

## **30**      ***OTHER ISSUES***

### **30.1**    ***INTRODUCTION***

1.      This Section of the ES describes other relevant marine infrastructure and legitimate uses of the sea in the Moray Firth not covered elsewhere in the ES and presents an assessment of any potential effects to that infrastructure and those legitimate uses resulting from construction, operation and decommissioning of the Project, which consists of the Wind Farm and the Offshore Transmission Works (OfTW).
2.      This Section of the ES is supported by the following Sections:
  - Sections 9 and 21: Wind Farm and OfTW Physical Processes and Geomorphology;
  - Sections 18 and 28 : Wind Farm and OfTW Shipping and Navigation; and
  - Section 19: Wind Farm Aviation.
3.      This section includes the following elements:
  - Assessment Methodology;
  - Consultation;
  - Study Area;
  - Baseline Description;
  - Assessment of Potential Effects;
  - Air Quality and Carbon Emissions;
  - Mitigation Measures;
  - Residual Effects;
  - Assessment of Cumulative Effects;
  - Statement of Significance; and
  - References.

### **30.2**    ***ASSESSMENT METHODOLOGY***

4.      The following aspects are included in the assessment:
  - Military exercise areas;
  - Telecommunications;
  - Pipelines and marine cables;
  - Ports and harbours;
  - Oil and gas activities;
  - Other wind farm developments; and
  - Air Quality and Carbon Emissions.
5.      The assessment outlines the nature of other marine users currently active in and around the Offshore Project. The assessment considers the likely effects of the Project with these uses and concludes on whether these interactions are likely to be acceptable or unacceptable. Unacceptable interactions are considered to be significant in terms of the EIA Regulations.

6. A desk based study was undertaken to identify the existing baseline environment using available data and information gained during the consultation process. The following data sources were used to inform the assessment:
- United Kingdom Offshore Operators Associated (UKOOA) (location of submarine cables);
  - United Kingdom Cable Protection Committee (UKCPC) (location of submarine cables);
  - The Crown Estates (Offshore wind farm lease sites and aggregate areas);
  - UK Deal (oil and gas infrastructure);
  - Department of Energy and Climate Change (DECC) (oil and gas licensing); and
  - Practice and Exercise Areas (PEXA) UK Hydrographic Office (military activities).

### **30.2.1 WORST CASE SCENARIO**

7. The assessment of effects on other marine users is based on the findings of the assessment presented in Sections 9 and 21: Wind Farm and OfTW Physical Processes and Geomorphology, Sections 18 and 