 9) it was concluded there are no additional setting receptors that have to be included.

10.6.2 Assessment criteria

During the construction, operation and decommissioning phases of the project, the setting of cultural heritage assets may be affected. Although most of the assessment criteria has been laid out in Chapter 8.5 of the Moray East ES 2012, updated guidance has been released in regards to the cultural significance of setting and the potential impact on that setting. Therefore, the cultural significance of assets will be considered in terms of the values described in Managing Change in the Historic Environment – Setting (Historic Environment Scotland, 2016). Most setting impacts will relate to contextual and associative values. The potential impact of the proposed change on a cultural heritage asset setting can be summarised from the guidance as followed:

- The impact on key views to or from the historic asset or place.
- Proposed change could dominate or detract in a way that affects our ability to understand and appreciate the asset.
- The visual impact of the proposed change relative to the scale of the asset and its setting.
- The visual impact of the proposed change relative to the surroundings of the asset in the landscape.
- The presence, extent, character and scale of the existing built environment within the surroundings of the asset.
- The magnitude of the change relative to the sensitivity of the setting of the asset:

- The ability of the setting to absorb new developments without affecting its key characteristics;
- The impact of the proposed change on qualities of the existing setting such as sense of remoteness, current noise levels, evocation of the historical past, sense of place, cultural identity, associated spiritual responses; and
- Cumulative impacts: individual developments may not cause significant impacts, but may do so when they are combined.

Magnitude of an impact on the setting of a cultural heritage asset will be in line with the criteria included in the Moray East ES 2012.

The cultural significance of assets will be broadly similar to that used in the Moray East ES 2012, updated as appropriate by the terms defined in Scottish Historic Environment Policy (SHEP, Historic Environment Scotland 2016). These are:

- Intrinsic value – those relating to the fabric of the asset;
- Contextual value – those relating to the monument's place in the landscape or in the body of existing knowledge; and
- Associative value – more subjective assessments of the associations of the monument, including with current or past aesthetic preferences.

10.7 Proposed wind farm EIA - approach to assessment of cumulative impacts

The whole project and cumulative impact assessments (as described in Chapter 2) will require the consideration of the impacts of the proposed wind farm consent application together with impacts associated with:

- The Modified TI for Moray East (as presented in the Moray East Modified TI ES 2014);
- The projects that were considered in the whole project and CIA in the Moray East ES 2012 (excluding BOWL and Moray West); and
- Other new relevant projects that have been consented or proposed since submission of the Moray East 2012 ES (as identified in Chapter 6, Table 6.2).

The overall approach to the whole project and CIA is set out in the Moray East ES 2012 (Chapter 15.5.3). The assessment methodology followed that outlined in the Moray Firth Offshore Wind Developers Group Discussion Document (ERM, 2011; see Moray East ES 2012 Technical Appendix 1.3 D). Specific guidance that was followed in regards to the approach can be found in Section 10.4.2. Following is a summary of the approach in regards to the impact on setting of archaeological and cultural heritage assets.

The cumulative impacts in relation to other wind farm offshore scenarios (operational/under construction, consented and application stage) and onshore, as well as other relevant marine developments, will be mapped out in GIS within the study area of 35 km from the proposed wind farm consent application. This was the area agreed by Headland Archaeology for the Moray East ES 2012 with consultees.

This information will be used to assess whether the wind farm context has changed and if further impacts on setting are created as a result of the proposed wind farm consent application. Considering the significant impact of BOWL in the context of the proposed wind farm consent application it is considered unlikely that further significant additional cumulative impacts would arise. The degree of assessment required to establish the cumulative impact of the proposed wind farm consent application in the context of onshore wind farm development will be agreed in consultation with relevant consultees.

Scoping Question 10.8

Is Marine Scotland in agreement with the following with regards to the proposed windfarm EIA for cultural heritage?

- Have all the appropriate sources of data been identified to inform the site characterisation / baseline description?
- Is the method of project specific impact assessment proposed appropriate?
- Is the method of whole project and cumulative impact assessment proposed appropriate?

10.8 References

COWRIE (2007) Historic Environment Guidance for the Offshore Renewable Energy Sector, The Crown Estate.

COWRIE (2008) Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy, The Crown Estate.

Headland Archaeology UK Ltd., (2011). Moray Offshore Wind Farm Archaeology and Cultural Heritage Baseline Technical Report.

Historic Environment Scotland (2016) Managing Change in the Historic Environment

Institute for Archaeologists Standard and guidance for historic environment desk-based assessment (2014) CIfA.

Joint Nautical Archaeology Policy Committee (JNAPC). 2008 Code for Practice for Seabed Development JNAPC.

The Scottish Government (2016) Scottish National Marine Plan. Available at: http://www.gov.scot/Publications/2015/03/6517

11 Civil and military aviation

11.1 Introduction

The following chapter presents the proposed approach to the assessment of potential impacts associated with the proposed wind farm consent application with respect to civil and military aviation. In developing the proposed approach, it has been necessary to take into consideration work completed for the Moray East ES 2012 (including site characterisation studies; technical reports etc.; outcome from the impact assessment in terms of key sensitive receptors and potential impacts and their significance; and proposed mitigation measures) and any additional information provided during the determination period. The proposed approach also takes into account key stakeholder concerns and key issues raised during consultation, and actions taken to address these concerns.

Where new data have become available to inform the baseline for the assessment and new impact assessment methodologies and guidance are available these have been recognised and considered as appropriate. The aviation sections of the Moray East ES 2012 were prepared by Osprey Consulting Services Ltd with associated technical reports prepared by Pager Power, Helios and Spaven Consulting. The aviation section of this scoping report has been prepared by Coleman Aviation Ltd who will also be responsible for the aviation assessment in the proposed wind farm consent application EIA.

11.2 Work completed for the Moray East ES 2012

Key sources of site characterisation data and assessment methods used to inform the civil and military aviation assessment carried out as part of the Moray East ES 2012 are summarised in Chapter 4 of this scoping report and discussed in detail in Chapters 5.3 and 8.3 of the Moray East ES 2012 and associated Technical Appendices: Technical Appendix 5.3 A Initial Aviation Assessment Report, Technical Appendix 5.3 B Beatrice and Moray Offshore Wind Farms Helicopter Impact Assessment and Technical Appendix 5.3 C Osprey Radar Propagation Modelling Results.

11.3 Key findings from the Moray East ES 2012

Impact assessments were carried out to assess not only the specific impact of the Moray East development on civil and military aviation but also to assess the cumulative impact associated with other existing or foreseeable marine and coastal developments and activities. Key findings from the Moray East ES 2012 are provided below.

11.3.1 Impact of the consented Telford, Stevenson and MacColl wind farms

Assessment of the likely significant impacts of the consented Telford, Stevenson and MacColl wind farms on aviation and radar stakeholders are covered in the Moray East ES 2012 at Chapter 8.3. The impact assessment identified the following aviation receptors:

- National Air Traffic Services Plc (NERL) - Allanshill Primary Surveillance Radar (PSR) supporting Civil Air Traffic Control (ATC) and En-route operations;
- Ministry of Defence (MoD) Air Surveillance and Control Systems (ASACS) – Buchan Air Defence Radar (ADR) supporting UK Air Defence (AD) operations and training;
- MoD ATC – Royal Air Force (RAF) Lossiemouth PSR used to provide navigational services to aircraft inbound to and outbound from the airfield, and to military aircraft operating over the Moray Firth;
- Highlands and Islands Airports Ltd (HIAL) Wick Airport regarding potential impacts on aircraft flight patterns and procedures;
- Helicopter Main Routes – HMR X-Ray used by helicopters transiting between Aberdeen, via Wick to the Atlantic Rim offshore installations west of the Shetland Islands;
- Helicopter Approach Procedures to offshore platforms; and

- Minimum Safe Altitude (MSA), which is the lowest altitude set in areas to ensure separation between aircraft and known obstacles.

Of the receptors listed above, Wick Airport was the only aviation receptor that was considered to be unaffected by the impact of the consented Telford, Stevenson and MacColl wind farms during any phase of construction, operation and decommissioning; as a result, the impact on Wick Airport was assessed as not significant.

During construction and decommissioning, the impact on helicopter operations to offshore platforms and MSA was assessed as being significant whereas the impacts during construction and decommissioning on the remaining receptors were assessed as being not significant.

During the operational phase, the impact on all aviation receptors (with the exception of Wick Airport) was assessed as significant.

11.3.2 Cumulative Impacts

Assessment of the likely cumulative impacts of the consented Telford, Stevenson and MacColl wind farms associated with other existing or foreseeable marine and coastal developments and activities are covered in the Moray East ES 2012 at Chapter 15.3.

The developments and activities considered within the CIA were:

- Marine renewable projects:
    - Beatrice Offshore Wind Farm (BOWL);
    - Moray West Offshore Wind Farm;
    - Proposed Viking SHETL hub; and
    - Beatrice demonstrator turbines.
- Cable:
    - BOWL offshore transmission infrastructure;
    - Proposed Viking SHETL cable; and
    - SHEFA telecoms cable.
- Oil and gas industry infrastructure:
    - Beatrice and Jacky platforms and associated infrastructure.

The impact assessment identified that, in the absence of mitigation, significant cumulative impacts would occur on the following identified aviation stakeholders:

- NERL - Allanshill PSR; and
- MoD - RAF Lossiemouth PSR.

However, it was recognised that mitigation was under discussion with both NERL and MoD and that cumulative mitigation solutions would be achievable within the required timescales. It was equally determined that, with suitable technological mitigation in place, there would likely be negligible residual impact on the NERL Allanshill and RAF Lossiemouth PSR systems.

It was further predicted that there would be no cumulative impact on the ASACS Buchan ADR as the only predicted impact was from the consented Telford, Stevenson and MacColl wind farms. However, since the Moray East ES 2012 was published, the MoD has confirmed that the consented Telford, Stevenson and MacColl wind farms would not impact on the Buchan ADR and has subsequently withdrawn their objection in that regard.

It was also assessed that there would be no cumulative impact on HIAL Wick Airport as the only predicted impact was from BOWL.

With regard to helicopter approach procedures to offshore platforms, the technical report in the Moray East ES 2012 (Appendix 5.3 B - Beatrice and Moray Offshore Wind Farms Helicopter Impact Assessment) had considered the cumulative impacts of the consented Telford, Stevenson and MacColl wind farms, the Moray West Offshore Wind Farm and BOWL wind turbines. Mitigation discussions took place with the Moray Firth helicopter operators and it was anticipated that through continued discussion and implementation of mitigation measures, it would be agreed that the residual impact would not be significant.

A summary of the expected cumulative impacts is provided in the Moray East ES 2012 at Table 15.3-1.

11.3.3 Mitigation

In terms of mitigation, a great deal of discussion and negotiation with the relevant aviation stakeholders has taken place since the Moray East ES 2012 was submitted. Taking each of the aviation receptors in turn:

- NERL - Allanshill PSR: Requirement for mitigation to counter adverse impact to the Allanshill PSR is covered in Planning Conditions 21 and 22 of the Decision Letters for each of the consented Telford, Stevenson and MacColl wind farms. Consultation with NERL has identified that the impact of the consented Telford, Stevenson and MacColl wind farms can be mitigated by means of radar blanking; which is a standard mitigation technique offered by NERL. Moray East has already entered in commercial agreement with NERL to provide radar blanking;
- MoD ASACS – Buchan ADR: Mitigation was not required as the MoD confirmed that the Buchan ADR would not be affected by the consented Telford, Stevenson and MacColl wind farms and withdrew their objection;
- MoD ATC – RAF Lossiemouth PSR: Moray East has been in detailed negotiation with MoD reference mitigation of the RAF Lossiemouth PSR and both parties agreed a suitably worded planning condition which is covered in Planning Condition 20 of the Decision Letters for each of the consented Telford, Stevenson and MacColl wind farms. This condition has not yet been discharged although a path to mitigation, including the application to the CAA for and subsequent approval of a Transponder Mandatory Zone (TMZ) over the site, has been identified and it is anticipated that an appropriate solution will be developed to enable the TMZ to be removed in the future;
- HIAL Wick Airport: Mitigation not required as there would be no impact on Wick Airport operations;
- Helicopter Main Routes – HMR X-Ray: The Moray East ES 2012 confirmed that the MSA in the vicinity of HMR X-Ray would need to be raised to 1,700 ft allowing helicopters operating on HMR X-Ray to continue operations with minimum operational impact;
- Helicopter Approach Procedures to offshore platforms: The complexity of helicopter operations to offshore installations coupled with the cumulative impacts of the consented Telford, Stevenson and MacColl wind farms in conjunction with BOWL, mean that mitigation measures cannot be agreed until the final turbine layout is decided. However, meaningful discussions with the relevant aviation stakeholders had taken place prior to submission of the Moray East ES 2012 and it was accepted that changes to operational procedures would be achievable and deliverable to mitigate the impact of the consented Telford, Stevenson and MacColl wind farms development. However, as explained in Chapter 5 of this scoping report, work has progressed on the decommissioning of the Beatrice oil field and is anticipated to commence in 2017 and complete by 2021. It is also understood that preparatory works for decommissioning of the Jacky Platform is also anticipated to commence in 2017 and will involve removal of the platform. Consequently, mitigations measures involving changes to operational procedures will only need to be implemented if decommissioning activities are not complete prior to construction of the Moray East Offshore Wind Farm; and

- MSA: The Moray East ES 2012 recognised that the MSA would have to be raised to 1,700 ft to cater for turbines up to a maximum planned tip height of 204 m above Lowest Astronomical Tide (LAT).

11.4 Proposed wind farm consent application – site characterisation

11.4.1 Sources of data

Aviation issues associated with the proposed wind farm consent application will predominantly be resolved by means of continued consultation with the relevant aviation stakeholders. The data sources and technical reports that will be used to inform the impact assessment are contained in Table 11.1 below:

Table 11-1: Data sources for civil and military aviation

Dataset / technical report	Main content	Geographical coverage	Source	Date
Technical and Operational Assessment (TOPA)	Radar-Line-of-Sight (RLOS) assessment of Allanshill PSR	Moray East site	NERL	Mar 2012
Pre-Application Consultation Request	RLOS assessment of MoD radar systems (ATC and AD)	Moray East site	MoD	Mar 2012
Moray Firth TMZ Airspace Change Proposal	Detailed application and letter of approval from CAA for TMZ over Moray East	Moray East site	Moray East (and subsequent decision letter from CAA)	Jul 2015

11.4.2 Relevant guidance

A variety of aviation publications contain information and guidance relating to the potential impacts of offshore wind developments on aviation. The following list contains civilian aviation documents that were consulted to assess the specific impact of the Moray East ES 2012 and these will continue to be consulted on as part of the EIA for the proposed wind farm consent application. This list also contains additional military documents that will also be consulted as part of the EIA for the proposed wind farm consent application:

- CAP 393 - Air Navigation: The Order and the Regulations;
- CAP 670 – Air Traffic Services Safety Requirements;
- CAP 764 – CAA Policy and Guidelines on Wind Turbines;
- CAP 774: The UK Flight Information Services;
- UK AIP;
- Mil AIP;
- Military Aviation Authority (MAA): MAA Regulatory Publication 3000 Series: Air Traffic Management Regulations; and
- MAA: Manual of Military Air Traffic Management.

11.4.3 Inter-relationships

No inter-relationships have been identified with regard to the proposed design changes and other EIA topics to be covered as part of the EIA.

11.4.4 Summary of site characteristics and identification of key receptors

In terms of aviation, the important aspect of the change in Design Envelope is the increase in turbine size up to a maximum tip height of 280 m HAT (which is equivalent to 284.5 m LAT based on a 4.5 m difference between HAT and LAT). The fact that there will be fewer turbines than originally planned and that they will potentially be spaced further apart, but remaining within the lateral limits of the Moray East site, are positive aspects; however, the baseline characteristics and key receptors will remain the same as for the Moray East ES 2012. Namely:

- NERL - Allanshill PSR;
- MoD ASACS – Buchan ADR;
- MoD ATC – RAF Lossiemouth PSR;
- HIAL Wick Airport;
- HMR X-Ray;
- Helicopter Approach Procedures to offshore platforms; and
- MSA.

11.4.5 Data gaps

There are no known data gaps that will constrain the EIA for the proposed wind farm consent application.

11.5 Proposed wind farm consent application – impact identification

All the aviation impacts identified in the Moray East ES 2012 will need to be re-assessed within the EIA of the proposed wind farm consent application. Table 11.2 below outlines the potential change in impact associated with the proposed wind farm consent application:

Table 11-2: Potential changes in impact to aviation receptors

Receptor	Potential change in impact as a result of the proposed wind farm consent application
NERL - Allanshill PSR	Impact on Allanshill PSR will need to be re-assessed by NERL in order to confirm whether previously agreed mitigation (radar blanking) is still valid.
MoD - ASACS Buchan ADR	MoD did not previously object as there was no adverse impact on Buchan ADR. Increased height of proposed wind farm turbines may result in turbines being visible to Buchan ADR resulting in a requirement for mitigation.
MoD - RAF Lossiemouth PSR	A TMZ over the Moray East site has been approved by the CAA as a temporary mitigation solution and work is ongoing with the MoD to identify possible permanent solutions to replace the TMZ. The proposed amendments to the turbine parameters will need to be taken into account in this ongoing work.
HIAL Wick Airport	Increased height of proposed turbines may have an impact on aviation procedures at Wick Airport.
HMR X-Ray	Increased height of proposed turbines may have an impact on helicopter operations on HMR-X-Ray.
Helicopter Approach Procedures (Offshore Platforms)	Increased height of proposed turbines may have an impact on helicopter approach procedures to offshore installations.
MSA	Increased height of proposed turbines will have an impact on MSA.

11.6 Proposed wind farm consent application – approach to assessment of project specific impacts

The following section describes the approach that will be used to assess potential impacts of the proposed changes to the consented Telford, Stevenson and MacColl wind farms Design Envelope. RLOS assessments will need to be re-calculated by NERL and MoD and the impact on helicopter approach procedures, HMR X-Ray and MSA will need to be re-assessed. These will be conducted in the same manner as per the Moray East ES 2012.

11.6.1 Assessment methods

Assessment of the aviation issues associated with the Design Envelope for the proposed wind farm consent application will require consultation with the relevant aviation stakeholders; as follows:

- NERL - Allanshill PSR: NERL will be re-consulted to carry out a review of their original TOPA to ascertain whether the increased maximum height of the wind turbines will impact on the agreed mitigation solution (radar blanking);
- MoD ASACS – Buchan ADR: MoD will be re-consulted to ascertain whether the increased maximum height of the wind turbines will impact on the operation of the Buchan ADR;
- MoD ATC – Lossiemouth PSR: MoD will be re-consulted to ensure the mitigation options identified in the ongoing negotiations for the consented Telford, Stevenson and MacColl wind farms take account of the increased maximum height of the wind turbines;
- HIAL Wick Airport: HIAL will be re-consulted to ascertain whether the change in Design Envelope affects aircraft flight patterns and procedures; and
- Helicopter Main Routes (HMR X-Ray); Helicopter Approach Procedures to offshore platforms and MSA: Moray Firth helicopter operators will be re-consulted to ascertain any operational impact caused by increasing the height of the wind turbines.

The impact assessment will consider the proposed phased development of the proposed windfarm consent application as appropriate.

11.6.2 Assessment criteria

The assessment criteria utilised in the Moray East ES 2012 will also be utilised for the EIA of the proposed wind farm consent application.

11.7 Proposed wind farm consent application - approach to assessment of cumulative impacts

It is possible to scope out the need for assessing the cumulative impact of any cabling or offshore oil and gas infrastructure as it was established in the Moray East ES 2012 that there would be no impact on civilian or military aviation operations. In the CIA for the consented Telford, Stevenson and MacColl wind farm EIA, the projects considered in addition to Moray East were BOWL and Moray West Offshore Wind Farm. As both these projects have been scoped out of the CIA for Moray East (Chapter 2) no CIA is required with regards to civil and military aviation.

Scoping questions 11.1:

Is Marine Scotland in agreement with the following with regards to the proposed windfarm EIA for civil and military aviation:

- Have all the appropriate sources of data been identified to inform the site characterisation / baseline description?
- Is the method of project specific impact assessment proposed appropriate?
- Is the method of whole project and cumulative impact assessment proposed appropriate?

12 Socio-Economic impact assessment

12.1 Introduction

The following chapter presents the proposed approach to the assessment of potential impacts associated with the proposed windfarm consent application with respect to socio-economics. In developing the proposed approach, it has been necessary to take into consideration work completed for the Moray East ES 2012 (including site characterisation studies; technical reports etc.; outcome from the impact assessment in terms of key sensitive receptors and potential impacts and their significance; and proposed mitigation measures) and any additional information provided during the determination period. The proposed approach also takes into account stakeholder concerns and issues raised during consultation, and actions taken to address these concerns. Significant changes to the UK electricity market have taken place since 2012 which will reduce revenue earned by offshore generation by one third, and require to be considered by the assessment. Where new data have become available to inform the baseline for the assessment and new impact assessment methodologies and guidance are available these have been recognised and considered as appropriate.

The assessment of socio economic impacts in the Moray East ES 2012 was undertaken by SQW. The current proposed assessment will be undertaken by Development Economics Limited. The author of the current proposed assessment was formerly a Director at SQW who was involved there in undertaking socio-economic impact assessments for several offshore windfarms, including Neart na Gaoithe and Hornsea. The author is also currently leading the socio-economic impact assessment of the North West Coast Connection project in Cumbria and Lancashire for National Grid.

12.1.1 Recreation and tourism

With respect to recreation and tourism it is proposed that these receptors are scoped out of the assessment for the reasons outlined below:

- In terms of impacts on recreational sailing, recreational fishing and kayaking and surfing given that the design parameters for the proposed wind farm consent application will be within the assessed WCS design parameters relating to turbine numbers, spacing and layouts it can be concluded that the impacts presented in the Moray East ES 2012 remain valid for these receptors and that no further assessment is required.
- Potential impacts on walkers and visitors (tourism) will be captured in the context of impacts on seascape, landscape character and visual amenity assessed within the SLVIA. Separate assessment of these impacts is therefore not required as part of this assessment.
- Potential adverse impacts on tourism include the over occupation of holiday accommodation by workers during construction. However, given that the design parameters for the proposed wind farm consent application relating to turbine numbers, associated size of workforce required during the construction period and duration of the construction period will be within those included in the previous Moray East ES 2012, the impacts presented in the Moray East ES 2012 relating to tourism remain valid. Therefore, it is concluded that no further assessment will be required with regard to impacts on tourism.

12.2 Work completed for the Moray East ES 2012

Key sources of baseline data and assessment methods used to inform the socio-economic assessment carried out as part of the Moray East ES 2012 are summarised in this chapter of the scoping report and discussed in detail in Chapters 5.6 and 8.6 of the Moray East ES 2012 and associated Technical Appendix 5.6 A.

12.3 Key findings from the Moray East ES 2012

The following section provides a summary of key findings from the Moray East ES 2012.

During construction the project specific impacts on employment and GVA were predicted to be of major positive significance. During both operation and decommissioning the project specific impacts on employment and GVA were predicted to be of major positive significance.

The CIA took into account the predicted impacts of the consented Telford, Stevenson and MacColl wind farms in conjunction with BOWL, North Sea oil & gas activities and other (but unspecified) 'major proposed renewable energy projects'. The CIA found that the impacts on employment and GVA were predicted to be of major positive significance.

As there were no significant negative impacts identified by the previous assessment no mitigation measures were required or proposed.

12.4 Proposed wind farm consent application – site characterisation

12.4.1 Changes in baseline since 2012

Since the baseline for the Moray East ES 2012 was prepared there have been significant changes to the UK electricity market brought into impact by the Energy Act (2013) which received Royal Assent on 18 December 2013. The key features of these changes are summarised in documents published by the UK Government in 2015 (see References listed at the end of this chapter for a link to these documents).

As described in Chapter 1, the Energy Act introduced the CfD support mechanism for renewables (replacing the previous Renewables Obligation system). The CfD system offers a fixed price to renewable electricity generators, which they can use to plan the output prices for electricity, rather than providing a flat price as under the previous system.

The CfD mechanism was introduced to reduce the cost of renewable electricity provided to UK energy users (industrial, commercial and households) and to provide developers with an incentive to reduce the cost of projects.

In the first auction under the CfD mechanism prices dropped below £120/MWh (compared to circa £150/MWh under the ROC mechanism). For the second auction the Government has insisted that prices must fall below £105/MWh. Under the ROC system, offshore wind projects qualified for support on the grounds of their technology alone. Offshore wind projects no longer automatically qualify for support. There are more projects than there is financial support available, and offshore wind projects require to compete with each other, and with other technologies in an auction, in which CfDs are only awarded to the projects bidding the lowest price for their energy.

The reforms therefore require that cost savings must be made in the development of projects. The changes associated with this proposed wind farm consent application are, in part, a response to the changes in renewable electricity pricing mechanisms that Government has introduced since the previous assessment of Moray East ES 2012.

Changes in Design Envelope associated with the proposed wind farm consent application, in particular the reduction in the levels of expenditure expected to be required to build the wind farm, means that expected outputs relevant to the socio-economic assessment (such as employment and GVA) are likely to be reduced compared to levels predicted in the Moray East ES 2012. Other socio-economic impacts not considered in the Moray East ES 2012 will be positive; electricity will be produced much more cheaply.

The changes associated with this proposed wind farm consent application in response to national (UK) Government objectives also implies that an assessment of potential national (UK) level impacts should also be undertaken in the new assessment.

12.4.2 Sources of data

The study area proposed to be used in the new assessment is the same as used in the previous assessment, i.e. the local authority areas that border the proposed wind farm consent application area (Moray, Highlands and Aberdeenshire plus the City of Aberdeen).

It is also proposed that benchmark data be gathered for Scotland (which was also the case with the Moray East ES 2012) and for the UK. Baseline data at a UK level was not collected in the Moray East ES 2012 but this is now considered to be relevant given that the changes in Design Envelope associated this proposed wind farm consent application has occurred in response to changes to national (UK) electricity market reforms.

Most demographic, labour market and other economic data is updated on a regular basis, including annual releases of information at a local authority level regarding:

- Business counts, birth rates and survival rates;
- Numbers of local business establishments operating in sectors potentially relevant to the project supply chain;
- Numbers of jobs in the local economy (self-employed and employees); and
- Labour market statistics including employment, unemployment and economic inactivity rates.

The proposed approach is to replace the previous baseline characterisation with respect to socio-economics with up-to-date data from ONS and Scottish Government sources: in most cases data is already available for 2015, and many datasets are now also available for 2016.

As with the previous assessment, it is expected that local authorities and other stakeholders may hold additional data potentially relevant to the assessment or be able to provide insights into issues such as supply chain capacities. The approach will be to seek access to this data for use in conjunction with available labour market and other economic data from ONS and Scottish Government. In particular, consultations will be sought with, inter alia, the following organisations:

- Marine Scotland;
- Scottish Enterprise;
- Highlands and Islands Enterprise;
- Skills Development Scotland;
- Visit Scotland;
- Caithness and Sutherland Enterprise;
- Each of the local authorities with jurisdiction in the Study Area; and
- Other organisations that may be identified during the course of desk-based research and through consultations.

An assessment of economic and demographic current conditions and trends in the study area labour market and business base will be undertaken based on official labour market statistics and data on business demography using data published by ONS. The following data sources will be particularly important in this assessment:

- ONS Business Demography datasets. Data is available up to 2015;
- ONS Labour Force Survey. Quarterly data is available for the period up to 2016Q3;
- ONS Business Register and Employment Survey. Data is available up to 2015; and
- ONS estimates of national and sub-national Gross Value Added (2015 data).

The Moray East ES 2012 socio-economic baseline assessment also included data for some indicators that played little or no part in the assessment of impacts of the scheme. It is not proposed that baseline data will be collected and assessed for indicators of this type, including the following:

- House prices;
- Average earnings; and
- Deprivation indices.

The values for estimated project expenditure will be converted into estimates of GVA and employment using coefficients from the latest edition of the Scottish Input Output tables. The most recent tables (for the period 1998-2013) were published in December 2016. A link to these tables is provided in the References section at the end of this chapter.

The assessment of impacts at a UK level will be assessed in a similar way using national Input Output tables published by ONS.

12.4.3 Relevant guidance

There are no specific statutory requirements for the assessment of socio-economic impacts in EIAs of projects of this type. However, the assessment that will be carried out will be in line with the broad principles set out in HM Treasury's Green Book.

It is also proposed that the assessment be informed by guidance and recommendations found in relevant policy documents published by UK Government and its agencies, including the following:

- The Overarching National Policy Statement for Energy (DECC, 2011);
- Guidance published by the Marine Management Organisation (MMO) on assessing the socio-economic implications of the implementation of marine planning policies (2014); and
- The Homes and Communities Agency's Additionality Guide (4th edition, 2014).

The assessment is also likely to be informed by the Green Paper 'Building our Industrial Strategy' released by HM Government in January 2017. The Green Paper contains specific references to offshore wind energy as part of a long term strategy to address energy security and affordability in the UK.

The assessment will also take into account fully guidance, advice and requirements with respect to socio-economic assessments contained in Scotland's National Marine Plan published by the Scottish Government (2015).

12.4.4 Summary of site characteristics and identification of key receptors

The overall levels of employment and the employment rate (employment as a proportion of the 16 - 64 population) for each local authority, as well as the study area as a whole plus Scotland and the UK, is set out in Tables 12.1 and 12.2 below. These data are the latest available (12 months to September 2016). Apart from Aberdeen City, each local authority area has an employment rate significantly higher than the Scotland average.

Table 12-1: Employment rates by local authority

Area	Employment (persons in employment)	Employment rate (% of 16-64 population)
Aberdeen City	115,700	72.4%
Aberdeenshire	133,600	80.1%
Highland	108,800	77.0%
Moray	44,300	76.2%
Study area (i.e. total of the above)	402,400	76.5%

Area	Employment (persons in employment)	Employment rate (% of 16-64 population)
Scotland	2,485,900	72.8%
UK	31,799,000	74.5%

Source: ONS Annual Population Survey (October 2015-September 2016)

The sectors of business and employment that are of most relevance to the proposed wind farm consent application (i.e. within the potential supply chain) are those involved with manufacturing, construction & civil engineering, transportation services and tourism (accommodation & food services). Table 12.2 provides data on the proportions of overall employment that are found in each of these sectors in the study area, Scotland and the UK. The data comes from the annual ONS BRES survey and is for year 2015. Consideration will also need to be given to the fact that BOWL, the construction of which will commence in 2017, will now be considered as part of the baseline.

Table 12-2: Sector employment levels

Area	Study area (% of total)	Scotland (% of total)	UK (% of total)
Manufacturing	8.9%	7.1%	7.6%
Construction & civil engineering	5,5%	5.4%	6.4%
Transportation	4.5%	4.1%	4.9%
Accommodation & food services	8.7%	8.1%	6.7%

Source: ONS Business Register and Employment Survey (2015) published September 2016

Estimates for GVA are complicated because the ONS do not publish GVA figures that pertain exactly to the administrative boundaries of the Highland local authority area. As an alternative, the data below represents data for Aberdeen City, Aberdeenshire and an area that provides available data for the Highland area (but excludes Skye & Lochalsh and Lochaber). This is a similar approach to that taken in the baseline assessment for the Moray East ES 2012.

Table 12-3: GVA 2014

Area	GVA 2014 (£ millions)
Aberdeen City and Aberdeenshire	18,336
Highland (part)	6,455
Study area (part)	24,791
Scotland	123,543
UK	1,624,276

Source: ONS GVA datasets

A more detailed baseline assessment will be provided to support the assessment of socio-economic impacts using the most current data available. The indicators that will be included in the baseline will include the following:

- Overall levels of employment and the employment rate;
- Unemployment and economic inactivity rates;
- Employment in sectors that could potentially play a part in the supply chain for the project;
- Occupational structure of the workforce;
- Qualifications of the workforce;
- Business counts and start-up rates in sectors that could potentially play a part in the supply chain for the project;
- Data on levels of GVA and GVA per worker; and
- Government interventions directly relevant to the project

12.4.5 Data gaps

There are no major data gaps that will constrain the assessment, but there are several potential areas of data uncertainty.

Firstly, because procurement for the proposed wind farm consent application has not yet reached the stage of placing contracts for works and services, there will inevitably be some uncertainty about the extent to which suppliers located in the study area (as well as Scotland as a whole and the UK) will benefit directly from the project.

As was the case in the assessment undertaken for the Moray East ES 2012, this uncertainty will be taken into account through the modelling of scenarios. In particular, the intention is to develop a low case scenario with pessimistic assumptions for the value of contracts secured by suppliers located within the study area contrasted with a high case where more optimistic assumptions are made. As was the case with the Moray East ES 2012 the main focus of the assessment will be on the quantification of employment and GVA results associated with the low case.

Such a use of scenarios is also considered to be consistent with the advice and requirements for socio-economic assessments contained in the policy document Scotland's National Marine Plan published by the Scottish Government in 2015.

Secondly, a potential further area of data uncertainty is to do with financial expenditures associated with other projects to be included in the CIA. Where financial information is not available for other projects that are to be taken into account, estimates will be produced based on other information and additional assumptions based on professional judgement.

For example, with respect to other wind farm projects, estimates of potential effects would be developed on the scale of impacts for employment and GVA based on pro rating of assumptions based on details that are available for the other projects (such as the number of turbines and the scale of electricity production that is expected to be produced by other projects to be taken into account by the CIA).

12.5 Proposed wind farm consent application – impact identification

The changes to the Moray East Design Envelope with respect to socio-economics could result in changes to the results that were produced by the previous assessment. Table 12.4 below summarises the initial views on the potential direction of changes with respect to the assessment.

Table 12-4: Impact identification

Potential impact of proposed wind farm consent application requiring assessment	Receptor	Change to design parameter	Change to baseline from Moray East ES 2012 (where relevant)	Implication of change
Construction				
Impact on amount of employment and GVA	Employment	Reduction in number of turbines and sub-sea structures	Inclusion of BOWL in baseline	Changes to the Design Envelope mean that there is likely to be a reduced number of turbines installed requiring in turn reductions in the number of sub-surface structures. This is likely to reduce the timeframe for the construction of the project, and also mean that there could be reduction in the overall size of the workforce needed during the construction phase compared to the numbers that were estimated in the previous assessment.
	GVA	Reduction in number of turbines and sub-sea structures	Inclusion of BOWL in baseline	Similarly, changes to the Design Envelope means that construction phase expenditure is likely to be reduced (in real terms) compared the levels assumed in the previous assessment. For this reason it is likely that the GVA impacts in the study area will be reduced (in real terms) compared to the numbers that were estimated in the previous assessment.
Operation				
Impact on amount of employment and GVA	Employment	Reduction in number of turbines and sub-sea structures	Inclusion of BOWL in baseline	Changes to the Design Envelope mean that there is likely to be a potential small reduction in the operation phase employment impacts of the project
	GVA	Reduction in number of turbines and sub-sea structures	Inclusion of BOWL in baseline	Changes to the Design Envelope mean that there is likely to be a potential small reduction in the operation phase GVA impacts of the project.
Decommissioning				

Potential impact of proposed wind farm consent application requiring assessment	Receptor	Change to design parameter	Change to baseline from Moray East ES 2012 (where relevant)	Implication of change
Impact on amount of employment and GVA	Employment	Reduction in number of turbines and sub-sea structures	Inclusion of BOWL in baseline	Changes to the Design Envelope mean that there is likely to be a potential small reduction in the decommissioning phase employment impacts of the project.
	GVA	Reduction in number of turbines and sub-sea structures	Inclusion of BOWL in baseline	Changes to the Design Envelope mean that there is likely to be a potential small reduction in the decommissioning phase GVA impacts of the project.

12.6 Proposed wind farm consent application – approach to assessment of project specific impacts

The following section describes the approach that will be used to assess potential impacts of the proposed changes to the Moray East Design Envelope.

12.6.1 Assessment method

The impact assessment process to be applied for socio-economics will be consistent with that used for the Moray East ES 2012 as described in Chapter 8.6 and supporting Technical Appendix 5.6A and Impact Assessment of the Moray East ES 2012.

The approach will utilise input-output coefficients sourced from the most up-to-date edition of the Scottish Government's Input-Output tables as well as up-to-date information about likely expenditure required to build, operate and decommission the project.

As well as the assessment using the study area boundaries (i.e. the local administrative areas covered by Moray, Highlands and Aberdeenshire Councils plus the City of Aberdeen), the approach will also predict gross and net GVA and employment impacts at two further spatial levels: Scotland and the UK.

The previous assessment also produced predicted results at the spatial level of Scotland but not for the UK. The inclusion of a UK-level assessment is justified because an objective of this proposed wind farm consent application is to produce cheaper energy for the UK energy market in response to the reforms of the UK electricity market introduced by Government since 2013.

The assessment of the likely impacts of the proposed wind farm consent application at a national level (for employment and GVA) will be produced using UK Input-output tables published by the Office for National Statistics. An assessment of the potential impacts of the proposed wind farm consent application on national energy markets will be assessed using an economic impact model to be constructed using data published by DECC and the ONS.

The impact assessment will consider the proposed phased development of the proposed windfarm consent application as appropriate.

12.6.2 Assessment criteria

Specific criteria for defining receptor value and sensitivity (and vulnerability) and determining impact magnitude and significance for the Study Area will also be based on criteria included in Chapter 8.6 of the Moray East ES 2012.

Criteria for defining receptor value and sensitivity at a national (UK) level will be determined as follows:

- **Significance criteria:** The assessment of significance is based on combining the degree of sensitivity of the receptor (i.e. the UK economy) with the magnitude of the predicted impacts (scale and duration). These impacts can be characterised as positive, negative or neutral.
- **Sensitivity of receptor:** This criterion considers how sensitive the UK economy and the relevant sectors are to the impacts of the project. Sensitivity is defined using professional judgement based on the overview of the economy (for example: the levels of spare capacity in the UK labour market, available skills, and the capacity of businesses to participate in the potential supply chain).
- **Magnitude of impact:** The magnitude of the impact on the economy and labour market will depend largely on the scale and duration of expected impacts. To determine an overall assessment as to whether the magnitude of impact on employment and GVA is classified as negligible, low, medium or high, the scale and duration of impact are considered together. There is no specific number or guidance that defines whether the magnitude is negligible, low, medium or high and the conclusion will be a professional judgement.
- **Level of significance** will be determined based on the matrix set out above. The assessment process will be objective and will quantify impacts as far as possible. However, some impacts can only be assessed through professional judgement.

12.7 Proposed wind farm EIA - approach to assessment of cumulative impacts

The whole project and cumulative impact assessments (as described in Chapter 2) will require the consideration of the impacts of the proposed wind farm consent application together with impacts associated with:

- The Modified TI for Moray East (as presented in the Moray East Modified TI ES 2014);
- The projects that were considered in the whole project and CIA in the Moray East ES 2012 (excluding BOWL and Moray West Offshore Wind Farm); and
- Other new relevant projects that have been consented or proposed since submission of the Moray East 2012 ES (as identified in Chapter 6, Table 6.2).

The socio economic impact assessment is also likely to require consideration of activities within the wider UK offshore renewables and oil and gas sectors.

12.7.1 Assessment of cumulative impacts

In terms of employment and GVA, the cumulative impacts will depend on the scale and timing of impacts expected from the proposed wind farm consent application in conjunction with other developments and the capacity of the potential supply chain in the study area to meet demand from different projects and activities that might occur simultaneously. If demand from the proposed wind farm consent application and other developments results in competition for available capacity, then the result may be that some of the potential impacts on employment and GVA in the study area may end up being displaced elsewhere. In this case, the outcome of the CIA may be that some of the anticipated impacts associated with the Moray East Offshore Wind Farm may not be realised.

The scale of potential demand for supply chain capacity from projects included within the scope of the CIA will be assessed via the collection and review of information on other projects and activities and the application of professional judgement. Where quantified estimates have been produced regarding the potential scale and timing of procurement for other projects this will be used in the CIA. Where financial information is not available, estimates will be produced based on other information and additional assumptions based on professional judgement: for example, assumptions could be developed on the scale of impacts for employment and GVA based on pro rating of assumptions based on details provided by the developer for the proposed wind farm.

Consultations with stakeholders will also be used to inform the assessment of any potential changes to the future availability of capacity of the supply chain for the proposed wind farm consent application within the study area.

Scoping Question 12.1:

Is Marine Scotland in agreement with the following with regards to the proposed windfarm EIA with regards to the socio economic impact assessment?

- Have all the appropriate sources of data been identified to inform the site characterisation / baseline description?
- Is the method of project specific impact assessment proposed appropriate?
- Is the method of whole project and cumulative impact assessment proposed appropriate?

12.8 References

Beatrice Offshore Windfarm Limited: Environmental Statement and post-consent documentation, available at http://www.gov.scot/Topics/marine/Licensing/marine/scoping/Beatrice.

Department of Energy and Climate Change (2011) Overarching National Policy Statement for Energy (EN-1).

Green, R. and Vasilakos, N., (2010) The Economics of Offshore Wind, University of Birmingham.

Homes and Communities Agency (2014) Additionality Guide, Fourth Edition, available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/378177/additionality_guide_2014_full.pdf.

HM Government (2017), Green Paper: Building our Industrial Strategy, available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/586626/building-our-industrial-strategy-green-paper.pdf.

HM Government (2015), Electricity Market Reform, Contracts for Difference documents, available at: https://www.gov.uk/government/collections/electricity-market-reform-contracts-for-difference

HM Treasury (2003, updated 2011), The Green Book available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/220541/green_book_complete.pdf.

Marine Management Organisation (2014) The provision of guidance for marine licensing staff to support the implementation of marine planning policies for socioeconomics, tourism and seascape.

Scottish Government 1998-2013 Input Output tables, published in 2016, available at: http://www.gov.scot/Topics/Statistics/Browse/Economy/Input-Output.

Scottish Government (2015) Scotland's National Marine Plan, available at: http://www.gov.scot/Resource/0047/00475466.pdf.

13 Habitat Regulations Appraisal

13.1 Introduction

Information to support the HRA process will be submitted in a standalone HRA report (separate to the ES). The aim of this report is to provide information to support the Appropriate Assessment of the proposed wind farm consent application which will be undertaken by Marine Scotland (on behalf of the Scottish Minsters) as the Competent Authority.

As identified in Chapter 7, the HRA will consider potential effects of the proposed wind farm consent application on the following Natura sites:

- SPAs and pSPAs designated for seabirds and migratory waterfowl;
- Marine Mammal SACs and cSACs; and
- SACs where migratory fish are a qualifying feature.

Screening will be undertaken early in the EIA process and the results of this presented to Marine Scotland for agreement on the sites for which LSE cannot be ruled out. The results of screening will be summarised in tabular format with a short supporting screening note. The screening tables will then form the basis for more a detailed appraisal of sites where additional information is required to support an Appropriate Assessment.

Consultation will be ongoing throughout the EIA on HRA related issues as results of the different aspects of the EIA become available and can be used to define specific HRA issues and the required content of the HRA report.

The approach to the first two stages of the HRA process: Screening and provision of information to inform an Appropriate Assessment are discussed below.

13.2 Approach to HRA

Having determined that the Moray East Offshore Wind Farm proposal is not directly connected with, or necessary for the management of a European site for nature conservation, it is necessary to carry out screening to identify whether there is potential for the proposed wind farm consent application to have a Likely Significant Effect (LSE) on a European site. For those sites where it cannot be concluded that there will be no LSE an Appropriate Assessment is required. The approach to this HRA is illustrated in Figure 13.1 below.

13.2.1 HRA screening

The main objective of HRA screening is to conclude whether there will, or will not be, a LSE on a European site. The assessment of LSE is based on a high level filtering of qualifying interests and associated European sites based on:

- Evidence that qualifying interest(s) of a European site are present in the Moray East site / zone of impact associated with the proposed wind farm consent application;
- Whether there is connectivity between the Moray East site and European site(s) based on:
    - Foraging distances (seabirds) - mean max foraging range information available for species of concern e.g. Thaxter *et al*., 2012;
    - Migration routes (migratory wildfowl);
    - Foraging, breeding and migratory behaviour (marine mammals and fish); and
    - Indirect connectivity with other qualifying interests e.g. fresh-water pearl mussel due to life cycle ecology of salmonids.

- The range of impacts that the Moray East offshore wind farm proposal could have on qualifying interest(s) of a site (impact pathways); and
- Whether that qualifying interest(s) would, by virtue of its behavioural and foraging characteristics, be affected by a particular impact (species sensitivity).

Where potential impacts on a qualifying interest are identified, further evaluation will be undertaken to determine whether or not the proposed wind farm consent application (alone or in-combination with other Projects) will or will not have LSEs on the site taking into account appropriate mitigation (conclusion of LSE or no LSE).

Where it is obvious that there is no connectivity or impact pathway between the Moray East site and a Natura site it will be concluded that there is no LSE. No LSE will also be concluded for trivial effects (minor effects on qualifying interests that will not have a significant effect on a site) despite there being connectivity providing there is sufficient evidence to support this conclusion.

13.2.2 Appropriate Assessment

For sites where it cannot be concluded that there is no LSE an Appropriate Assessment is required to ascertain whether the proposed wind farm consent application will have an adverse effect on the integrity of a European site in view of the sites conservation objectives.

The Appropriate Assessment will be carried out by the Competent Authority (in this case Marine Scotland on behalf of Scottish Ministers) based on information provided in the HRA Report.

The HRA Report will contain the following information:

- The current condition status of the sites qualifying interests e.g. Favourable Conservation Status;
- Site specific and regional population estimates for specific qualifying interests;
- Assessment of potential impacts on qualifying interests – this will be a detailed assessment of impacts based on information presented in the ES;
- Importance of the Moray East site (and zone of impact associated with the proposed wind farm consent application) for the relevant qualifying interest based on seasonal abundance / density estimates in context of site and regional populations (e.g. % of site / regional population present in Moray East) (see Section 13.2.2.1 below); and
- Where relevant, information on demographic parameters for specific qualifying interests.

13.2.2.1 Assessment of population level impacts

To determine whether there would be an adverse effect on the integrity of a Natura site it is necessary to determine whether the changes to the Moray East Design Envelope will affect the viability of the site population (for the specific qualifying interest where LSE cannot be ruled out). Impacts on a site population may also need to be considered in the context of the wider regional population of a species.

For the viability of an SAC or SPA population to be significantly affected, a project would normally have to cause a change to the population's productivity or mortality rates. Typically, these parameters would need to change by at least 1% of their baseline rate for the change to be considered significant.

13.2.2.2 Assessment of in-combination effects

The assessment of effect of the proposed wind farm consent application on site integrity is also considered with respect to other plans and projects. The plans and projects considered as part of the HRA are the same as those considered for the EIA to ensure consistency across both processes

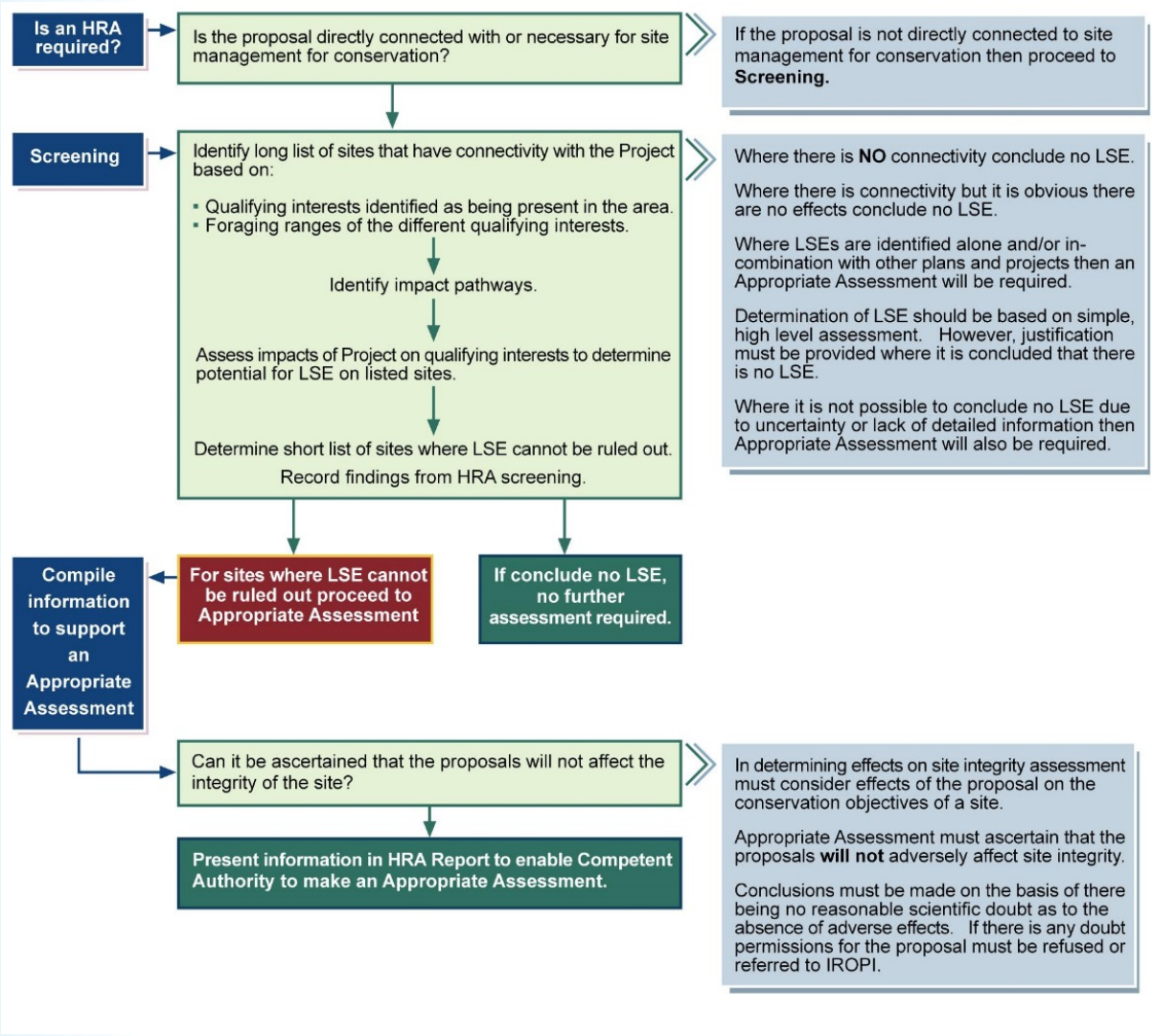

Figure 13-1: Approach to HRA

Scoping Question 13.1:

Is Marine Scotland in agreement with the approach outlined for the HRA?

Scoping Question 13.2

Does Marine Scotland have existing templates or tables that set out how information should be provided? E.g. tabular / matrix formats?

14 Stakeholder engagement

14.1 Introduction

At the outset, when development of the Moray East site commenced in 2010 the developer made a commitment to work with the organisations, individuals and communities who have an interest in the development of the Zone whether as a result of their activities or their location in order to enable the development of offshore wind in the Outer Moray Firth to benefit from the considerable experience of the communities who live and work there, and to allow the wind farm to develop with the involvement of the individuals and organisations affected by and interested in the development.

Moray East has established strong relationships with local stakeholders and remains committed to engaging with communities, organisations and individuals, to address any concerns they may have. This will be achieved through the various processes including letters, meetings, events and exhibitions, newsletters and the Moray East website.

Stakeholder engagement is a key part of the EIA process. The aim of the engagement is to facilitate two way communications about the proposed wind farm consent application with all relevant stakeholders. This allows any environmental concerns to be identified at an early stage and provides the opportunity for the project team to ensure that these concerns can be adequately addressed during the EIA process. This scoping report and the meetings that have taken place to inform its content, are a key part of this process of facilitating early stakeholder engagement.

14.2 Previous stakeholder engagement on the Moray East ES 2012

As described above, extensive stakeholder engagement was undertaken as part of the Moray East ES 2012. An overview of consultation to date is presented in Table 14.1.

Table 14-1: Stakeholder consultation undertaken for the Moray East site to date

Consultation	Details
Pre-scoping and scoping consultation	Following the award of the ZDA for the Zone by The Crown Estate (TCE) in January 2010 a stakeholder engagement strategy was published in April 2010. Distribution of introductory letter about the proposed Telford, Stevenson and MacColl wind farms to stakeholders in August 2010. Scoping report launch event for key stakeholders in August 2010 attended by 37 stakeholders, ranging from representatives from Marine Scotland, elected councillors and MSPs, environmental and economic development organisations and members of local recreational groups. Series of 13 public local consultation events which took place between 30th August and 17th September 2010. A scoping report was submitted in August 2010. This report (Moray East Scoping Report, 2010) included an introduction to, and description of the Telford, Stevenson and MacColl wind farms (based on project design information available at the time), information on relevant planning and legislative requirements and an initial description of the site characterisation for the key EIA topics that could be affected by the project. The scoping report also identified a number of potential impacts that would need to be assessed in more detail as part of the EIA. The scoping report or Non-Technical Summary of scoping report was mailed to approximately 500 stakeholders as appropriate. The scoping consultation and the public exhibitions were advertised through local newspapers. Half–page, full colour adverts were placed in a number of local publications one week prior to the public exhibition taking place.

	Media coverage - In order to maximise the exposure of the proposals for the Telford, Stevenson and MacColl wind farms to the general public, a pro–active press approach was adopted for the scoping report Launch. Public opinion survey. A scoping opinion from Marine Scotland Licencing Operations Team (MS-LOT) was received on 21/11/2011.
Pre application consultation	Throughout the EIA, Moray East attended regular meetings with Marine Scotland, SNH, The Highland Council and others (as relevant) in order to keep them directly informed and up to date with progress of the project, discuss and agree the proposed scope of EIA studies and present the findings of the EIA as it progressed. Winter 2011 (November – December 2011) pre application consultation - In the period since the first programme of public engagement, considerable progress had been made in both environmental assessment and engineering development, allowing more detailed and specific information to be provided to the general public in advance of the applications for the Telford, Stevenson and MacColl wind farms being submitted for consent. The key activities of the pre–application consultation included: • Publication of a 'Project Update Brochure' • Series of pre application public exhibitions organised by the Moray Firth Partnership held at a number of locations throughout Aberdeenshire, Moray, Inverness and Caithness, between 23rd November and 7th December 2011; • Development of a computer model of landscape and visuals; and • Publication of a Draft Environmental Statement. Further details on some of the above are provided below. News releases issued to the local press: • Visuals & Socio–Economic Press Conference November 2011; and • Application Submission Press Conference July 2012. It was recognised that the development of offshore wind energy is a matter which has commanded particular interest on the political agenda. Therefore, steps were taken to engage with elected members of the Scottish, UK and European Parliaments. Twenty six MSPs and six MPs have direct constituency interests with the project, and engagement with these members was on–going throughout the EIA. Briefings of and meetings with local councils, councillors and community councils throughout the EA. Meetings with Scottish Enterprise, the Scottish Government's Economic Development staff, and with Marine Scotland with the aim of supporting the agencies which are responsible for local economic development and the development of supply chain industries. In order to deliver a high–quality Environmental Statement, and to allow key stakeholders to examine, discuss and seek to resolve potential issues before the publication of the final Environmental Statement, a Draft Environmental Statement was issued in December 2011. It was distributed to a list of key stakeholders (21 organisations in total) including Marine Scotland, Statutory Nature Conservation Agencies, NGO's and industry representation groups and associations. A series of follow–up meetings was organised with those stakeholders in the 3 months

	following issue. 19 meetings were agreed with stakeholders; and 18 written responses were received on the Draft ES.
Post application engagement	Following submission of the Application public notices were placed in national press (as specified by Marine Scotland/legislation) for a period of 2 weeks. Hard copies were made publicly available in key locations to facilitate inspection, in person, by members of the local communities in the vicinity of the project. This allowed the public an opportunity to review the application, ES or request a copy of the submission and a statutory public consultation period allowed written representations on the Telford, Stevenson and MacColl wind farms to be made. Given the significance of the Telford, Stevenson and MacColl wind farms and limited circulation of the papers within which the public notices of the original application were provided (within the project's geographical area) the statutory publication period for the public notices (two weeks) was not considered to meet Moray East's ongoing commitment to openness transparency, and accessibility of information for those organisations and individuals who live, work, or have an interest in the Moray Firth and its coastal communities. A post application engagement strategy was therefore devised and executed which comprised: • Issue of a press release; • Publication of the public notice in the Press and Journal; • Organisation of a series nine public exhibitions between 11th September and 2nd October 2012 at various locations throughout Aberdeenshire, Moray, Inverness and Caithness, the aim of which was to provide information including advice on how members of the public could participate in the Marine Scotland consultation; • Additional local advertising through local noticeboards, post offices, shops etc through the Moray Firth Partnership. The partnership also circulated details of the public exhibitions to some 1,200 organisations and individuals; and • Briefing by Rob Gibson MSP in the Scottish Parliament on 3rd October 2012 to 28 MSPs with either a geographical or committee interest in the project.
Post consent consultation and engagement	Since award of consent in 2014, Moray East has had meetings with Marine Scotland, SNH and others (as relevant) in relation to actions and documents produced with regards to the discharge of consent conditions for example a piling strategy to ensure impacts from underwater noise are not significant and a fish monitoring strategy to understand more about the fish sensitivities in the Moray Firth. Ongoing wider stakeholder engagement has taken place in the form of continued parliamentary briefings to MSPs and a briefing at Westminster (in 2015) for MPs and the Secretary of State for Energy. In addition, four supply chain events have been held (in Wick, Aberdeen, Inverness and Fraserburgh).

14.3 Stakeholder engagement for proposed wind farm consent application

Consultation with regards to the proposed wind farm consent application has already commenced. A series of meetings have been organised with key stakeholders to communicate the proposed design changes, and the consenting strategy associated with the proposed wind farm consent application. Issues raised during these meetings have been used to inform the specific content of this scoping report and the EIA methodologies presented herein.

Due to the large amount of EIA work previously undertaken as part of the Moray East ES 2012, it has been possible to use the scoping process to prepare a detailed scoping report, both in terms of being able to

confidently scope out those topics that do not require to be reassessed in the new application EIA, and provide detailed methodologies for those topics that require assessment. This 'front loading' of consultation to the scoping process will mean that consultation during the EIA can focus on presentation of study results and early agreement on the potential significance of impacts associated with the Design Envelope for the proposed wind farm consent application ahead of application submission.

On submission of the scoping report, Moray East will take the opportunity to issue a project update note to stakeholders.

A project update newsletter will be sent to all stakeholders on the database advising of the restructuring of the company. A non-technical summary of the Scoping Report will also be sent to relevant stakeholders, inviting comments, and the full scoping report will be made available at appropriate council offices etc. across the Moray Firth area. As with previous scoping reports, a series of public exhibitions will be held at locations around the Moray Firth, accompanied by appropriate advertisement through the local media to allow local feedback and opinion to be sought. The scoping report and feedback facilities will also be provided on the Moray East website.

A pre-application publication report will be prepared and submitted with the application for the proposed wind farm consent application. This will include:

- A description of the consultation event(s);
- A description of the information provided by Moray East at the event(s);
- Comments received by Moray East at the pre-application event(s);
- A description of amendments to be made to the Section 36 and Marine Licence applications;

Details of all stakeholder activities and responses / feedback from stakeholder engagement activities are recorded in a stakeholder database. The ES will also include a specific chapter on stakeholder engagement which will provide more information on the stakeholder engagement activities carried out as part of the EIA process, information / feedback received from these activities and details of how concerns or issues raised have been taken into account in the EIA process.

Consultation will continue beyond the submission of the application. Assuming successful award of consent for the proposed wind farm consent application, licence condition implementation, including the development of appropriate environmental monitoring protocols, will generally require continuing engagement and consultation with the regulators and their statutory consultees. In addition, Moray East will continue its communications with organisations and individuals who live, work, or have an interest in the Moray Firth and its coastal communities, to keep them informed of the project process and key milestones.

Communications with these stakeholder groups will be co-ordinated by Moray East Communications Manager, Craig Milroy.

Scoping Question 14.1

Does Marine Scotland agree with the approach to stakeholder engagement?

15 Structure of Environmental Statement (ES)

15.1 Introduction

The proposed structure of the ES is presented below.

The aim is to prepare a succinct, while robust ES which is proportionate to the scope of the EIA of the proposed wind farm consent application as defined in this scoping report. For the EIA topics requiring further assessment (ornithology, SLVIA, archaeology and cultural heritage (setting only), civil and military aviation and socio-economics) it is proposed that these are presented in standalone dedicated chapters. The structure of these chapters is presented below.

Where the assessments are supported by data collected as part of the Moray East 2012 ES, the relevant technical reports will be presented as supporting technical documents. Any updates to and/ and new site specific information will be incorporated directly into the into the site characterisations sections of each of the topic specific ES chapters.

With respect to the EIA topics that are being scoped out of the ES, a summary of the key findings presented in this scoping report will be incorporated into the front end sections of the ES. This will ensure fully traceability of the decisions made with regard to the scope of the EIA. It is also proposed that the table presented in Appendix A of this scoping report is included as an annex or appendix to the ES.

15.2 Structure of the ES

The proposed structure for proposed wind farm consent application ES is presented below:

- Glossary and abbreviations;
- Introduction and background including:
    - Requirements for change in Design Envelope; and
    - Legislation and policy.
- Project description including comparative appraisal of Design Envelope included in the Moray East ES 2012, the consent Design Envelope and the proposed design changes associated with the proposed wind farm consent application;
- Stakeholder engagement;
- Scoping summary – summary of the key findings as presented in this scoping report;
- Impact assessment approach and method;
- Findings from baseline validation exercises carried out for commercial fisheries and shipping and navigation;
- EIA topic specific assessment chapters (ornithology, SLVIA, archaeology and cultural heritage (setting only), civil and military aviation and socio-economics only (assuming baseline data is validated for both Shipping and Navigation and Commercial Fisheries)):
    - Site characterisation data sources and description (with relevant site specific technical studies completed for the Moray East ES 2012 provided as supporting documents;
    - Relevant legislation and guidance;
    - Key responses from consultation, including scoping, and how addressed in ES (presented in tabular format);
    - Key Design Envelope parameters (topic / receptor specific); and

  - Results from the assessment of impacts including mitigation measures, residual impacts, whole project assessment impacts and cumulative impacts.

- Summary chapter – summary of all impacts; and

Environmental management and monitoring.

A summary of key findings from the HRA will also be included where relevant e.g. ornithology.

Scoping Question 15.1

Does Marine Scotland agree with the proposed structure of the ES?

16 Complied list of Scoping Questions

Question ref	Scoping question
Chapter 1	
1.1	Does Marine Scotland agree that the following can be scoped out from the EIA for the proposed wind farm consent application: • Air quality, and • Airborne noise?
1.2	Does Marine Scotland agree that the EIA topics considered in this scoping report cover the factors requiring assessment under the EIA Directive 2014?
Chapter 2	
2.1	Does Marine Scotland agree with the approach to the scoping in / out topics and reporting of significant residual impacts for the proposed wind farm EIA?
2.2	Does Marine Scotland agree with the proposal that BOWL and potential future development within the Zone (i.e. Moray West) should be excluded from the CIA based on the fact that: • BOWL is now considered with the baseline (due to the commencement of construction in 2017), and • It will be requested that the Moray East application is determined before Moray West's?
2.3	Does Marine Scotland agree that the consented Telford, Stevenson and MacColl wind farms do not need to form part of the CIA?
2.4	Does Marine Scotland agree that the assessment of impacts should be based on the development scenario set out in 2.4.3?
2.5	Does Marine Scotland agree that the potential for transboundary impacts is unlikely?
Chapter 3	
3.1	Is the level of detail presented in the project description in this scoping report of sufficient detail to inform the proposed wind farm EIA. If not what further details would Marine Scotland expect to see presented in the ES?
Chapter 4	
4.1	Does Marine Scotland agree that no further work is required for validation of site characterisation data and impact assessment methods as part of the EIA (HRA is dealt with separately in Section 13) with regards to the following: • Physical environment and sediment processes; • Benthic ecology; • Fish and shellfish ecology; • Marine mammals; • Civil and military aviation; • Archaeology and cultural heritage; and

	• Other human activities?
4.2	Does Marine Scotland agree with the proposed approach for validation of site characterisation data for Commercial Fisheries and Shipping and Navigation?
Chapter 5	
5.1	Is Marine Scotland in agreement that the following disciplines do notrequire further assessment in the EIA to support the proposed wind farm consent application due to there being no changes in the conclusions on potential impacts presented in the Moray East ES 2012: • Physical environment and sediment processes; • Benthic ecology; • Fish and shellfish ecology; • Marine mammals; • Commercial fisheries; • Shipping and navigation; and • Other human activities?
5.2	Does Marine Scotland agree this Chapter has identified correctly the specific significant effects predicted in the Moray East 2012 which should be reported in the ES for the proposed wind farm application?
Chapter 6	
6.1	Is Marine Scotland in agreement with the list of new projects in Table 6-2 (excluding BOWL and Moray West) that need to be considered with respect to the CIA for the proposed windfarm consent application?
6.2	Is Marine Scotland in agreement that the following have been scoped out of the whole project and cumulative impacts for the proposed wind farm EIA due to their being no changes in the impacts predicted in the Moray East 2012 ES: • Physical environment and sediment processes; • Benthic ecology; • Fish and shellfish ecology; • Marine mammals; • Commercial fisheries; • Civil and military aviation; • Sipping and Navigation; and • Other human activities?
Chapter 8	
8.1	Is Marine Scotland in agreement with the following with regards to the proposed windfarm EIA for ornithology? • Have all the appropriate sources of data been identified to inform the site characterisation / baseline description?

	• Is the method of project specific impact assessment proposed appropriate? • Is the method of whole project and cumulative impact assessment proposed appropriate?
Chapter 9	
9.1	Is Marine Scotland in agreement with the following with regards to the proposed windfarm EIA for SLVIA? • Have all the appropriate sources of data been identified to inform the site characterisation / baseline description? • Is the method of project specific impact assessment proposed, including proposed VPs and approach to visualisations, appropriate? • Is the method of whole project and cumulative impact assessment proposed appropriate?
Chapter 10	
10.1	Is Marine Scotland in agreement with the following with regards to the proposed windfarm EIA for cultural heritage? • Have all the appropriate sources of data been identified to inform the site characterisation / baseline description? • Is the method of project specific impact assessment proposed appropriate? • Is the method of whole project and cumulative impact assessment proposed appropriate?
Chapter 11	
11.1	Is Marine Scotland in agreement with the following with regards to the proposed windfarm EIA for civil and military aviation? • Have all the appropriate sources of data been identified to inform the site characterisation / baseline description? • Is the method of project specific impact assessment proposed appropriate? • Is the method of whole project and cumulative impact assessment proposed appropriate?
Chapter 12	
12.1	Is Marine Scotland in agreement with the following with regards to the proposed windfarm EIA with regards to the socio economic impact assessment? • Have all the appropriate sources of data been identified to inform the site characterisation / baseline description? • Is the method of project specific impact assessment proposed appropriate? • Is the method of whole project and cumulative impact assessment proposed appropriate?
Chapter 13	
13.1	Is Marine Scotland in agreement with the approach outlined for the HRA?

13.2	Does Marine Scotland have existing templates or tables that set out how information should be provided? E.g. tabular / matrix formats?
Chapter 14	
14.1	Does Marine Scotland agree with the approach to stakeholder engagement?
Chapter 15	
15.1	Does Marine Scotland agree with the proposed structure of the ES?

Appendix A: Project specific impact appraisal table

Project specific impacts														
EIA Topic	**Impacts assessed in the Moray East EIA 2012 (OWF only)**	**Key receptors**	**Moray East ES 2012 assessed Worst Case Scenario (WCS) design envelope parameters**	**Predicted residual impact (post mitigation)**	**Reference to Moray East ES 2012**	**Do proposed design changes affect conclusions from Moray East ES 2012?**	**Justification**	**New / updated data since submission of Moray East ES in 2012?**	**Description of new / updated data**	**Does data affect conclusions from Moray East ES 2012?**	**Are the assessnent methods from Moray East EIA 2012 still valid?**	**Do new methods affect conclusions in Moray East ES 2012**	**Implications for Moray East ES 2012 impact assessment**	**Further assessment required in proposed EIA?**
Construction and decommissioning														
Physical environment and sediment processes	Increase in suspended sediment concentrations due to foundation installation activities.	Smith Bank.	GBS foundations. In particular dredging overspill at 30 kg / s and excavated area of 95 m diameter and 5 m depth.	Minor significance	Moray East ES 2012 Chapter 6.1. Tables 6.1-2 and 6.2-1 Impact Assessment Summary Table 6.1-3 and 6.2-2 Rochdale Envelope Parameters Relevant to the Hydrodynamics Effect and Sedimentary and Coastal Processes Assessment respectively	No	Design parameters for suction bucket foundation remain within the assessed WCS design envelope for GBS foundations. There will also be no change in WCS assessed for dredging overspill. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	No	Inclusion of BOWL In baseline. However, given that BOWL was considered as part of the CIA in the Moray East ES 2012 and that it has been consented (and is to be constructed soon within the parameters of what was considered in the Moray East ES), there will be no impact on the residual impacts in the Moray East ES 2012 from BOWL alone.	No	Yes	N/A	Impact assessment remains valid.	No
	Accumulation of sediment and change of sediment type at seabed due to foundation installation activities.	Smith Bank.	Jacket foundations. In particular drill arisings at 26 kg / s and other key parameters.	Minor significance		No	There will be no change to WCS design parameters for the jacket foundations. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	No		No	Yes	N/A	Impact assessment remains valid.	No
	Increased suspended sediment concentrations due to inter-array cable installation activities.	Smith Bank.	Jet trenching installation techniques Cable trench 1 m deep x 3 m wide.	Negligible significance		No	There will be no change in the assessed WCS design envelope for cable installation (jet trenching). Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	No		No	Yes	N/A	Impact assessment remains valid.	No
	Indentations on seabed due to jack up vessels and large anchors.	Smith Bank.	Four legged jack up with 100 m^2 footprint. Anchors 1.5 m to 3 m length.	Negligible significance		No	There will be no change in the assessed WCS design envelope associated with the use of jack-up vessels. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	No		No	Yes	N/A	Impact assessment remains valid.	No
Operations and maintenance														
Physical environment and sediment processes	Changes to sediment transport regime and geomorphology due to foundation presence, exposure of inter-array cables and cable protection measures.	Smith Bank.	GBS and jacket foundations (based on layouts with maximum number of turbines).	Not significant	Moray East ES 2012 Chapter 6.1. Tables 6.1-2 and 6.2-1 Impact Assessment Summary Table 6.1-3 and 6.2-2 Rochdale Envelope Parameters Relevant to the Hydrodynamics Effect and Sedimentary and Coastal Processes Assessment respectively	No	Design parameters for suction bucket foundations remain within the assessed WCS design envelope for GBS foundations. There will also be no change in design parameters for jacket foundations. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	No	Inclusion of BOWL In baseline. However, given that BOWL was considered as part of the CIA in the Moray East ES 2012 and that it has been consented (and is to be constructed soon within the parameters of what was considered in the Moray East ES), there will be no impact on the residual impacts in the Moray East ES 2012 from BOWL alone.	No	Yes	N/A	Impact assessment remains valid.	No
		Designated coastal habitats (as detailed in Moray East ES 2012 Technical Appendix 3.4 A).		Negligible significance		No		No		No	Yes	N/A	Impact assessment remains valid.	No
	Scour effects due to presence of turbine foundations.	Smith Bank.	GBS and jacket foundations.	Minor significance		No	Design parameters for suction bucket foundations will be within the assessed WCS design envelope for GBS foundations. There will also be no change in WCS design parameters for jacket foundations. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	No		No	Yes	N/A	Impact assessment remains valid.	No
	Scour effects due to exposure of inter-array cables and cable protection measures.	Smith Bank.	Inter-array cables and cable protection measures.	Negligible significance		No	There will be no change in the assessed WCS design parameters for inter-array cables and cable protection measures. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	No		No	Yes	N/A	Impact assessment remains valid.	No
	Changes to tidal regime due to presence of turbine foundations.	Smith Bank. Designated coastal habitats. Stratification Fronts. Recreational surfing venues.	GBS foundations (dimensions and excavated areas).	Negligible significance		No	Although suction buckets to be included in new consent as alternative foundation structure the design parameters for these remain within the assessed Worst Case Scenario (WCS) design envelope for GBS foundations. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	No		No	Yes	N/A	Impact assessment remains valid	No
	Changes to wave regime due to presence of turbine foundations.		GBS foundations (dimensions and excavated areas).	Negligible significance		No	As above. Design parameters for suction bucket foundations remain within the assessed WCS design envelope for GBS foundations. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	No		No	Yes	N/A	Impact assessment remains valid	No
Construction and decommissioning														
Benthic Ecology	Temporary direct seabed disturbance.	Sand and gravel sediment habitats and communities (biotopes).	Maximum footprint of 5.99 km^2 (2.03%) total area of the Moray East site including: dredged area for GBS foundations; inter-array cables; jack-up vessel spud cans; anchors; and one met mast.	Minor significance	Moray East ES 2012 Chapter 7.1. Table 7.1-1 Impact Assessment Summary Table 7.1-2 Rochdale Envelope Parameters Relevant to the Benthic Ecology Effect Assessment	No	Design parameters for suction buckets are within the WCS for GBS foundations. There will also be no changes in WCS design envelope with respect to inter-array cables, jack-up vessel spud cans, anchors or met mast. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	No	The Moray Firth is not considered to be a dynamic environment. Consequently it is considered highly unlikely that the benthic conditions within the site would have changed since submission of the Moray East ES in 2012. Extensive benthic ecological data was collected as part of the original assessment (see Moray East ES 2012 (Chapter 4.2 and Technical Appendix 4.2A). This data remains valid for the purpose of informing the scope of the EIA for the proposed wind farm consent. Inclusion of BOWL In baseline. However, given that BOWL was considered as part of the CIA in the Moray East ES 2012 and that it has been consented (and is to be constructed soon within the parameters of what was considered in the Moray East ES), there will be no impact on the residual impacts in the Moray East ES 2012 from BOWL alone.	No	Yes	N/A	Impact assessment remains valid.	No
	Temporary indirect (sediment) disturbance.	Sand and gravel sediment habitats and communities (biotopes).	Fine sediment from seabed preparation based on maximum number of turbines (339) and maximum length of inter-array cables (572 km).	Not significant - Minor		No	Design parameters for suction buckets are within the WCS for GBS foundations. No changes in WCS design envelope with respect to inter-array cables, jack-up vessel spud cans, anchors or met mast. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	No		No	Yes	N/A	Impact assessment remains valid.	No
	Deposition of sediment arisings from drilling of jacket pin piles.	Sand and gravel sediment habitats and communities (biotopes).	Footprint of 0.28 km2 (0.09% total seabed area of the Moray East site) based on maximum design parameters for drill arisings; maximum number of turbines (339) and four pin piles or jacket foundations.	Minor significance		No	There will be no change in the WCS design parameters relating to drill arisings from drilling of jacket foundation pin piles. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	No		No	Yes	N/A	Impact assessment remains valid.	No
	Seabed contamination as a result of accidental chemical release (construction).	Sand and gravel sediment habitats and communities (biotopes).	No specific information on design parameters available.	Minor significance	Moray East ES 2012 Chapter 7.1. Section 7.1.6.48	No	Given that there are no changes in the WCS design parameters proposed with respect to construction vessels / activities, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	No		No	Yes	N/A	Impact assessment remains valid.	No
Operation														
Benthic Ecology	Net reduction of area of seabed habitat.	Sand and gravel sediment habitats and communities (biotopes).	Maximum loss of 3.76 km2 of seabed habitats (1.27% total area of the Moray East site) based on maximum number of turbines (339) with GBS foundations. Includes inter-array cables.	Minor significance	Moray East ES 2012 Chapter 7.1.	No	Design parameters for suction buckets are within the WCS for GBS foundations. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	No	See below for information on data updates.	No	Yes	N/A	Impact assessment remains valid.	No

EIA Topic	Impacts assessed in the Moray East EIA 2012 (OWF only)	Key receptors	Moray East ES 2012 assessed Worst Case Scenario (WCS) design envelope parameters	Predicted residual impact (post mitigation)	Reference to Moray East ES 2012	Do proposed design changes affect conclusions from Moray East ES 2012?	Justification	New / updated data since submission of Moray East ES in 2012?	Description of new / updated data	Does data affect conclusions from Moray East ES 2012?	Are the assessment methods from Moray East EIA 2012 still valid?	Do new methods affect conclusions in Moray East ES 2012	Implications for Moray East ES 2012 impact assessment	Further assessment required in proposed EIA?
Project specific impacts														
Benthic Ecology	Habitat and associated community change due to introduction and colonisation of new hard structures on seabed.	Sand and gravel sediment habitats and communities (biotopes). Indigenous populations.	Maximum footprint of 2.63 km2 (0.89% total area of the Moray East site). Includes scour protection, maximum number of turbines (339) with GBS foundations (WCS).	Minor significance		No	Design parameters for suction buckets are within the WCS for GBS foundations. Also no changes in WCS design envelope with respect to scour protection. Therefore, there will be no change in impacts assessed for the Telford, Stevenson and MacColl wind farms.	No	The Moray Firth is not considered to be a dynamic environment. Consequently it is considered highly unlikely that the benthic conditions within the site would have changed since submission of the Moray East ES in 2012. Extensive benthic ecological data was collected as part of the original assessment (see Moray East ES 2012 (Chapter 4.2 and Technical Appendix 4.2A). This data remains valid for the purpose of informing the scope of the EIA for the proposed wind farm consent. Inclusion of BOWL In baseline. However, given that BOWL was considered as part of the CIA in the Moray East ES 2012 and that it has been consented (and is to be constructed soon within the parameters of what was considered in the Moray East ES), there will be no impact on the residual impacts in the Moray East ES 2012 from BOWL alone.	No	Yes	N/A	Impact assessment remains valid.	No
	Effects on physical processes and related biological changes.	Sand and gravel sediment habitats and communities (biotopes).	Secondary scour. Change in tidal flow and sediment transport rates (see Chapter 6 Physical Processes). Change in wave climate.	Not significant - minor	Moray East ES 2012 Chapter 7.1. Table 7.1-1 Impact Assessment Summary Table 7.1-2 Rochdale Envelope Parameters Relevant to the Benthic Ecology Effect Assessment	No	Although no specific parameters identified with regard this impact, given that there are no changes in the WCS design parameters associated with turbine foundations, inter-array cables, scouring protection, there will be no changes in the impacts assed for the Telford, Stevenson and MacColl wind farms.	No		No	Yes	N/A	Impact assessment remains valid.	No
	Temporary direct seabed disturbances during operation.	Sand and gravel sediment habitats and communities (biotopes). Physical processes (scour).	Maximum footprint of 0.71 km2 (0.24% total area of the Moray East site) based on maximum number of turbines (339) and total area of spud cans associated with jack-up vessels (O&M).	Not significant		No	There will be no change in the assessed WCS design envelope associated with the use of jack-up vessels. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	No		No	Yes	N/A	Impact assessment remains valid.	No
	Seabed contamination as a result of accidental chemical release (operation).	Sand and gravel sediment habitats and communities (biotopes). Water quality.	No specific information on design parameters available.	Minor significance		No	There are no changes in the WCS design parameters proposed with respect to use of sacrificial nodes and unit-fouling coatings. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	No		No	Yes	N/A	Impact assessment remains valid.	No
Construction and decommissioning														
Fish and shellfish ecology	Temporary disturbance to seabed.	Fish and shellfish	WCS for both GBS and jacket foundations (based maximum number of turbines (339)), inter-array cables (maximum length 572 km and maximum cable trench width and depth (6 m by 1 m).	Minor significance	Moray East ES 2012 Chapter 7.2 Table 7.2-1 Impact Assessment Summary Table 7.2-2 Rochdale Envelope Parameters Relevant to the Fish and Shellfish Ecology Assessment	No	Design parameters for suctions buckets are within the WCS design parameters for GBS foundations. There will also be no changes in the assessed WCS design parameters for jacket foundations or inter-array cables (total length and trench dimensions). Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes (for sandeel and cod only)	Sandeel surveys were carried out by Moray East in 2012 (results included in the Moray East ES). In addition to this BOWL carried out sandeel surveys in 2014. These reported similar findings to the Moray East survey which indicates that the sandeel distribution associated with the Moray East site is patchy and low numbers. Moray East is also committed to carrying out pre-construction herring surveys and pre and post construction sandeel surveys in the original Stevenson and MacColl areas.	No	Yes	N/A	Impact assessment remains valid.	No
		Herring		Minor significance		No								
		Sandeel		Minor significance		No								
	Noise	Plaice	Maximum number of turbines (339). Maximum pile diameter for jacket pin piles (2.5 m). Maximum number of pin piles = four. Maximum number of simultaneous piling operations = six. Met mast monopile diameter = 4.5 m.	Minor significance		No	There will be changes in the assessed WCS design parameters for jacket foundations. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes (for sandeel and cod only)	In addition to the sandeel surveys described above, Moray East carried out cod surveys in 2013. These found cod densities to be very low across the Moray East site, with spawning concentrated (although still at very low concentrations) to the south of the Moray East site and within the south east corner of the Moray East site. Cod surveys carried out by BOWL in 2014 report similar findings to the Moray East surveys. Inclusion of BOWL In baseline.	No	Yes	N/A	Impact assessment remains valid.	No
		Salmon and sea trout		Minor significance		No								
		Cod		Minor significance		No								
		Whiting		Minor significance		No								
		Herring		Minor significance		No								
		Larvae and Glass eels		Minor significance		No								
		Shellfish		Minor significance		No								
Operation														
Fish and shellfish ecology	Loss of habitat	Fish and shellfish	Maximum net reduction of seabed habitat of 3.76 km2 (1.27 %) based on maximum GBS foundation diameter (65 m), scour protection, cable protection measures for maximum number of turbines (339) and maximum length of inter-array cable (572 m).	Not significant	Moray East ES 2012 Chapter 7.2 Table 7.2-1 Impact Assessment Summary Table 7.2-2 Rochdale Envelope Parameters Relevant to the Fish and Shellfish Ecology Assessment	No	Design parameters for suctions buckets are within the WCS design parameters for GBS foundations. There will also be no changes in the assessed WCS design parameters for jacket foundations or inter-array cables (total length and trench dimensions). Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes (for sandeel and cod - only see above)	With respect to herring spawning, Moray East is committed to carrying pre-construction herring spawning surveys in the August / September prior to construction commencing. Herring spawning surveys were carried out by BOWL in 2014. These support the conclusions within the Moray East ES that herring spawning occurs to the north of the Moray East site and beyond a distance at which any significant noise impacts are likely to occur.	No	Yes	N/A	Impact assessment remains valid.	No
		Spawning herring		Minor significance		No								
		Sandeel		Minor significance		No								
	Introduction of new habitat	Fish and shellfish	Maximum footprint of 2.63 km2 (0.89% total area of the Moray East site). Includes scour protection, maximum number of turbines (339) with GBS foundations (WCS) and inter-array cable protection.	Minor significance (positive)		No	Design parameters for suction buckets are within the WCS design parameters for GBS foundations. There will also be no changes in the assessed WCS design parameters for scour protection and inter-array cable protection. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	No (see above sections relating sandeel, cod and herring	N/A	No	Yes	N/A	Impact assessment remains valid.	No
		Edible crab		Minor significance (positive)		No			N/A	No	Yes	N/A	Impact assessment remains valid.	No
	EMF	Elasmobranchs	Inter-array cable parameters: AC cables, maximum voltage 66 kV, maximum inter-array cable length of 572 km and trench depth 1 m.	Minor significance	Moray East ES 2012 Chapter 7.2 Table 7.2-1 Impact Assessment Summary Table 7.2-2 Rochdale Envelope Parameters Relevant to the Fish and Shellfish Ecology Assessment	No	There will be no change in the assessed WCS design parameters for inter-array cables in terms of transmission type (AC) and maximum voltage (66 kV). Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	No	As yet, no new data has been collected for Atlantic salmon. However, Moray East has committed to carrying out surveys which would aim to increase the knowledge on the behaviour of Atlantic salmon and sea trout in the Moray Firth and contribute to the National Strategy for Monitoring of Diadromous Fish.	No	Yes	N/A	Impact assessment remains valid.	No
		River and sea lamprey		Minor significance		No								
		Salmon and sea trout		Minor significance		No								
		European eel		Minor significance		No								
		Other fish species		Minor significance		No								
		Shellfish species		Minor significance		No								
	Operational noise	All fish	Maximum number of turbines (339).	Minor significance		No	The maximum number of turbines for the new consent is within (less than) the assessed WCS of 339 turbines. The minimum spacing (1200 m x 1050 m) is also within the assessed WCS spacing between turbines (840 m x 600 m minimum). Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	No	N/A	No	Yes	N/A	Impact assessment remains valid.	No
		Cod		Minor significance		No		Yes (see above for additional data on cod)	See above	No	Yes	N/A	Impact assessment remains valid.	No
	Changes to fishing activities	All fish	Maximum number of turbines (339).	Minor significance		No	The maximum number of turbines for the new consent is within (less than) the assessed WCS of 339 turbines. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes for cod, sandeel and herring	See above	No	Yes	N/A	Impact assessment remains valid.	No

Project specific impacts														
EIA Topic	**Impacts assessed in the Moray East EIA 2012 (OWF only)**	**Key receptors**	**Moray East ES 2012 assessed Worst Case Scenario (WCS) design envelope parameters**	**Predicted residual impact (post mitigation)**	**Reference to Moray East ES 2012**	**Do proposed design changes affect conclusions from Moray East ES 2012?**	**Justification**	**New / updated data since submission of Moray East ES in 2012?**	**Description of new / updated data**	**Does data affect conclusions from Moray East ES 2012?**	**Are the assessnent methods from Moray East EIA 2012 still valid?**	**Do new methods affect conclusions in Moray East ES 2012**	**Implications for Moray East ES 2012 impact assessment**	**Further assessment required in proposed EIA?**
Construction and decommissioning														
Marine mammals	Disturbance / displacement due to noise from construction activities (vessels and piling)	Harbour seal Grey seal Harbour porpoise Bottlenose dolphin Minke whale	WCS based jacket foundations: Maximum number of turbines (339) Maximum pin pile diameter (2.5 m) Maximum number of pin piles = four Maximum number of simultaneous piling operations = six. Met mast monopile diameter = 4.5 m Also noise from construction vessels	Potential significant short term impact. No significant long term impact	Moray East ES 2012 Chapter 7.3 Table 7.3-1 Impact Assessment Summary Table 7.3-2 Rochdale Envelope Parameters Relevant to the Marine Mammal Impact Assessment	No	There will be no changes in the assessed WCS design parameters for jacket foundations (in particular with regard to number of pin piles per foundation and diameter). There will also be no change in assessed WCS design parameters for number and type of construction vessels and frequency of movements. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes	Moray East has been monitoring marine mammals in the Moray Firth as part of the Marine Mammal Monitoring Programme (Thompson, 2014), since 2014. Additional seal monitoring has also been undertaken in the Moray Firth by the Sea Mammal Research Unit (SMRU). This observed that harbour seal numbers have fluctuated over a number of years with numbers of seals in some haul out sites increasing and other decreasing (SCOS, 2015). Also a number of studies carried out (e.g. Russell et al., 2016) and Thompson et al., 2013) in the Moray Firth and other regions. These conclude that assumptions about the scale of disturbance to marine mammals from piling noise was highly conservative. Continued monitoring has shown an increase in population of bottlenose dolphin. However, there has been no sign of recovery in harbour seal populations. WhisIt the seal assessment framework in the Moray East ES 2012 considered an increasing population, other scenarios with stable population levels were considered. These indicate that long term population trends were dominated by other external drivers rather than the windfarm construction. New Management Units were introduced in 2015 for key cetacean species including harbour porpoise, bottlenose dolphin and minke whale. However, no significant changes have been identified that would invalidate the findings from the original Moray East site EIA impact assessment for marine mammals. Inclusion of BOWL in baseline	No	Yes	N/A	Impact assessment remains valid.	No
	Hearing damage due to noise from construction activities (vessels and piling)		WCS based jacket foundations: Maximum number of turbines (339) Maximum pin pile diameter (2.5 m) Maximum number of pin piles = four Maximum number of simultaneous piling operations = six. Met mast monopile diameter = 4.5 m	Potential significant short term impact. No significant long term impact		No	There will be no changes in the assessed WCS design parameters for jacket foundations (in particular with regard to number of pin piles per foundation and diameter). Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes		No	Yes	N/A	Impact assessment remains valid.	No
	Collision risk with vessels involved in construction activities (note to add on ducted propellers)		Increase in vessel movements and presence during construction.	No significant short or long term impact		No	There will be no change in assessed WCS design parameters for number and type of construction vessels and frequency of movements. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes		No	Yes	N/A	Impact assessment remains valid.	No
	Reduction in prey sources		Secondary effects resulting from changes in prey distribution and density. Assessed WCS = GBS foundations for maximum of 339 turbines. 65 m diameter. Also piling noise on prey species (fish)	No significant short or long term impact		No	Design parameters for suction bucket foundations remain within the assessed WCS design envelope for GBS foundations. There will also be no change in WCS design parameters for jacket foundations (in particular in relation to number of pin piles (4) and pin pile diameters). Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes		No	Yes	N/A	Impact assessment remains valid.	No
	Reduction in foraging ability (due to increased turbidity from seabed disturbance / sediment suspension)		Secondary effects due to increased suspended sediment associated with construction activities / seabed disturbance (discussed in Moray East ES 2012 Chapter 6.2)	No significant short or long term impact		No	Design parameters for suction buckets are within the WCS for GBS foundations. No changes in WCS design envelope with respect to inter-array cables, jack-up vessel spud cans, anchors or met mast. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes		No	Yes	N/A	Impact assessment remains valid.	No
Operation														
Marine mammals	Barrier to movement / displacement due to noise from operational turbines	Harbour seal Grey seal Harbour porpoise Bottlenose dolphin Minke whale	Maximum number of turbines (339) Minimum spacing between turbines (840 m x 600 m) WCS based on 7 MW turbines	Not significant	Moray East ES 2012 Chapter 7.3 Table 7.3-1 Impact Assessment Summary Table 7.3-2 Rochdale Envelope Parameters Relevant to the Marine Mammal Impact Assessment	No	The maximum number of turbines for the new consent is within (less than) the assessed WCS of 339 turbines. There minimum spacing (1200 m x 1050 m) is also within the assessed WCS spacing between turbines (840 m x 600 m minimum). Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes	Moray East has been monitoring marine mammals in the Moray Firth as part of the Marine Mammal Monitoring Programme (Thompson, 2014), since 2014. Additional seal monitoring has also been undertaken in the Moray Firth by the Sea Mammal Research Unit (SMRU). This observed that harbour seal numbers have fluctuated over a number of years with numbers of seals in some haul out sites increasing and other decreasing (SCOS, 2015). Also a number of studies carried out (e.g. Russell et al., 2016) and Thompson et al., 2013) in the Moray Firth and other regions. These conclude that assumptions about the scale of disturbance to marine mammals from piling noise was highly conservative. Continued monitoring has shown an increase in population of bottlenose dolphin. However, there has been no sign of recovery in harbour seal populations. WhisIt the seal assessment framework in the Moray East ES 2012 considered an increasing population, other scenarios with stable population levels were considered. These indicate that long term population trends were dominated by other external drivers rather than the windfarm construction. New Management Units were introduced in 2015 for key cetacean species including harbour porpoise, bottlenose dolphin and minke whale. However, no significant changes have been identified that would invalidate the findings from the original Moray East site EIA impact assessment for marine mammals Inclusion of BOWL in baseline	No	Yes	N/A	Impact assessment remains valid.	No
	Collision risk with vessels involved in O&M activities		Increase in vessel movements and presence during operation	Not significant		No	There be no change in assessed WCS design parameters for number and type of vessels involved in O&M activities and frequency of vessel movements. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes		No	Yes	N/A	Impact assessment remains valid.	No
	Stranding due to electromagnetic fields (EMF)		AC inter-array cables Maximum transmission voltage 66 kV Cable trench depth 1 m	Not significant		No	There will be no change in the assessed WCS design parameters for inter-array cables in terms of transmission type (AC) and maximum voltage (66 kV). Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes		No	Yes	N/A	Impact assessment remains valid.	No
	Long term changes in prey availability		Secondary effects due to changes in prey distribution or density due to habitat loss or avoidance due to operational noise	Not significant		No	The maximum number of turbines for the new consent is within (less than) the assessed WCS of 339 turbines. There minimum spacing (1200 m x 1050 m) is also within the assessed WCS spacing between turbines (840 m x 600 m minimum). Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes		No	Yes	N/A	Impact assessment remains valid.	No
	Toxic contamination		Sacrificial nodes and anti-fouling coatings	Not significant		No	There are no changes in the WCS design parameters proposed with respect to use of sacrificial nodes and unit-fouling coatings. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes		No	Yes	N/A	Impact assessment remains valid.	No
Construction, decommissioning and operation														
Ornithology	Disturbance / Displacement	Fulmar	Displacement from array area of the three wind farms.	Minor significance	Moray East ES 2012 Chapter 7.4 Table 7.4-1 Impact Assessment Summary Table 7.4-2 Rochdale Envelope Parameters Relevant to the Ornithological Impact Assessment	Yes	Impact may be assessed on individual turbine basis	Yes	New population count data for East Caithness Cliffs SPA and North Caithness Cliffs SPA. Recent (2016 / 2017) designation of pSPAs and East Caithness Cliffs NCMPA Inclusion of BOWL in basline	To be determined based on additional site characterisation work carried out as part of the EIA.	No	Updated displacement analysis required.	Potential	Yes
	Collision risk		Collision - 139 x 3.6 MW turbines and 144 x 7 MW turbines.	Not significant		No	Although change in turbine design parameters collision risk = negligible risk for fulmar. Change in parameters not expected to affect collisions from assessment	Yes			No	CRM to be updated.	Impact assessment remains valid.	No
	Barrier to movement		Barrier effects - diameter of array area.	Minor significance		No	Impact remains within assessed WCS for Telford, Stevenson and MacColl wind farms	Yes			Yes	N/A	Impact assessment remains valid.	No
	Disturbance / Displacement	Gannet	Displacement from array area of the three wind farms.	Minor significance		Yes	Impact may be assessed on individual turbine basis	Yes			No	Updated displacement analysis required.	Potential	Yes
	Barrier to movement		Barrier effects - diameter of array area.	Minor significance		No	Impact remains within assessed WCS for Telford, Stevenson and MacColl wind farms	Yes			Yes	N/A	Impact assessment remains valid.	No
	Collision risk		Collision - 139 x 3.6 MW turbines and 144 x 7 MW turbines.	Moderate significance		Yes	Change in proposed turbines has implications for collision risk modelling	Yes			No	CRM to be updated.	Potential	Yes

Project specific impacts														
EIA Topic	**Impacts assessed in the Moray East EIA 2012 (OWF only)**	**Key receptors**	**Moray East ES 2012 assessed Worst Case Scenario (WCS) design envelope parameters**	**Predicted residual impact (post mitigation)**	**Reference to Moray East ES 2012**	**Do proposed design changes affect conclusions from Moray East ES 2012?**	**Justification**	**New / updated data since submission of Moray East ES in 2012?**	**Description of new / updated data**	**Does data affect conclusions from Moray East ES 2012?**	**Are the assessment methods from Moray East EIA 2012 still valid?**	**Do new methods affect conclusions in Moray East ES 2012**	**Implications for Moray East ES 2012 impact assessment**	**Further assessment required in proposed EIA?**
Ornithology	Disturbance / Displacement	Kittiwake	Displacement from array area of the three wind farms.	Minor significance	Moray East ES 2012 Chapter 7.4 Table 7.4-1 Impact Assessment Summary Table 7.4-2 Rochdale Envelope Parameters Relevant to the Ornithological Impact Assessment	Yes	Impact may be assessed on individual turbine basis	Yes	New population count data for East Caithness Cliffs SPA and North Caithness Cliffs SPA. Recent (2016 / 2017) designation of pSPAs and East Caithness Cliffs NCMPA Inclusion of BOWL in basline	To be determined based on additional site characterisation work carried out as part of the EIA.	No	Updated displacement analysis required.	Potential	Yes
	Barrier to movement		Barrier effects - diameter of array area.	Minor significance		No	Impact remains within assessed WCS for Telford, Stevenson and MacColl wind farms	Yes			Yes	N/A	Impact assessment remains valid.	No
	Collision risk		Collision - 139 x 3.6 MW turbines and 144 x 7 MW turbines.	Minor significance		Yes	Change in proposed turbines has implications for collision risk modelling	Yes			No	CRM to be updated.	Potential	Yes
	Disturbance / Displacement	Herring gull	Displacement from array area of the three wind farms.	Minor significance		Yes	Impact may be assessed on individual turbine basis	Yes			No	Updated displacement analysis required.	Potential	Yes
	Barrier effect		Barrier effects - diameter of array area.	Not significant		No	Herring gull identified as having negligible risk in terms of barrier effects	Yes			Yes	N/A	Impact assessment remains valid.	No
	Collision risk		Collision - 139 x 3.6 MW turbines and 144 x 7 MW turbines.	Moderate significance		Yes	Change in proposed turbines has implications for collision risk modelling	Yes			No	CRM to be updated.	Potential	Yes
	Disturbance / Displacement	Great black-backed gull	Displacement from array area of the three wind farms.	Minor significance		No	Impact remains within assessed WCS for Telford, Stevenson and MacColl wind farms	Yes			No	Updated displacement analysis required.	Potential	Yes
	Collision risk		Collision - 139 x 3.6 MW turbines and 144 x 7 MW turbines.	Minor significance		Yes	Change in proposed turbines has implications for collision risk modelling	Yes			No	CRM to be updated.	Potential	Yes
	Disturbance / Displacement	Guillemot	Displacement from array area of the three wind farms.	Minor significance		No	Impact remains within assessed WCS for Telford, Stevenson and MacColl wind farms	Yes			No	Updated displacement analysis required.	Potential	Yes
	Collision risk		Collision - 139 x 3.6 MW turbines and 144 x 7 MW turbines.	Not significant		No	Although change in turbine design parameters collision risk = negligible risk for guillemot. Change in parameters not expected to affect collisions from assessment	Yes			No	N/A as potential for impact negligible	Impact assessment remains valid.	No
	Barrier effects		Barrier effects - diameter of array area.	Minor significance		No	Impact remains within assessed WCS for Telford, Stevenson and MacColl wind farms	Yes			Yes	N/A	Impact assessment remains valid.	No
	Disturbance / Displacement	Razorbill	Displacement from array area of the three wind farms.	Minor significance		No	Impact remains within assessed WCS for Telford, Stevenson and MacColl wind farms	Yes			No	Updated displacement analysis required.	Potential	Yes
	Collision		Collision - 139 x 3.6 MW turbines and 144 x 7 MW turbines.	Not significant		No	Although change in turbine design parameters collision risk = negligible risk for razorbill. Change in parameters not expected to affect collisions from assessment	Yes			No	N/A as potential for impact negligible	Impact assessment remains valid.	No
	Barrier effects		Barrier effects - diameter of array area.	Minor significance		No	Impact remains within assessed WCS for Telford, Stevenson and MacColl wind farms	Yes			Yes	N/A	Impact assessment remains valid.	No
	Disturbance / Displacement	Puffin	Displacement from array area of the three wind farms.	Minor significance		No	Impact remains within assessed WCS for Telford, Stevenson and MacColl wind farms	Yes			No	Updated displacement analysis required.	Potential	Yes
	Collision		Collision - 139 x 3.6 MW turbines and 144 x 7 MW turbines.	Not significant		No	Although change in turbine design parameters collision risk = negligible risk for puffin. Change in parameters not expected to affect collisions from assessment	Yes			No	N/A as potential for impact negligible	Impact assessment remains valid.	No
	Barrier effects		Barrier effects - diameter of array area.	Minor significance		No	Impact remains within assessed WCS for Telford, Stevenson and MacColl wind farms	Yes			Yes	N/A	Impact assessment remains valid.	No
	Collision risk	Pink-footed goose	Collision - 139 x 3.6 MW turbines and 144 x 7 MW turbines.	Minor significance		Yes	Change in proposed turbines has implications for collision risk modelling	Yes	N/A	No	No	CRM to be updated.	Yes	Yes
	Disturbance / Displacement		Displacement	Not significant		No	Pink-footed goose no risk from displacement / disturbance	No	N/A	No	Yes	N/A	Impact assessment remains valid.	No
	Barrier effects		Barrier effects - diameter of array area.	Minor significance		No	Impact remains within assessed WCS for Telford, Stevenson and MacColl wind farms	No	N/A	No	Yes	N/A	Impact assessment remains valid.	No
	Collision risk	Greylag goose	Collision - 139 x 3.6 MW turbines and 144 x 7 MW turbines.	Minor significance		Yes	Change in proposed turbines has implications for collision risk modelling	No	N/A	No	No	CRM to be updated.	Potential	Yes
	Disturbance / Displacement		Displacement	Not significant		No	Greylag goose no risk from displacement / disturbance	No	N/A	No	Yes	N/A	Impact assessment remains valid.	No
	Barrier effects		Barrier effects - diameter of array area.	Minor significance		No	Impact remains within assessed WCS for Telford, Stevenson and MacColl wind farms	No	N/A	No	Yes	N/A	Impact assessment remains valid.	No

Project specific impacts													
EIA Topic	**Impacts assessed in the Moray East EIA 2012 (OWF only)**	**Key receptors**	**Moray East ES 2012 assessed Worst Case Scenario (WCS) design envelope parameters**	**Predicted residual impact (post mitigation)**	**Reference to Moray East ES 2012**	**Do proposed design changes affect conclusions from Moray East ES 2012?**	**Justification**	**New / updated data since submission of Moray East ES in 2012?**	**Description of new / updated data**	**Does data affect conclusions from Moray East ES 2012?**	**Are the assessnent methods from Moray East EIA 2012 still valid?**	**Do new methods affect conclusions in Moray East ES 2012**	**Implications for Moray East ES 2012 impact assessment**	**Further assessment required in proposed EIA?**
Construction and decommissioning													
Commercial fisheries	Adverse effects on target species (commercial fish and shellfish populations)	All target species	WCS for both GBS and jacket foundations (based maximum number of turbines (339)), inter-array cables (maximum length 572 km and maximum cable trench width and depth (6 m by 1 m).	Minor significance	Moray East ES 2012 Chapter 8.1 Table 8.1-1 Impact Assessment Summary Table 8.1-3 Summary of Worst Case Parameters for Commercial Fisheries	No	Suction bucket foundations are within assessed WCS design parameters for GBS foundations. There will also be no changes in the assessed WCS design parameters for inter-array cables. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes	Data on landings from within ICES rectangle 45E7 is published by Marine Scotland on an annual basis. The Moray East ES 2012 presented data on landings from 2001 to 2010. A review of additional landings data for the period 2011 to 2015 (most recent) will be undertaken as part of the site characterisation validation. This data indicates that there has been a change in the value of landings for key target species with decreases in Nephrops and increases in squid and white fish. It is proposed that further work is carried out as part of the EIA in order to determine wether any changes may have occurred and to determine whether there are any implications for the proposed wind farm consent application. Since submission of the Moray East ES in 2012, Moray East has continued to engage with the fishing industry and has agreed a Mitigation Strategy to be implemented during construction and operation of consented Telford, Stevenson and MacColl wind farms. Inclusion of BOWL in baseline	To be determined based on additional site characterisation work carried out as part of the EIA.	Yes	N/A	Impact assessment expected to remain valid as new design parameters within assessed WCS with regard to commercial fisheries	Validation of ICES data required
	Adverse effects on recreational fish populations	All target species	WCS for both GBS and jacket foundations (based maximum number of turbines (339)), inter-array cables (maximum length 572 km and maximum cable trench width and depth (6 m by 1 m).	Minor - moderate significance		No	Suction bucket foundations are within assessed WCS design parameters for GBS foundations. There will also be no changes in the assessed WCS design parameters for inter-array cables. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes			Yes	N/A		Validation of ICES data required
	Complete loss or restricted access to traditional fishing grounds	Scallop	WCS for GBS foundations Maximum number of turbines (339) Maximum number of met masts (2) Diamond layout Minimum spacing (840 m x 600 m) Max inter-array cable length (572 km) Maximum number of construction vessels (six) each with 500 m exclusion zone Maximum number of incomplete infrastructure with safety zones (50 m)	Moderate significance		No	Design parameters for suction buckets are within the WCS design parameters for GBS foundations. The maximum number of turbines for the new consent is within (less than) the assessed WCS of 339 turbines. There minimum spacing (1200 m x 1050 m) is also within the assessed WCS spacing between turbines (840 m x 600 m minimum). There will also be no changes in the assessed WCS design parameters for inter-array cables (total length, burial depth) and no changes in number of construction vessels and requirements for safety zones (500 m). Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes			Yes	N/A		Validation of ICES data required
		Squid		Moderate significance		No		Yes			Yes	N/A		Validation of ICES data required
		White fish		Minor significance		No		Yes			Yes	N/A		Validation of ICES data required
	Safety issues for fishing vessels	All fisheries	WCS based on: Maximum number of turbines (339) Maximum inter-array cable length (572 km) Incomplete installation of inter-array cables.	Within acceptable safety limits		No	The maximum number of turbines for the new consent is within (less than) the assessed WCS of 339 turbines. There will also be no change in the assessed WCS design parameters for inter-array cables. Therefore there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes			Yes	N/A		Validation of ICES data required
	Increased steaming time to fishing grounds	All fisheries	Maximum of six safety zones (based on maximum of six construction vessels) Each safety exclusion zone = 500 m. Additional 50 m safety exclusion zone applied to installed infrastructure.	Minor significance		No	The number of construction vessels will be within the assessed WCS (six vessels). Each vessel is likely to require a 500 m safety zone. There may also remain a requirement for a 50 m safety exclusion zone applied to installed infrastructure. Therefore there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes			Yes	N/A		Validation of ICES data required
	Displacement of fishing vessels into other areas	Scallop	WCS for GBS foundations Maximum number of turbines (339) Maximum number of met masts (2) Diamond layout Minimum spacing (840 m x 600 m) Max inter-array cable length (572 km) Maximum number of construction vessels (six) each with 500 m exclusion zone Maximum number of incomplete infrastructure with safety zones (50 m) Maximum of six safety zones Each safety exclusion zone = 500 m. Additional 50 m safety exclusion zone applied to installed infrastructure .	Moderate significance		No	Design parameters for suction buckets are within the WCS design parameters for GBS foundations. The maximum number of turbines for the new consent is within (less than) the assessed WCS of 339 turbines. There minimum spacing (1200 m x 1050 m) is also within the assessed WCS spacing between turbines (840 m x 600 m minimum). There will also be no changes in the assessed WCS design parameters for inter-array cables (total length, burial depth) and no changes in number of construction vessels and requirements for safety zones (500 m). Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes			Yes	N/A		Validation of ICES data required
		Squid		Moderate significance		No		Yes			Yes	N/A		Validation of ICES data required
		White fish		Minor significance		No		Yes			Yes	N/A		Validation of ICES data required
	Interference with fishing activities	All fisheries except crab and lobster	Location of port of construction. Maximum number of construction vessels (six).	Minor significance		No	The number of construction vessels will be within the assessed WCS (six vessels). Therefore there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes			Yes	N/A		Validation of ICES data required
		Crab and lobster		Minor significance		No		Yes			Yes	N/A		Validation of ICES data required
	Temporary disturbance to seabed	Salmon and sea trout	See Table 7.2-2 Rochdale Envelope Parameters Relevant to the Fish and Shellfish Ecology Assessment for more information. Specific design parameters not included in Chapter 8.1.	Assessed in Chapter 7.2		No	See fish and shellfish above	Yes			Yes	N/A		Validation of ICES data required
	Noise	Salmon and sea trout		Assessed in Chapter 7.2		No	See fish and shellfish above	Yes			Yes	N/A		Validation of ICES data required
Operation													
Commerical fisheries	Adverse effects on target species (commercial fish and shellfish populations)	All target species	WCS for both GBS and jacket foundations (based maximum number of turbines (339)), inter-array cables (maximum length 572 km and maximum cable trench width and depth (6 m by 1 m)	Minor significance	Moray East ES 2012 Chapter 8.1 Table 8.1-1 Impact Assessment Summary Table 8.1-3 Summary of Worst Case Parameters for Commercial Fisheries	No	Suction bucket foundations are within assessed WCS design parameters for GBS foundations. There will also be no changes in the assessed WCS design parameters for inter-array cables. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes	Data on landings from within ICES rectangle 45E7 is published by Marine Scotland on an annual basis. The Moray East ES 2012 presented data on landings from 2001 to 2010. A review of additional landings data for the period 2011 to 2015 (most recent) will be undertaken as part of the site characterisation validation. This data indicates that there has been a change in the value of landings for key target species with decreases in Nephrops and increases in squid and white fish. It is proposed that further work is carried out as part of the EIA in order to determine wether any changes may have occurred and to determine whether there are any implications for the proposed wind farm consent application. Since submission of the Moray East ES in 2012, Moray East has continued to engage with the fishing industry and has agreed a Mitigation Strategy to be implemented during construction and operation of consented Telford, Stevenson and MacColl wind farms.	To be determined based on additional site characterisation work carried out as part of the EIA.	Yes	N/A	Impact assessment expected to remain valid as new design parameters within assessed WCS with regard to commercial fisheries	Validation of ICES data required
	Adverse effects on recreational fish populations	All target species	WCS for both GBS and jacket foundations (based maximum number of turbines (339)), inter-array cables (maximum length 572 km and maximum cable trench width and depth (6 m by 1 m).	Minor significance		No	Suction bucket foundations are within assessed WCS design parameters for GBS foundations. There will also be no changes in the assessed WCS design parameters for inter-array cables. Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes			Yes	N/A		Validation of ICES data required
	Complete loss or restricted access to traditional fishing grounds	Scallop	WCS for GBS foundations (diameter 65 m) Maximum number of turbines (339) Maximum number of met masts (2) Diamond layout Minimum spacing (840 m x 600 m) Maximum inter-array cable length (572 km) Maximum unburied sections of inter-array cable protected by concrete mattresses Minimum burial of inter-array cable	Minor to moderate		No	Design parameters for suction buckets are within the WCS design parameters for GBS foundations. The maximum number of turbines for the new consent is within (less than) the assessed WCS of 339 turbines. There minimum spacing (1,200 m x 1,050 m) is also within the assessed WCS spacing between turbines (840 m x 600 m minimum). There will also be no changes in the assessed WCS design parameters for inter-array cables (total length, burial depth) and no changes in number of construction vessels and requirements for safety zones (500 m). Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes			Yes	N/A		Validation of ICES data required

EIA Topic	Impacts assessed in the Moray East EIA 2012 (OWF only)	Key receptors	Moray East ES 2012 assessed Worst Case Scenario (WCS) design envelope parameters	Predicted residual impact (post mitigation)	Reference to Moray East ES 2012	Do proposed design changes affect conclusions from Moray East ES 2012?	Justification	New / updated data since submission of Moray East ES in 2012?	Description of new / updated data	Does data affect conclusions from Moray East ES 2012?	Are the assessnent methods from Moray East EIA 2012 still valid?	Do new methods affect conclusions in Moray East ES 2012	Implications for Moray East ES 2012 impact assessment	Further assessment required in proposed EIA?
Project specific impacts														
Commerical fisheries	Complete loss or restricted access to traditional fishing grounds	Squid	WCS for GBS foundations (diameter 65 m) Maximum number of turbines (339) Maximum number of met masts (2) Diamond layout Minimum spacing (840 m x 600 m) Maximum inter-array cable length (572 km) Maximum unburied sections of inter-array cable protected by concrete mattresses Minimum burial of inter-array cable	Moderate significance	Moray East ES 2012 Chapter 8.1 Table 8.1-1 Impact Assessment Summary Table 8.1-3 Summary of Worst Case Parameters for Commercial Fisheries	No	Design parameters for suction buckets are within the WCS design parameters for GBS foundations. The maximum number of turbines for the new consent is within (less than) the assessed WCS of 339 turbines. There minimum spacing (1,200 m x 1,050 m) is also within the assessed WCS spacing between turbines (840 m x 600 m minimum). There will also be no changes in the assessed WCS design parameters for inter-array cables (total length, burial depth) and no changes in number of construction vessels and requirements for safety zones (500 m). Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes	Data on landings from within ICES rectangle 45E7 is published by Marine Scotland on an annual basis. The Moray East ES 2012 presented data on landings from 2001 to 2010. A review of additional landings data for the period 2011 to 2015 (most recent) will be undertaken as part of the site characterisation validation. This data indicates that there has been a change in the value of landings for key target species with decreases in Nephrops and increases in squid and white fish. It is proposed that further work is carried out as part of the EIA in order to determine wether any changes may have occurred and to determine whether there are any implications for the proposed wind farm consent application. Since submission of the Moray East ES in 2012, Moray East has continued to engage with the fishing industry and has agreed a Mitigation Strategy to be implemented during construction and operation of consented Telford, Stevenson and MacColl wind farms.	To be determined based on additional site characterisation work carried out as part of the EIA.	Yes	N/A	Impact assessment expected to remain valid as new design parameters within assessed WCS with regard to commercial fisheries	Validation of ICES data required
		White fish		Minor significance		No		Yes			Yes	N/A		Validation of ICES data required
	Safety issues for fishing vessels	All fisheries	WCS based on: Maximum number of turbines (339) Maximum inter-array cable length (572 km) Maximum unburied sections of inter-array cable protected by concrete mattresses Minimum burial of inter-array cable	Within acceptable safety limits		No	The maximum number of turbines for the new consent is within (less than) the assessed WCS of 339 turbines. There will also be no change in the assessed WCS design parameters for inter-array cables. Therefore there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes			Yes	N/A		Validation of ICES data required
	Increased steaming time to fishing grounds	All fisheries	Maximum of six safety zones (based on maximum of six construction vessels) Each safety exclusion zone = 500 m Additional 50 m safety exclusion zone applied to installed infrastructure	Minor significance		No	The number of construction vessels will be within the assessed WCS (six vessels). Each safety zone will continue to require a 500 m safety zone. There may also remain a requirement for a 50 m safety exclusion zone applied to installed infrastructure. Therefore there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes			Yes	N/A		Validation of ICES data required
	Obstacles on the sea post construction	All fisheries	Any construction related obstacles and changes to seabed conditions, including cable burial and protection.	Within acceptable safety limits		No	No change safety procedures	Yes			Yes	N/A		Validation of ICES data required
	Displacement of fishing vessel into other areas	Scallop	WCS for GBS foundations (diameter 65 m) Maximum number of turbines (339) Maximum number of met masts (2) Diamond layout Minimum spacing (840 m x 600 m) Max inter-array cable length (572 km) Maximum number of construction vessels (six) each with 500 m exclusion zone Maximum number of incomplete infrastructure with safety zones (50 m)	Minor to moderate		No	Design parameters for suction buckets are within the WCS design parameters for GBS foundations. The maximum number of turbines for the new consent is within (less than) the assessed WCS of 339 turbines. There minimum spacing (1200 m x 1050 m) is also within the assessed WCS spacing between turbines (840 m x 600 m minimum). There will also be no changes in the assessed WCS design parameters for inter-array cables (total length, burial depth) and no changes in number of construction vessels and requirements for safety zones (500 m). Therefore, there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes			Yes	N/A		Validation of ICES data required
		Squid		Moderate significance		No		Yes			Yes	N/A		Validation of ICES data required
		White fish		Minor significance		No		Yes			Yes	N/A		Validation of ICES data required
	Interference with fishing activities	All fisheries	Location of port of construction Maximum number of construction vessels (six)	Minor significance		No	The number of construction vessels will be within the assessed WCS (six vessels). Therefore there will be no change in the impacts assessed for the Telford, Stevenson and MacColl wind farms.	Yes			Yes	N/A		Validation of ICES data required
	Loss of habitat	Salmon and sea trout	See Table 7.2-2 Rochdale Envelope Parameters Relevant to the Fish and Shellfish Ecology Assessment for more information. Specific design parameters not included in Chapter 8.1.	Assessed in Chapter 7.2		No	See fish and shellfish	Yes			Yes	N/A		Validation of ICES data required
	Introduction of new habitat	Salmon and sea trout						Yes			Yes	N/A		Validation of ICES data required
	EMFs	Salmon and sea trout						Yes			Yes	N/A		Validation of ICES data required
	Operational noise	Salmon and sea trout						Yes			Yes	N/A		Validation of ICES data required
	Changes to fishing activities	Salmon and sea trout						Yes			Yes	N/A		Validation of ICES data required
Construction and decommissioning														
Shipping and navigation	Effects on Vessel Routing and Collision During Construction	Commercial Shipping	Maximum loss of navigable sea area based on maximum number of construction vessels and associated support traffic - Increased Level of Vessel Activity with the Proposed Sites (irrespective of layout, foundation types and subsea cabling) - 1,355 vessel movements per construction period	Minor significance	Moray East ES 2012 Chapter 8.2 Table 8.2-1 Impact Assessment Summary Table 8.2-2 Rochdale Envelope Parameters Considered within Assessment of Potential Impacts on Shipping and Navigation	No	Maximum number of turbines assumes maximum level of activity on site and therefore worst case has been assessed.	Yes	Given the age of the marine traffic survey data, site characterisation data validation exercise required (marine traffic AIS data) in accordance with MGN543 Inclusion of BOWL in baseline	No changes are expected.	No	The existing baseline must be reassessed against MGN 543.	Impact assessment expected to remain valid as new design parameters within assessed WCS with regard to navigatable sea area	No - However consultation with regulators will be required.
	Effects on Fishing Vessels During Construction	Fishing Vessels	Maximum loss of navigable sea area based on maximum number of construction vessels and associated support traffic within the proposed sites.	Minor significance		No	Maximum number of turbines assumes maximum level of activity on site and therefore worst case has been assessed.	Yes	Given the age of the marine traffic survey data, site characterisation data validation exercise required (marine traffic AIS data) in accordance with MGN543 Inclusion of BOWL in baseline	No changes are expected.	No	The existing baseline must be reassessed against MGN 543.		
	Effects on Recreational Routing During Construction	Recreational Vessels	Maximum loss of navigable sea area based on maximum number of construction vessels and associated support traffic within the proposed sites.	Minor significance		No	Maximum number of turbines assumes maximum level of activity on site and therefore worst case has been assessed.	Yes	Given the age of the marine traffic survey data, site characterisation data validation exercise required (marine traffic AIS data) in accordance with MGN543 Inclusion of BOWL in baseline	No changes are expected.	No	The existing baseline must be reassessed against MGN 543.		

Project specific impacts														
EIA Topic	**Impacts assessed in the Moray East EIA 2012 (OWF only)**	**Key receptors**	**Moray East ES 2012 assessed Worst Case Scenario (WCS) design envelope parameters**	**Predicted residual impact (post mitigation)**	**Reference to Moray East ES 2012**	**Do proposed design changes affect conclusions from Moray East ES 2012?**	**Justification**	**New / updated data since submission of Moray East ES in 2012?**	**Description of new / updated data**	**Does data affect conclusions from Moray East ES 2012?**	**Are the assessnent methods from Moray East EIA 2012 still valid?**	**Do new methods affect conclusions in Moray East ES 2012**	**Implications for Moray East ES 2012 impact assessment**	**Further assessment required in proposed EIA?**
Operation														
Shipping and navigation	Effects on Commercial Ship Routing During Operation and Maintenance	Commercial Shipping	Maximum loss of navigable sea area based on placement of jacket foundation of 45 x 45 m topside diameter for max number of turbines (339) Placement of largest substation foundation of 100 x 100 m topside diameter Maximum number of substations installed in the proposed sites (eight)	Minor significance	Moray East ES 2012 Chapter 8.2 Table 8.2-1 Impact Assessment Summary Table 8.2-2 Rochdale Envelope Parameters Considered within Assessment of Potential Impacts on Shipping and Navigation	No	Maximum number of turbines assumes maximum level of activity on site and therefore worst case has been assessed.	Yes	Given the age of the marine traffic survey data, it is likely that the baseline conditions (traffic numbers and routing) have changed Inclusion of BOWL in baseline	No changes are expected.	No	The existing baseline must be reassessed against MGN 543.	Impact assessment expected to remain valid as new design parameters within assessed WCS with regard to navigatable sea area	Validation of marine traffic survey data required
	Effect on Commercial Shipping Collision Risk During Operation and Maintenance	Commercial Shipping	Maximum loss of navigable sea area based on placement of jacket foundation of 45 x 45 m topside diameter for max number of turbines (339) Placement of largest substation foundation of 100 x 100 m topside diameter Maximum number of substations installed in the proposed sites (eight)	Minor significance		No	Maximum number of turbines assumes maximum level of activity on site and therefore worst case has been assessed.	Yes	Given the age of the marine traffic survey data, it is likely that the baseline conditions (traffic numbers and routing) have changed Inclusion of BOWL in baseline	No changes are expected.	No	The existing baseline must be reassessed against MGN 543.		Validation of marine traffic survey data required
	Effect on Fishing Vessels During Operation Including Collision and Displacement During Operation and Maintenance	Fishing Vessels	Maximum loss of navigable sea area based on placement of jacket foundation of 45 x 45 m topside diameter for max number of turbines (339) Placement of largest substation foundation of 100 x 100 m topside diameter Maximum number of substations installed in the proposed sites (eight)	Minor significance		No	Maximum number of turbines assumes maximum level of activity on site and therefore worst case has been assessed.	Yes	Given the age of the marine traffic survey data, it is likely that the baseline conditions (traffic numbers and routing) have changed Inclusion of BOWL in baseline	No changes are expected.	No	The existing baseline must be reassessed against MGN 543.		Validation of marine traffic survey data required
	Effect on Recreational Vessels Including Collision (Blade and Structure) and Displacement During Operation and Maintenance	Recreational Vessels	Maximum loss of navigable sea area based on placement of jacket foundation of 45 x 45 m topside diameter for max number of turbines (339) Placement of largest substation foundation of 100 x 100 m topside diameter Maximum number of substations installed in the proposed sites (eight) Max turbine blade air draft 22 m HAT	Minor significance		No	Maximum number of turbines assumes maximum level of activity on site and therefore worst case has been assessed.	Yes	Given the age of the marine traffic survey data, it is likely that the baseline conditions (traffic numbers and routing) have changed Inclusion of BOWL in baseline	No changes are expected.	No	The existing baseline must be reassessed against MGN 543.		Validation of marine traffic survey data required
	Effect on Search and Rescue - increase in events or reduced capability During Operation an Maintenance	Casualties and Search And Rescue Responders (surface craft)	Maximum loss of navigable sea area based on placement of jacket foundation of 45 x 45 m topside diameter for max number of turbines (339) Placement of largest substation foundation of 100 x 100 m topside diameter Maximum number of substations installed in the proposed sites (eight)	Minor significance		No	Maximum number of turbines assumes maximum level of activity on site and therefore worst case has been assessed.	Yes	Historical accident and incident data is now available up to 2014. Inclusion of BOWL in baseline	No changes are expected.	No	Current baseline line and envelope must be reassessed against MGN 543.	Impact assessment expected to remain valid as new design parameters within assessed WCS with regard to navigatable sea area	Validation of marine traffic survey data required
	Effect on Helicopter Operations in Line with Regulatory Guidance During Operation and Maintenance	Helicopter Search and Rescue Responders	Maximum loss of navigable sea area for helicoper operations based on placement of jacket foundation of 45 x 45 m topside diameter for max number of turbines (339) Placement of largest substation foundation of 100 x 100 m topside diameter Maximum number of substations installed in the proposed sites (eight)	Minor significance		No	Maximum number of turbines assumes maximum level of activity on site and therefore worst case has been assessed.	Yes	Historical accident and incident data is now available up to 2014. Inclusion of BOWL in baseline	No changes are expected.	No	Current baseline line and envelope must be reassessed against MGN 543.		Validation of marine traffic survey data required
	Effect on Marine Radar Systems During Operation and Maintenance	All Vessels	Radar interference based on placement of jacket foundation of 45 x 45 m topside diameter for max number of turbines (339) Placement of largest substation foundation of 100 x 100 m topside diameter Maximum number of substations installed in the proposed sites (eight)	Minor significance		No	Maximum number of turbines assumes maximum level of activity on site and therefore worst case has been assessed.	Yes	Given the age of the marine traffic survey data, it is likely that the baseline conditions (traffic numbers and routing) have changed Inclusion of BOWL in baseline	No changes are expected.	Yes	No	No	No
Construction, decommissioning and operation														
Seascape, landscpae and visual assessment	Change to landscape planning designations through visibility of turbines associated with the consented Telford, Stevenson and MacColl wind farms	Castle of Mey, Dunbeath Castle, Langwell Lodge, Cullen House, Gordon Castle, Gordonstoun, Innes House and Duff House Gardens and Designed Landscapes; Dunnet Head; Duncansby Head, Flow Country and BerriMoray East sitele Coast and Loch Fleet, Loch Brora and Glen Loth Special Landscape Areas; Area of Landscape Significance; and Coastal Protection Zone	Turbine layout scenario 4C as described in Chapter 8 of the Moray East ES 2012, Section 8.4.3.	Not significant	Moray East ES 2012 Chapter 8.4 Table 8.4-4 Assessment of Residual Visual Effects Table 8.4-7 Assessment of Effects on Coastal Character Areas (CCA) Table 8.4-8 Asssessment of Effects on Gardens and Designated Landscapes	Yes	Increased height and separation of turbines.	Yes	BOWL as built based on 84 turbines and final layout to now be considered in the baseline.	Yes	See updated guidance listed below	New guidance to be taken into account in updated assessment.	New guidance to be taken into account in updated assessment.	Yes

EIA Topic	Impacts assessed in the Moray East EIA 2012 (OWF only)	Key receptors	Moray East ES 2012 assessed Worst Case Scenario (WCS) design envelope parameters	Predicted residual impact (post mitigation)	Reference to Moray East ES 2012	Do proposed design changes affect conclusions from Moray East ES 2012?	Justification	New / updated data since submission of Moray East ES in 2012?	Description of new / updated data	Does data affect conclusions from Moray East ES 2012?	Are the assessnent methods from Moray East EIA 2012 still valid?	Do new methods affect conclusions in Moray East ES 2012	Implications for Moray East ES 2012 impact assessment	Further assessment required in proposed EIA?
Project specific impacts														
Seascape, landscpae and visual assessment	Change to search area for wild land (SAWL) through visibility of turbines associated with the consented Telford, Stevenson and MacColl wind farms	NA. 36 km at its closest point from the previous Moray East site. No specific assessment carried out in previous Moray East site ES. Wildness characteristics considered in assessment of effects on coastal character areas.	Turbine layout scenario 4C as described in Chapter 8 of the Moray East ES 2012, Section 8.4.3.	Not significant	Moray East ES 2012 Chapter 8.4 Table 8.4-4 Assessment of Residual Visual Effects Table 8.4-7 Assessment of Effects on Coastal Character Areas (CCA) Table 8.4-8 Asssessment of Effects on Gardens and Designated Landscapes	Yes	Increased height and separation of turbines.	Yes	BOWL as built based on 84 turbines and final layout to now be considered in the baseline.	Yes	Updated assessment guidance including: Landscape Institute and IEMA, 2013, Guidelines for Landscape and Visual Impact Assessment of Landscape and Visual Impacts: Third Edition. SNH, 2014, Visual Representation of Wind Farms (Version 2.1). SNH, 2014, Siting and designing wind farms in the landscape - Version 2. The Highland Council (THC), 2016, Visualisation Standards for Wind Energy Developments. SNH (TBC currently draft 2016) Guidance on Coastal Character Assessment	New guidance to be taken into account in updated assessment.	New guidance to be taken into account in updated assessment.	Yes
	Change to coastal character areas through visibility of turbines associated with the consented Telford, Stevenson and MacColl wind farms	Coastal character areas along the Caithness, Moray and Aberdeenshire coastlines within the study area (study area only).	Turbine layout scenario 4C as described in Chapter 8 of the Moray East ES 2012, Section 8.4.3.	Not significant		Yes	Increased height and separation of turbines.	Yes	BOWL as built based on 84 turbines and final layout to now be considered in the baseline.	Yes				Yes
	Change to landscape character areas through visibility of turbines associated with the consented Telford, Stevenson and MacColl wind farms	Landscape character types/units within Caithness, Moray and Aberdeenshire (study area only).	Turbine layout scenario 4C as described in Chapter 8 of the Moray East ES 2012, Section 8.4.3.	Not significant		Yes	Increased height and separation of turbines.	Yes	BOWL as built based on 84 turbines and final layout to now be considered in the baseline.	Yes				Yes
	Change in views from viewpoints	Viewpoints 1 - 22 as described in Moray East ES 2012 Table 8.4-4 Assessment of Residual Effects	Turbine layout scenario 4C as described in Chapter 8 of the Moray East ES 2012, Section 8.4.3.	Significant effect on: Viewpoint 4: Wick Bay Viewpoint 5: Sarclet (Sarclet Haven Info Board) Viewpoint 6: Hill O'Many Stanes Viewpoint 7: Lybster (end of Main Street) Viewpoint 8: Latherton Viewpoint 9: Dunbeath (nr Heritage Centre) Viewpoint 15: Whaligoe Steps Not significant effects on all other viewpoints.		Yes	Increased height and separation of turbines.	Yes	BOWL as built based on 84 turbines and final layout to now be considered in the baseline.	Yes				Yes
	Change in views from principal visual receptors	Viewpoints 1 - 22 as described in Moray East ES 2012 Table 8.4-4 Assessment of Residual Effects	Turbine layout scenario 4C as described in Chapter 8 of the Moray East ES 2012, Section 8.4.3.	Significant effect on: Viewpoint 4: Wick Bay Viewpoint 5: Sarclet (Sarclet Haven Info Board) Viewpoint 6: Hill O'Many Stanes Viewpoint 7: Lybster (end of Main Street) Viewpoint 8: Latherton Viewpoint 9: Dunbeath (nr Heritage Centre) Viewpoint 15: Whaligoe Steps Not significant effects on all other viewpoints.		Yes	Increased height and separation of turbines.	Yes	BOWL as built based on 84 turbines and final layout to now be considered in the baseline.	Yes				Yes
Construction, decommissioning and operation														
Archaeology and cultural heritage	Development within the footprint or anchoring outside of the footprint has negative impact (Net Reduction of Seabed Area)	Recorded Sites such as Known Wrecks, Sites of Medium or High Potential identified in the Geophysical Survey Data and unknown potential archaeological sites	Maximum footprint based on: 339 turbines, Placement of gravity base foundations of 65 m diameter; and excavated diameter of 95 m including scour protection.	Negligible significance	Moray East ES 2012 Chapter 8.5 Table 8.5-1 Impact Assessment Summary Table 8.5-3 Summary of Worst Case Parameters for Archaeology and Visual Receptors	No	Impact remains within assessed WCS for Telford, Stevenson and MacColl wind farms	No	N/A	No	Yes	N/A	No	No
	Net Effect of Inter–Array Cabling on the Seabed	Recorded Sites such as Known Wrecks, Sites of Medium or High Potential identified in the Geophysical Survey Data and unknown potential archaeological sites	572 km maximum cable length; Ploughing method for installation of cable trenches – 3 m extreme depth and 6 m affected width; Potential surface laying protection either mattress or rock placement; and Deployment of up to six anchors every 500 m along length of inter–array cables.	Negligible significance		No	Impact remains within assessed WCS for Telford, Stevenson and MacColl wind farms	No	N/A	No	Yes	N/A	No	No
	Temporary Seabed Disturbances and Re–Distribution of Fine Sediments	Recorded Sites such as Known Wrecks, Sites of Medium or High Potential identified in the Geophysical Survey Data and unknown potential archaeological sites	Total area of spud cans per jack–up barge (assume six legs per barge) = 420 m2; Number of visits per installation / decommissioning = two; Fine sediments arising from seabed preparation and installation of 339 gravity base foundations and 572 km of inter–array cabling transported within spring tidal axes.	Negligible significance		No	Impact remains within assessed WCS for Telford, Stevenson and MacColl wind farms	No	N/A	No	Yes	N/A	No	No
	Turbine Height and Layout in Relation to the Setting of Onshore Receptors	Setting of Designated Onshore Receptors	339 turbines. Estimated Blade Tip Height of 162 m to 204 m	Negligible significance		Yes	Increased height and separation of turbines.	Yes	BOWL as built based on 84 turbines and final layout to now be considered in the baseline.	Yes	Yes	N/A	No	Yes

Project specific impacts													
EIA Topic	**Impacts assessed in the Moray East EIA 2012 (OWF only)**	**Key receptors**	**Moray East ES 2012 assessed Worst Case Scenario (WCS) design envelope parameters**	**Predicted residual impact (post mitigation)**	**Reference to Moray East ES 2012**	**Do proposed design changes affect conclusions from Moray East ES 2012?**	**Justification**	**New / updated data since submission of Moray East ES in 2012?**	**Description of new / updated data**	**Does data affect conclusions from Moray East ES 2012?**	**Are the assessnent methods from Moray East EIA 2012 still valid?**	**Do new methods affect conclusions in Moray East ES 2012**	**Implications for Moray East ES 2012 impact assessment**	**Further assessment required in proposed EIA?**
Construction, decommissioning and operation														
Civil and military aviation	Impact on civilian and military radar systems:	NATS En-Route plc (NERL) Allanshill Radar	For the assessments of likely significant aviation effects, it was presumed that the entirety of the area of each proposed wind development area would be populated with wind turbines at the maximum tip height of 204 m above Lowest Astronomical Tide (LAT). A larger area of detectable turbines irrespective of their size will create a larger area of clutter/radar degradation leading to a greater effect on the provision of navigation services.	Not significant	Moray East ES 2012 Chapter 8.3 Table 8.3-1 Impact Assessment Summary	Yes	Impact on Allanshill PSR will need to re-assessed by NERL in order to confirm whether previously agreed mitigation (radar blanking) is still valid.	No	BOWL as built based on 84 turbines and final layout to now be considered in the baseline.	No	Yes	N/A	No	Yes
		ASACS Buchan Air Defence (AD) Radar		Not significant		Yes	Impact on RAF Lossiemouth PSR will need to be re-assessed by MoD and incorporated into the ongoing work to identify mitigation.	No	BOWL as built based on 84 turbines and final layout to now be considered in the baseline.	No	Yes	N/A	No	Yes
		RAF Lossiemouth Air Traffic Control (ATC) Radar		N/A (mitigation not required; MOD withdrew objection)		Yes	Previously, MoD did not object as there was no adverse impact on Buchan ADR. Increased height of new Moray East site turbines may result in turbines being visible to the Buchan ADR resulting in a requirement for mitigation.	No	BOWL as built based on 84 turbines and final layout to now be considered in the baseline.	No	Yes	N/A	No	Yes
	Impact on civilian and military aviation operations	HIAL Wick Airport		Not significant		Yes	Increased height of proposed turbines may have an impact on aviation procedures into Wick Airport.	No	BOWL as built based on 84 turbines and final layout to now be considered in the baseline.	No	Yes	N/A	No	Yes
		Helicopter Main Route (HMR) X-Ray		Not significant		Yes	Increased height of proposed turbines may have an impact on helicopter operations on HMR-X-Ray.	No	BOWL as built based on 84 turbines and final layout to now be considered in the baseline.	No	Yes	N/A	No	Yes
		Offshore Installations		Not significant		Yes	Increased height of proposed turbines may have an impact on helicopter approach procedures to offshore installations.	No	BOWL as built based on 84 turbines and final layout to now be considered in the baseline.	No	Yes	N/A	No	Yes
		Minimum Safe Altitude		Not significant		Yes	Increased height of proposed turbines will have an impact on Minimum Safe Altitude.	No	BOWL as built based on 84 turbines and final layout to now be considered in the baseline.	No	Yes	N/A	No	Yes
Construction, decommissioning and operation														
Socio-economics	The labour market in the study area	Jobs created by the project during each stage of development (construction, operation, decommissioning)	Minimum predicted expenditure to deliver 1.5G; 216 x 7MW turbines; 315 km of inter array cables (total indicative length)	Major postive	Moray East ES 2012 Chapter 8.6 Table 8.6-1 Impact Assessment Summary Table 8.6-2 Parameters relevant to the Socio-Economic, Tourism and Recreation Impact Assessment	Yes	Reduction in number of turbines while within assessed WCS could affect impacts predicted for employment	Yes	Employment, unemployment and other labour market indicators have changed since 2012 Inclusion of BOWL in baseline	Yes	No	Extended scope of assessment to provide more national context	Yes	Yes
	The business base in the study area	Gross Value Added (GVA)	Minimum predicted expenditure to deliver 1.5GW; 216 x 7MW turbines; 315 km of inter array cables (total indicative length)	Major postive		Yes	Reduction in number of turbines while within assessed WCS could affect impacts predicted for GVA	Yes	Business conditions such as economic output and business demographic conditions have changed since 2012 Inclusion of BOWL in baseline	Yes	No		Yes	Yes
	Leisure tourism activities in the study area (excluding dolphin watching)	Leisure tourism (excluding dolphin watching)	Maximum predicted seascape, landscape and visual effects (leisure tourism, excluding dolphin watching); 216 x 7MW turbines	Minor adverse		No	Impact remains within assessed WCS for Telford, Stevenson and MacColl wind farms.	No	N/A	No	No	N/A	No	No
	Leisure tourism activities in the study area (including dolphin watching)	Leisure tourism (dolphin watching)	Maximum number of sub-structures ; 339 turbines	Minor adverse		No	Impact remains within assessed WCS for Telford, Stevenson and MacColl wind farms.	No	N/A	No	No	N/A	No	No
	Business tourism in the study area	Business tourism	Maximum number of sub-structures ; 339 turbines	Minor positive		No	Impact remains within assessed WCS for Telford, Stevenson and MacColl wind farms.	No	N/A	No	No	N/A	No	No
	Recreational activities (walking) in the study area	Recreation (walking)	Maximum predicted seascape, landscape and visual effects (leisure tourism, excluding dolphin watching); 216 x 7MW turbines	Negligible		No	Impact remains within assessed WCS for Telford, Stevenson and MacColl wind farms.	No	N/A	No	No	N/A	No	No
	Recreational activities (sailing and surfing) in the study area	Recreation (sailing and surfing)	Maximum number of sub-structures ; 339 turbines	Negligible		No	Impact remains within assessed WCS for Telford, Stevenson and MacColl wind farms.	No	N/A	No	No	N/A	No	No
Construction and decommissioning														
Other human activities	Effect on other offshore wind farms	BOWL Beatrice demonstrator turbine	Maximum construction seabed footprint of 5.99 km2 based on: maximum number of turbines (339), total dredged area for GBS foundations; inter-array cables (572 km with trench 1 m x 6 m); jack-up vessel spud cans; anchors; and met masts (2). Diamond layout with minimum spacing of turbines (840 m x 600 m). Maximum unburied sections of inter-array cable protected by concrete mattresses Maximum number of construction vessels (six) each with 500 m exclusion zone. Maximum buffer between the Moray East site and adjacent BOWL site of 600 m. Maximum construction window of up to 6 years	Not significant	Moray East ES 2012 Chapter 8.7 Table 8.7-1 Impact Assessment Summary Table 8.7-2 Parameters relevant to other human activities	No	There will be no change in the assessed WCS design parameters. Therefore, impacts assessed for the Telford, Stevenson and MacColl wind farms remain valid.	Yes	Inclusion of BOWL In baseline.	No	Yes	N/A	No	No
	Effect on military practice and exercise areas	Practice area D809		Not significant		No	There will be no change in the assessed WCS design parameters. Therefore, impacts assessed for the Telford, Stevenson and MacColl wind farms remain valid.	No	N/A	No	Yes	N/A	No	No
	Effects on subsea cables	None present in Moray East site		No impact		No	There will be no change in the assessed WCS design parameters. Therefore, impacts assessed for the Telford, Stevenson and MacColl wind farms remain valid.	No	N/A Caithness Moray Interconnector expected to be installed 2017	No	Yes	N/A	No	No
	Effect on oil and gas operations and infrastructure including pipelines	Oil and gas block licence holders Jacky and Beatrice oil platforms associated with Beatrice field		Not signficant		No	There will be no change in the assessed WCS design parameters. Therefore, impacts assessed for the Telford, Stevenson and MacColl wind farms remain valid.	Yes	UKCS Blocks 12/21 and 12/23 recently made available in the 28th and 29th UK Government oil and gas licencing rounds. However, no awards have yet been made. In 2015 Suncor carried out exploration works in blocks 12/26b and 12/27 assoicated wih the Niobe field and located at southern end of Moray East site. However, licences for these blocks were then surrendered in December 2015.	No	Yes	N/A	No	No
	Health and safety risk due to unexploded ordnance (UXO)	Offshore personnel		Not signficant		No	There will be no change in the assessed WCS design parameters. Therefore, impacts assessed for the Telford, Stevenson and MacColl wind farms remain valid.	No	N/A	No	Yes	N/A	No	No
Operation														
Other human activities	Effect on other offshore wind farms	BOWL Beatrice demonstrator turbine	See parameters listed below	Not significant	Moray East ES 2012 Chapter 8.7 Table 8.7-1 Impact Assessment Summary Table 8.7-2 Parameters relevant to other human activities	No	There will be no change in the assessed WCS design parameters. Therefore, impacts assessed for the Telford, Stevenson and MacColl wind farms remain valid.	Yes	Inclusion of BOWL In baseline.	No	Yes	N/A	No	No

Project specific impacts														
EIA Topic	**Impacts assessed in the Moray East EIA 2012 (OWF only)**	**Key receptors**	**Moray East ES 2012 assessed Worst Case Scenario (WCS) design envelope parameters**	**Predicted residual impact (post mitigation)**	**Reference to Moray East ES 2012**	**Do proposed design changes affect conclusions from Moray East ES 2012?**	**Justification**	**New / updated data since submission of Moray East ES in 2012?**	**Description of new / updated data**	**Does data affect conclusions from Moray East ES 2012?**	**Are the assessnent methods from Moray East EIA 2012 still valid?**	**Do new methods affect conclusions in Moray East ES 2012**	**Implications for Moray East ES 2012 impact assessment**	**Further assessment required in proposed EIA?**
Other human activities	Effect on military practice and exercise areas	Practice area D809	Maximum construction seabed footprint of 5.99 km2 based on: maximum number of turbines (339), total dredged area for GBS foundations; inter-array cables (572 km with trench 1 m x 6 m); jack-up vessel spud cans; anchors; and met masts (2). Diamond layout with minimum spacing of turbines (840 m x 600 m). Maximum unburied sections of inter-array cable protected by concrete mattresses Maximum number of construction vessels (six) each with 500 m exclusion zone. Maximum buffer between the Moray East site and adjacent BOWL site of 600 m. Maximum construction window of up to 6 years	Not significant	Moray East ES 2012 Chapter 8.7 Table 8.7-1 Impact Assessment Summary Table 8.7-2 Parameters relevant to other human activities	No	There will be no change in the assessed WCS design parameters. Therefore, impacts assessed for the Telford, Stevenson and MacColl wind farms remain valid.	No	N/A	No	Yes	N/A	No	No
	Effects on subsea cables	None present in Moray East site		No impact		No	There will be no change in the assessed WCS design parameters. Therefore, impacts assessed for the Telford, Stevenson and MacColl wind farms remain valid.	No	N/A Caithness Moray Interconnector expected to be installed 2017	No	Yes	N/A	No	No
	Effect on oil and gas operations and infrastructure including pipelines	Oil and gas block licence holders Jacky and Beatrice oil platforms associated with Beatrice field		Significant		No	There will be no change in the assessed WCS design parameters. Therefore, impacts assessed for the Telford, Stevenson and MacColl wind farms remain valid.	Yes	UKCS Blocks 12/21 and 12/23 recently made available in the 28th and 29th UK Government oil and gas licencing rounds. However, no awards have yet been made. In 2015 Suncor carried out exploration works in blocks 12/26b and 12/27 assoicated wih the Niobe field and located at southern end of Moray East site. However, licences for these blocks were then surrendered in December 2015.	No	Yes	N/A	No	No
	Health and safety risk due to unexploded ordnance (UXO)	Offshore personnel		Not signficant		No	There will be no change in the assessed WCS design parameters. Therefore, impacts assessed for the Telford, Stevenson and MacColl wind farms remain valid.	No	N/A	No	Yes	N/A	No	No

Appendix B: SNH advice note on scope of EIA

23 February 2017

MORAY FIRTH – MORL EASTERN DEVELOPMENT AREA
SNH ADVICE FOR REASSESSMENT OF NEW TURBINE PARAMETERS

Background

We had a recent meeting with MORL (8 February 2017) where they let us know that they're planning a revision to turbine design to be used in the Eastern Development Area (EDA).

The overall capacity for the EDA will remain at 1,116 MW, however, MORL wish to be able to use turbines of a higher rated capacity. They're considering ratings up to a possible 15 MW, but more likely in the region of 10-12 MW.

Following the meeting with MORL, SNH staff met internally (14 February 2016) in order to discuss which parts of the EDA Environmental Impact Assessment and Habitats Regulations Appraisal might need to be updated to address the use of larger turbines. We've reviewed our advice at application stage (SNH & JNCC response of 8 July 2013) and we confirm that there are only two areas we consider need some updated assessment:

- **ornithology**
- **seascape, landscape and visual interests.**

We provide our advice on these aspects in more detail below. **Note** that this advice on MORL EDA is given without prejudice to any future advice we may be providing in respect of the Western Development Area.

For all other natural heritage interests – marine mammals, fish interests (diadromous and marine) and benthic ecology – the use of a smaller number of larger turbines will result in reduced impacts and no further work is needed in order to be able to confirm this.

We note that the EDA **piling strategy** has already considered the use of larger turbines and has demonstrated that piling impacts will be no greater than the 'worst case' assessed at application stage for **marine mammal** and **fish interests** (diadromous and marine). MORL's piling mitigation protocol has already been 'signed off' via the Moray Firth Regional Advisory Group (MFRAG) and SNH has already confirmed that we've no outstanding concerns in relation to EDA piling – please see our advice of 23 February 2016 and 12 January 2017.

In relation to **benthic ecology**, the use of larger turbines will reduce the number needed – at most this will be 137 turbines (if the lowest 8.1MW rating is used). Using fewer turbines reduces the scale of habitat loss and / or habitat disturbance and this falls within the 'worst case' previously assessed, whether for piled foundations, gravity bases or the potential use of suction buckets.

Our advice on the issues which we consider do need some reassessment is provided overleaf.

Ornithology

We advise that using fewer, larger turbines should reduce ornithological impacts, however, MORL need to undertake some reassessment in order to demonstrate this for the relevant seabird species of concern. The collision risk modelling (CRM) for these seabird interests will need to be re-worked in order to take account of the new turbine parameters. We consider this to be the only part of the original ornithological assessment that needs updating.

(i) Collision risk modelling

As noted in our original advice, any potential collision risk to migratory (non-seabird) interests has been addressed in the strategic 'worst case' assessment commissioned by Marine Scotland[1]. Since this work was published, a number of the wind farms included for assessment have now been withdrawn, and the 'worst case' scenarios addressed in the modelling have also been reduced. Therefore we advise that the use of larger turbines for MORL EDA makes no material change to this strategic assessment and does not alter the conclusions that there are no significant risks from Scottish offshore wind farms to migratory (non-seabird) interests.

In respect of the key, relevant SPA seabird species identified in SNH & JNCC's original advice (8 July 2013), we advise that MORL's collision risk modelling for the EDA should be updated. We advise that the Band CRM model is adopted: while there is current discussion around ways to incorporate uncertainty into CRM calculations, there is not yet agreement on a final approach. Therefore, we require the modelling to be presented on the currently available spreadsheets, located at:

https://www.bto.org/science/wetland-and-marine/soss/projects

Our advice on updating the CRM for the relevant SPA seabird species is as follows:

- **Great black-backed gull, Herring gull**
  We advise that CRM is undertaken for the agreed new turbine parameters and that outputs are presented for model options 1, 2 and 3 using Johnston *et al* flight heights[2] and a 99.5% (+/- 2 standard deviations, SD) avoidance rate. This recommendation is based on advice agreed between SNH and the other statutory nature conservation bodies:

  http://www.snh.gov.uk/docs/A1464185.pdf

  Further background is provided here:

  http://www.snh.gov.uk/planning-and-development/renewable-energy/offshore-renewables/offshore-wind/

  We recommend that the risk of collision mortality is estimated for breeding and non-breeding seasons using the same apportioning approaches as adopted under the "common currency" for the MORL EDA and BOWL cumulative impact assessment.

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1 Marine Scotland strategic CRM, report available from: http://www.gov.scot/Resource/0046/00461026.pdf

2 Johnston, A., Cook, A. S. C. P., Wright, L. J., Humphreys, E. M. and Burton, N. H. K. (2014). Modelling flight heights of marine birds to more accurately assess collision risk with offshore wind turbines. J Appl Ecol, 51: 31–41. doi:10.1111/1365-2664.12191

This flight height data is available from https://www.bto.org/science/wetland-and-marine/soss/projects

- **Kittiwake, Gannet**
  We advise that CRM is undertaken for the agreed new turbine parameters and that CRM outputs are presented for model options 1 and 2 using Johnston *et al* flight heights and a 98.9% (+/- 2 SD) avoidance rate. Until better data becomes available, we do not require, nor do we recommend, that option 3 outputs are presented for kittiwake or gannet.

  We recommend that an estimate of annual collision mortality is presented for each species as done for the original application, although we acknowledge that this will result in an over-estimate of impacts to assign to the relevant SPAs. (This may need further discussion, if required).

The turbines parameters to use for this updated collision risk modelling will need to be agreed between relevant parties. (Note that the largest commercially available turbine is currently a 10MW machine, however, the engineering for larger machines is progressing rapidly.)

We advise that these reworked seabird CRMs are only required in respect of MORL EDA. Once MORL have demonstrated that the impact of using fewer, larger turbines is less than the previously assessed 'worst case' for the EDA then there's no requirement for them to update BOWL's collision risk modelling or the previously agreed cumulative impact assessment.

(ii) Displacement assessment

SNH, along with the other statutory nature conservation bodies, has recently published joint guidance on the assessment of displacement impacts, see:

http://jncc.defra.gov.uk/pdf/Joint_SNCB_Interim_Displacement_AdviceNote_2017.pdf

We adopt a matrix approach where (in the ongoing absence of empirical data) the level of displacement is assumed, based on the 'disturbance susceptibility' scores presented in Wade *et al.* 2016[3]. The cumulative impact assessment for MORL EDA and BOWL follows this approach using flat rates of 40% displacement for puffin and 60% for guillemot and razorbill across the wind farms. These rates are in line with the 'disturbance susceptibility' scores and therefore don't need to be updated. Using a flat rate across the wind farms means that a change in turbine numbers / density makes no difference to this calculation and it therefore remains a precautionary 'worst case' assessment.

In the new SNCB guidance, the amount of displacement is considered in relation to adult survival, making assumptions about the potential levels of mortality that may result from the assumed rates of displacement. This differs to the MORL EDA and BOWL assessments where displacement was considered in terms of its potential impact on productivity. For SNH & JNCC advice, we assumed that displacement of an individual would result in the total failure of a breeding pair (i.e. a 100% impact on productivity). SNH considers that this approach remains sufficiently precautionary and does not require changing (considering that the proposed change to turbines does not affect this part of the displacement calculation).

Potential seabird displacement impacts from MORL EDA and BOWL have been assessed as acceptable in Marine Scotland's appropriate assessment, supported by SNH & JNCC advice on guillemot and razorbill (29 October 2013) and puffin (17 January 2014). As the previous

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[3] Wade H.M., Masden. E.A., Jackson, A.C. and Furness, R.W. (2016). Incorporating data uncertainty when estimating potential vulnerability of Scottish seabirds to marine renewable energy developments. Marine Policy 70, 108–113: http://www.sciencedirect.com/science/article/pii/S0308597X1630241X

displacement assessment is based on a precautionary 'worst case', using a smaller number of larger turbines at MORL EDA will remain within the envelope of impacts previously assessed.

(iii) Considering the significance of impacts

The focus of any reassessment is for MORL to demonstrate that using new larger turbines in the EDA will not result in any worse impacts compared to those previously assessed.

In SNH & JNCC advice on MORL EDA and BOWL, we considered the significance of impacts that could arise from these developments, particularly in relation to the protected seabird interests of SPA breeding colonies located within foraging range. We considered collision risk and displacement across the breeding and non-breeding seasons (noting that this will have resulted in some over-estimation of the impacts assigned to SPAs). On the basis of this 'worst case' assessment we concluded that there would be **no adverse impact on site integrity** arising from MORL EDA in relation to any of the relevant SPAs.

Therefore, as long as MORL can demonstrate that the collision risk for the proposed new turbines is no greater than that previously assessed for the EDA, then there should be no requirement to update the overall cumulative impact assessment for the Moray Firth wind farms, nor to revise the appropriate assessment undertaken for MORL and BOWL together.

(iv) new Marine Protected Area (MPA) and proposed marine SPA

A new MPA has been designated and a new marine SPA proposed in the Moray Firth since the time that MORL EDA and BOWL were consented (19 March 2014). In this regard we have the following advice:

- **East Caithness Cliffs MPA** – this site has been designated for breeding aggregations of black guillemot. This species is relatively sedentary and remains in coastal waters. We advise that there is no strong connectivity between MORL EDA and this MPA, and no risk of any significant impacts to black guillemot. We therefore do not consider this to be a significant issue and it does not require any re-assessment; black guillemot was addressed in MORL's original environmental statement and we are satisfied with this work (section 4.24, p218, Appendix 4.5A).

- **Moray Firth proposed SPA** – this marine SPA is located in the inner Moray Firth and is designated for wintering diver and seaduck interests as well as for European shag. Further information on the boundary, features of interest and draft conservation interests are given here:

  http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/proposed-marine-spas/moray-firth/

  SNH advises that there is no connectivity between MORL EDA and this proposed SPA. The species of interest have a coastal distribution and are recorded in greatest numbers within the proposed SPA – this lies roughly 41km from the EDA at its closest point. Two years of boat-based survey work at the EDA recorded only minimal numbers of these species on-site (Table 21, p62-67, Appendix 4.5A of MORL's environmental statement).

  Note that SNH has already given advice on MORL's export cable in relation to this proposed SPA (see our response of 14 August 2014).

Seascape, landscape and visual interests

SNH's advice on the seascape, landscape and visual impacts of the Moray Firth wind farms is discussed in Appendix E of each of the MORL EDA and BOWL response letters (8 July 2013). As identified in these responses, the impacts are greatest in a core area between Noss Head (Wick) and Dunbeath where the wind farms lie closest to shore. At its closest point, Beatrice is around 13km from the coast and MORL EDA about 22km. As discussed in our advice, Beatrice contributes most to the seascape, landscape and visual impacts, and MORL appears recessive in the view, behind the Beatrice turbines.

We have considered the proposal to increase turbine size in respect of seascape, landscape and visual interests to determine what needs to be assessed and how this design change should be illustrated. We think the critical issue is whether or not the proposed increases in height and rotor swept area will be noticeable over the distances involved, and whether it'll make a difference to the perception of MORL EDA and Beatrice as a single wind farm.

In this regard, we would welcome a meeting between the relevant parties to discuss and agree the possible options to investigate this. While we consider the following information might be helpful, we highlight that there is no requirement, in our view, for MORL to undertake a full, new SLVIA. They should concentrate on explaining and illustrating the effects of the proposed changes to turbine parameters and whether or not these are significant.

We suggest the following as possible options to help investigate this:

- A comparative zone of theoretical visibility (ZTV) for new MORL turbines compared against the largest turbines (8MW) in the consented EDA design envelope. We think it may be helpful for MORL to produce a ZTV for a 'more likely' choice of turbine – with 10MW currently the maximum rating commercially available – as well as for a possible future 15MW machine.

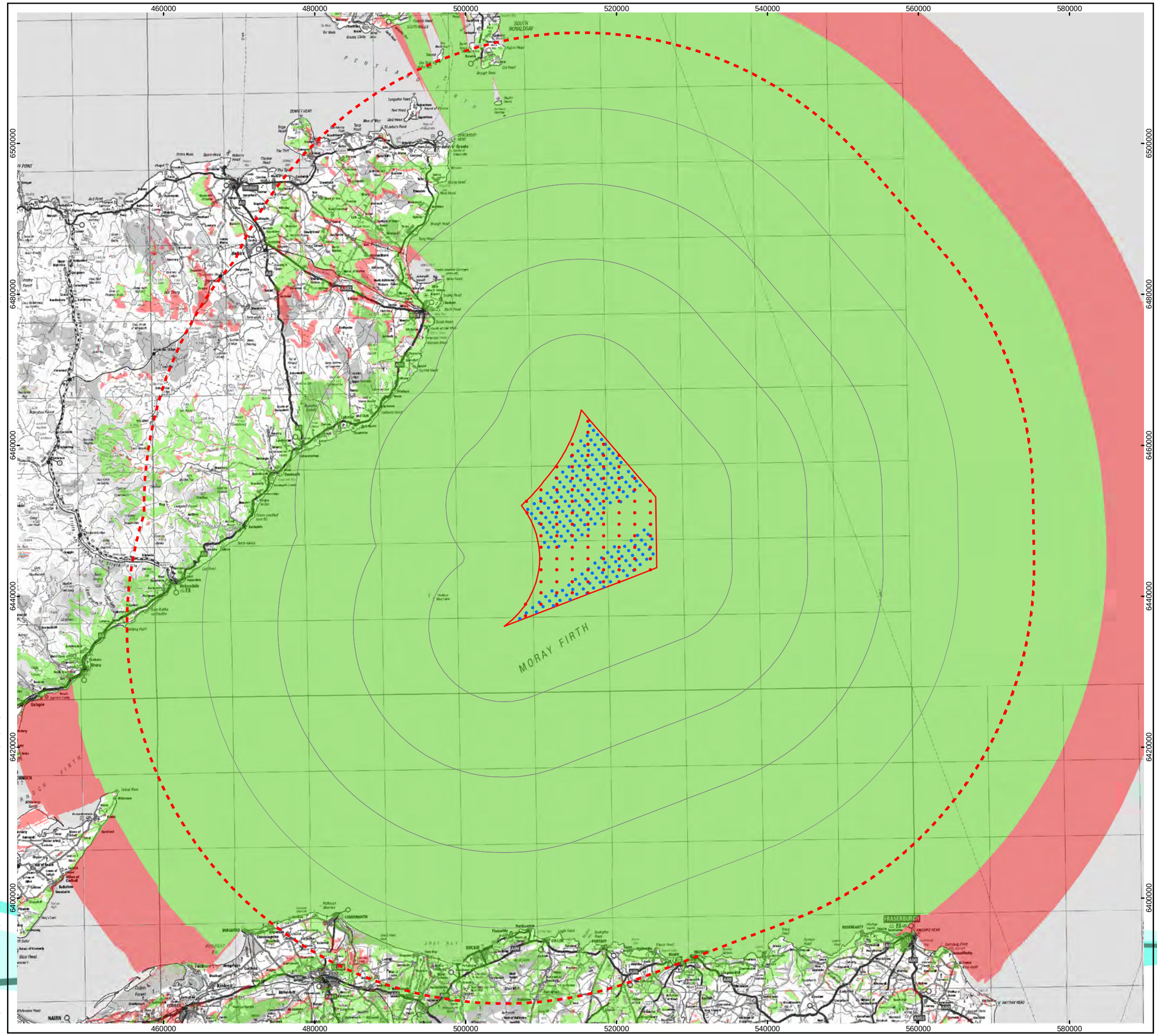
- Comparative ZTVs for new MORL turbines (the 'more likely' 10MW and potential 15MW) compared against the final layout and turbine choice for Beatrice.

- Wirelines to illustrate the proposed design change from the design viewpoints previously agreed: VP 1. Duncansby Head, VP 2. Keiss Pier, VP 4. Wick Bay (north), VP 5. Sarclet, VP 7. Lybster, VP 8. Latheron and VP 9. Dunbeath. At the proposed meeting we can discuss and agree whether a view point might be needed along the Moray coastline.

  MORL should be illustrated on these wirelines together with the final Beatrice scheme. We would welcome further discussion over possible techniques to help investigate MORL's design changes, such as use of 'monochrome analysis' to illustrate changes in the rotor swept area.

  We emphasise that photomontages are not required for considering these proposed design changes at MORL EDA.

Appendix C: SLVIA Figures



MORAY EAST
OFFSHORE WINDFARM

KEY

●	Three Consented Wind Farms (Blade Tip 204m above HAT)
●	Proposed Wind Farm (Blade Tip 280m above HAT)
□	Eastern Development Area
□	10km Distance Radii
⬚	50km Study Area Boundary
🟦	Three Consented Wind Farms Theoretical Visibility
🟥	Proposed Wind Farm Theoretical Visibility
🟩	Combined Theoretical Visibility

Blade tip height:	204 / 280m	Observer height:	2m
DTM:	OS T50	Surface features:	Excluded
DTM resolution:	50m	Earth curvature:	Included

Horizontal Scale: 1:480,000 A3 Chart

0 10,000 20,000 Meters

N

Geodetic Parameters: WGS84 UTM Zone 30N

Produced: LA
Reviewed: LT
Approved: LT

Date: 02/03/2017 Revision: D

REF: 8460001-PPV0010-MOR-MAP-003

Figure 9.1
Comparative Blade Tip ZTV

Moray Offshore
Windfarm (East) Ltd

460000 480000 500000 520000 540000 560000 580000

6500000 6480000 6460000 6440000 6420000 6400000

MORAY FIRTH

MORAY EAST
OFFSHORE WINDFARM

KEY

- Beatrice Wind Farm (Blade Tip 185m above HAT)
- Proposed Wind Farm (Blade Tip 280m above HAT)
- Eastern Development Area
- 10km Distance Radii
- 50km Study Area Boundary
- Beatrice Wind Farm Theoretical Visibility
- Proposed Wind Farm Theoretical Visibility
- Combined Theoretical Visibility

Blade tip height:	185 / 280m	Observer height:	2m
DTM:	OS T50	Surface features:	Excluded
DTM resolution:	50m	Earth curvature:	Included

Horizontal Scale: 1:480,000 A3 Chart

0 10,000 20,000 Meters

N

Geodetic Parameters: WGS84 UTM Zone 30N

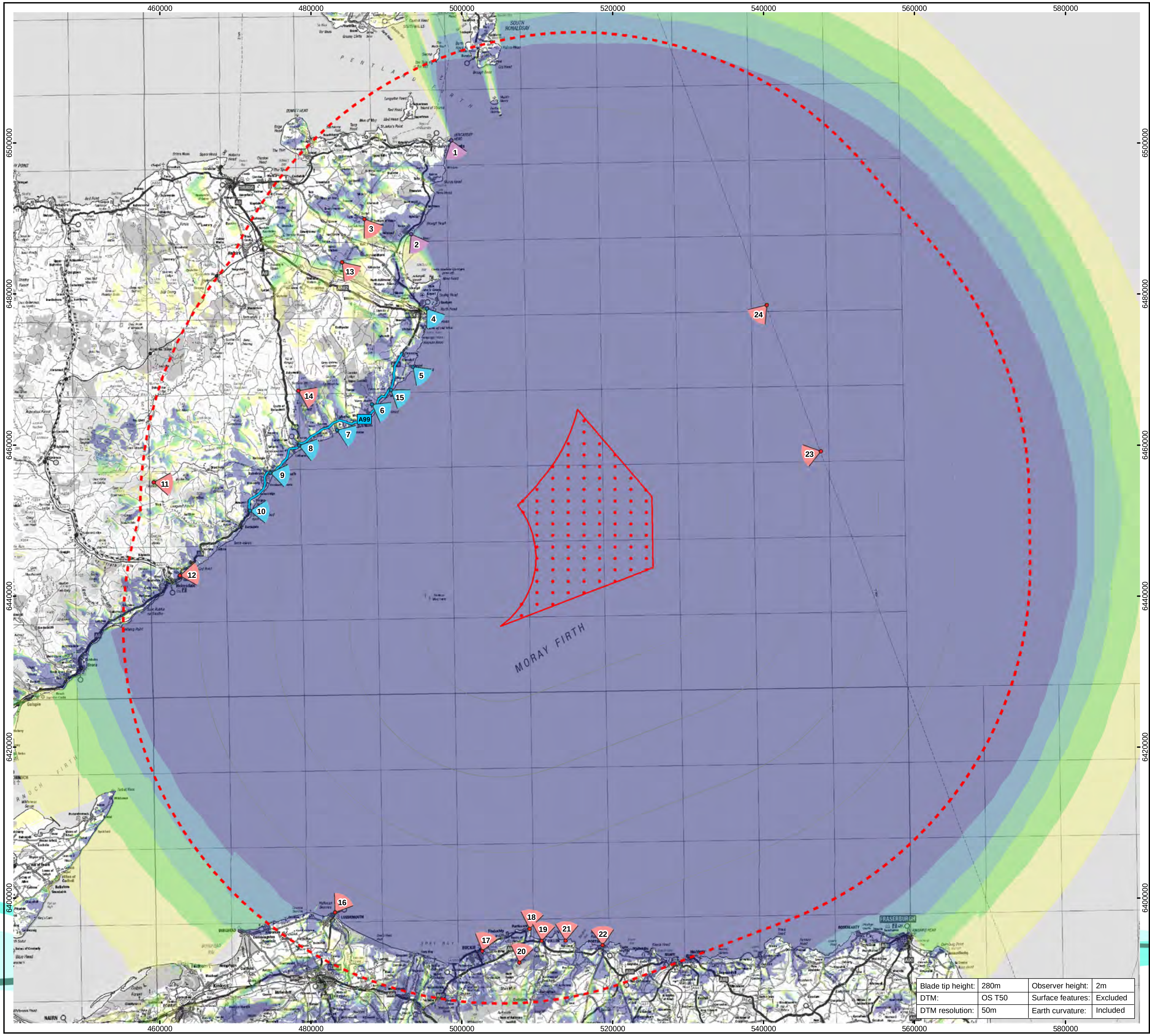
Produced: LA
Reviewed: LT
Approved: LT

Date: 02/03/2017 Revision: D

REF: 8460001-PPV0010-MOR-MAP-004

Figure 9.2
Comparative Blade Tip ZTV with Beatrice Wind Farm

Moray Offshore Windfarm (East) Ltd



Blade tip height:	280m	Observer height:	2m
DTM:	OS T50	Surface features:	Excluded
DTM resolution:	50m	Earth curvature:	Included

MORAY EAST
OFFSHORE WINDFARM

KEY

- Proposed Wind Farm (Blade Tip 280m above HAT)
- Eastern Development Area
- 10km Distance Radii
- 50km Study Area Boundary

Zone of Theoretical Visibility
No. of Blade Tips (280m) Visible

- 1 - 20
- 20 - 40
- 40 - 60
- 60 - 80
- 80 - 100

Viewpoint Location
(Scoped out of Proposed Wind Farm SLVIA)

3. Sortat
11. Morven
12. Navidale
13. Catchory
14. Minor Rd
16. Lossiemouth Harbour
17. Buckie
18. Portnockie - Bow Fiddle Rock Info Point
19. Cullen
20. Bin Hill
21. Findlater Castle
22. Portsoy
23. Ferry Route (Kirkwall to Aberdeen) 1
24. Ferry Route (Kirkwall to Aberdeen) 2

Visual Receptors for Assessment in the Proposed Wind Farm SLVIA

Viewpoint Location
(Scoped in to Proposed Wind Farm SLVIA)

4. Wick Bay
5. Sarclet (Sarclet Haven Info Board)
6. Hill O' Many Stanes
7. Lybster (end of Main Street)
8. Latheron (A9)
9. Dunbeath (nr Heritage Centre)
10. Berriedale (A9)
15. Whaligoe Steps

Viewpoint Location
(Included for Further Investigation)

1. Duncansby Head
2. Keiss Pier

Horizontal Scale: 1:480,000 A3 Chart

0 10,000 20,000 Meters

N

Geodetic Parameters: WGS84 UTM Zone 30N

Produced: LA
Reviewed: LT
Approved: LT

Date: 02/03/2017 Revision: D

REF: 8460001-PPV0010-MOR-MAP-005

Figure 9.3
Blade Tip ZTV with Viewpoints

Moray Offshore Windfarm (East) Ltd

Viewpoint 4: Wick Bay

Grid Ref: 336985 951027 Distance to nearest turbine: 26.16km (Consented) / 25.67km (Proposed) AOD: 10.4m View Direction 114.11 degrees

0 500 1000m
scale in metres 1: 20,000

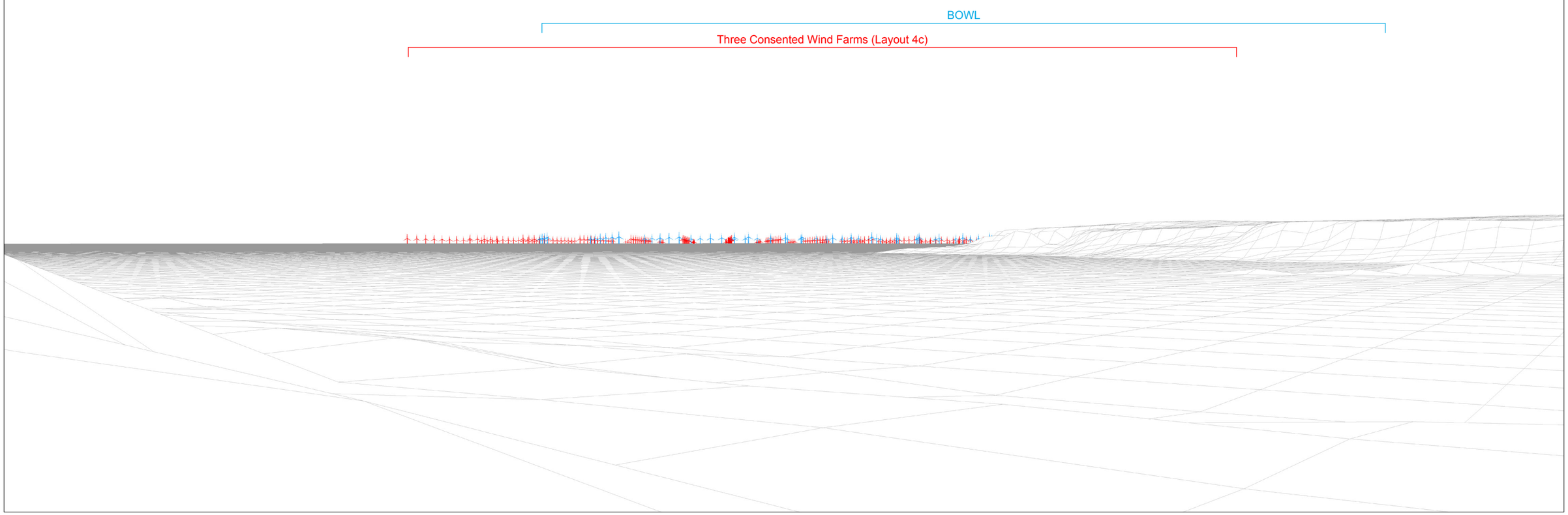
View from northern edge of Wick Bay, on Scalesburn Road pavement.

Viewpoint 4
Wick Bay
Figure No. 9.4

Moray Offshore Wind Farm (East) Ltd.

Viewpoint 4 Existing view | Distance to nearest turbine 26.16km | Camera: EOS 5D Mark II | Focal Length (27°) x 28mm horizontal (65.5°) | Camera height 1.5m | Date: 08/09/12 | Time: 16:30

Viewpoint 4 Wireline overlay - Three Consented Wind Farms (Layout 4c) | Blade Tip: 204m | Rotor Diameter: 172m | No. of Turbines: 216

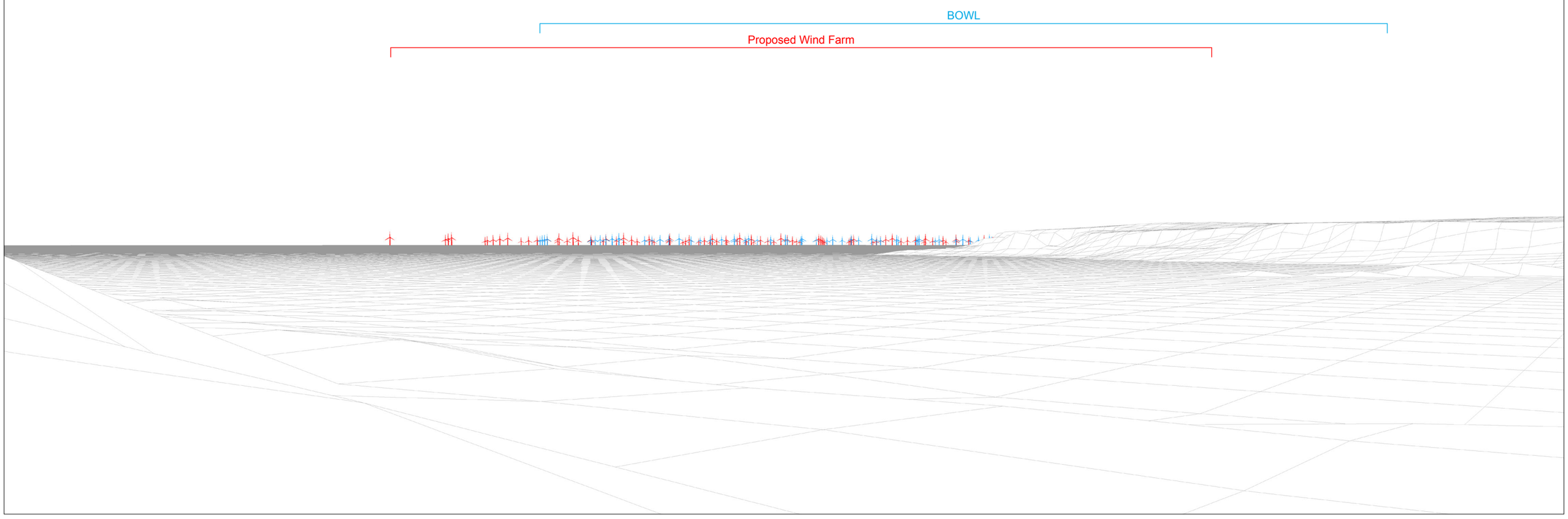


Viewpoint 4 Wireline overlay - Proposed Wind Farm

Blade Tip: 280m

Rotor Diameter: 230m

No. of Turbines: 100



Viewpoint 7: Lybster

Grid Ref: 324843 935082 Distance to nearest turbine: 26.88km (Consented) / 26.44km (Proposed) AOD: 55.2m View Direction 111.14 degrees

0 500 1000m
scale in metres 1: 20,000

View from the end of Main Street in Lybster

Viewpoint 7
Lybster (end of Main Street)
Figure No. 9.5

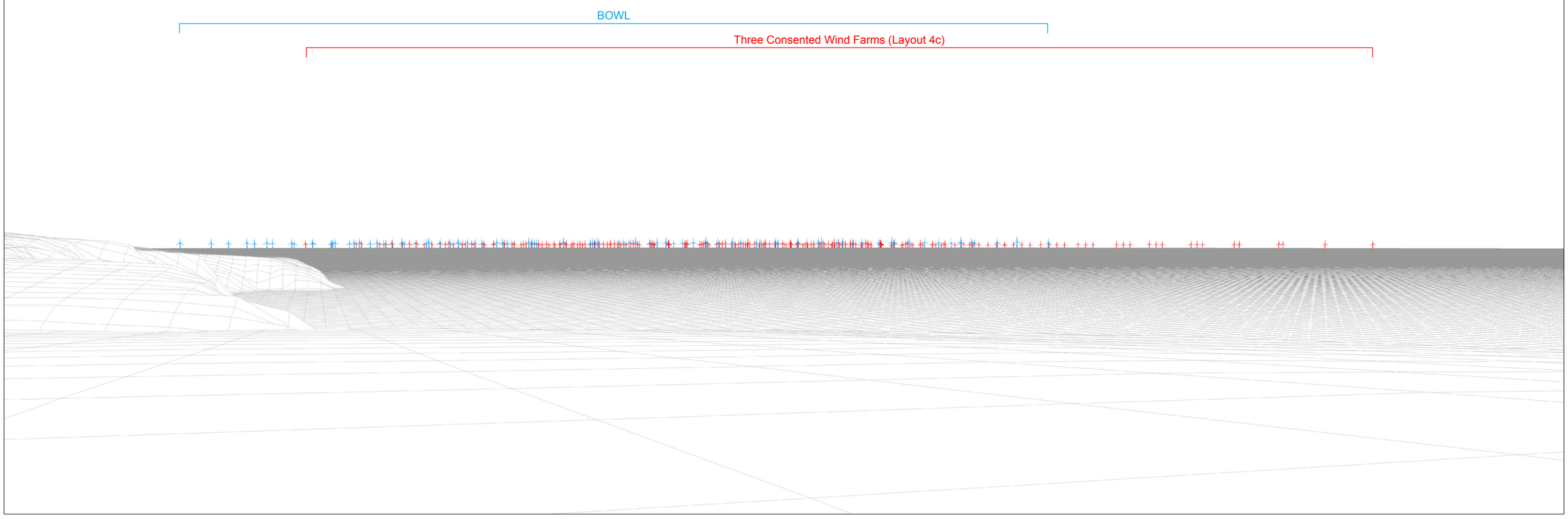
Moray Offshore Wind Farm (East) Ltd.

Viewpoint 7 Wireline overlay - Three Consented Wind Farms (Layout 4c)

Blade Tip: 204m

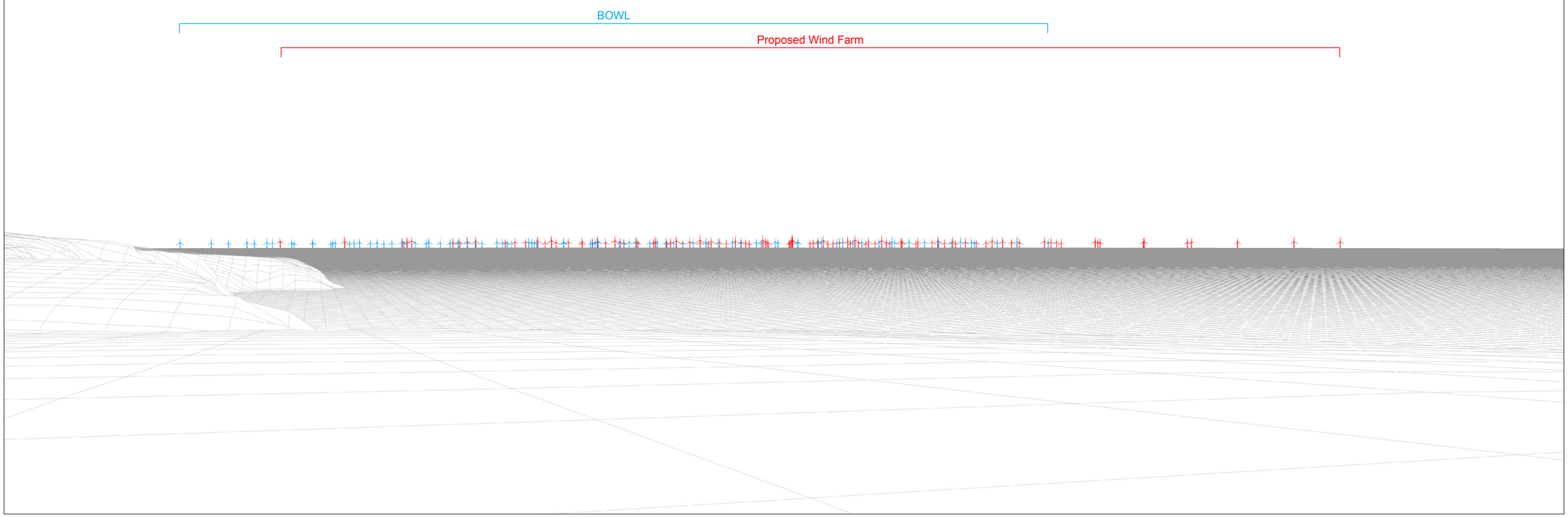
Rotor Diameter: 172m

No. of Turbines: 216



Viewpoint 7 Existing view | Distance to nearest turbine 26.44km | Camera: EOS 5D Mark II | Focal Length (27°) x 28mm horizontal (65.5°) | Camera height 1.5m | Date: 08/09/12 | Time: 16:56

Viewpoint 7 Wireline overlay - Proposed Wind Farm | Blade Tip: 280m | Rotor Diameter: 230m | No. of Turbines: 100



Viewpoint 17: Buckie, Cliff Terace

Grid Ref: 343091, 865825 Distance to nearest turbine: 44.39km (Consented) / 44.79km (Proposed) AOD: 24.2m View Direction 14.50 degrees

0 500 1000m
scale in metres 1: 20,000

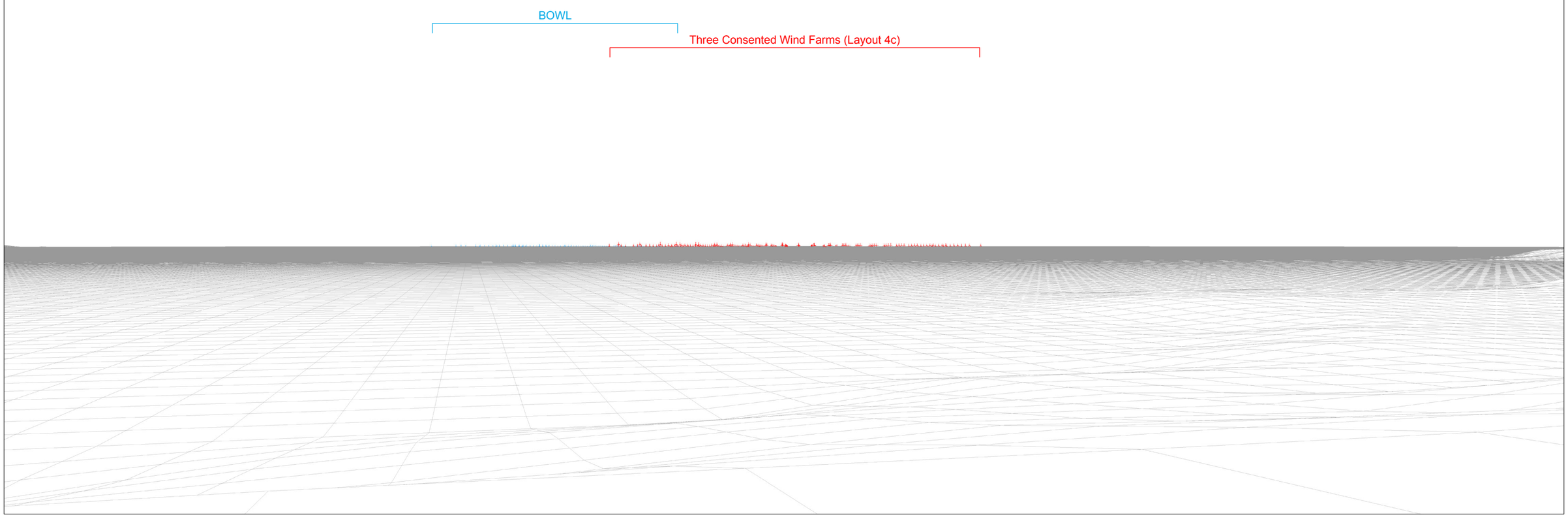
View taken from Cliff Terrace, adjacent to the lighthouse

Viewpoint 17
Buckie, Cliff Terrace
Figure No. 9.6

Moray Offshore Wind Farm (East) Ltd.

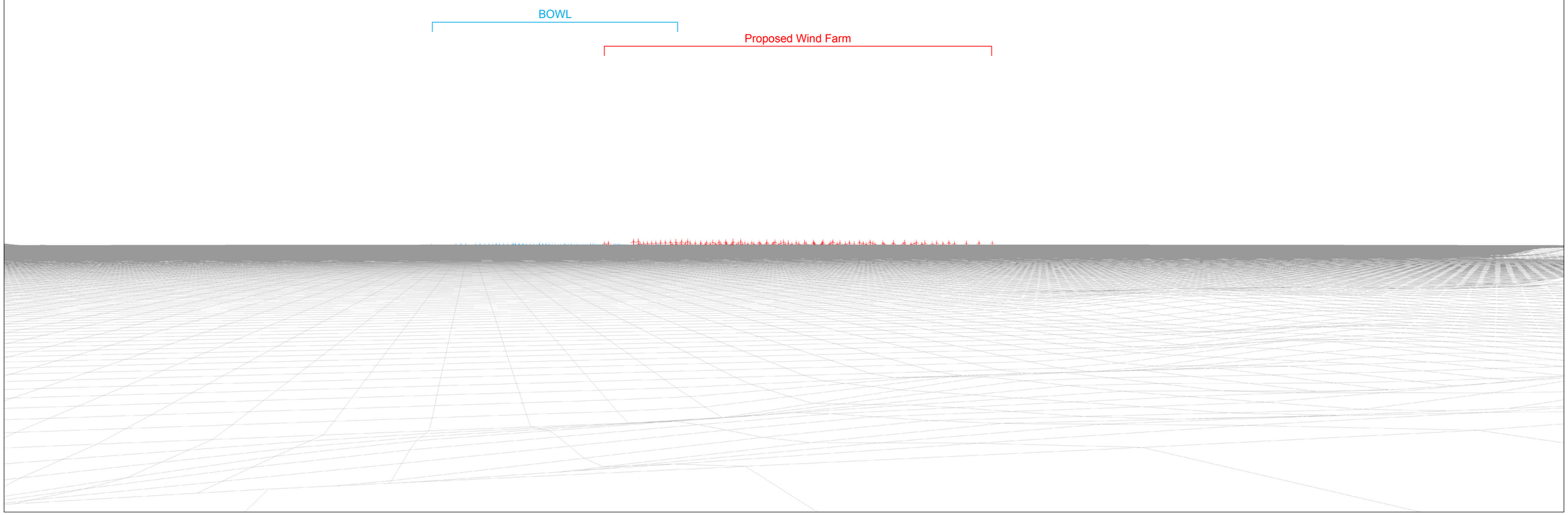
Viewpoint 17 Existing view | Distance to nearest turbine 44.39km | Camera: EOS 5D Mark II | Focal Length (27°) x 28mm horizontal (65.5°) | Camera height 1.5m | Date: 06/09/11 | Time: 14:24

Viewpoint 17 Wireline overlay - Three Consented Wind Farms (Layout 4c) | Blade Tip: 204m | Rotor Diameter: 172m | No. of Turbines: 216



Viewpoint 17 Existing view | Distance to nearest turbine 44.79km | Camera: EOS 5D Mark II | Focal Length (27°) x 28mm horizontal (65.5°) | Camera height 1.5m | Date: 06/09/11 | Time: 14:24

Viewpoint 17 Wireline overlay - Proposed Wind Farm | Blade Tip: 280m | Rotor Diameter: 230m | No. of Turbines: 100



MORAY EAST
OFFSHORE WINDFARM

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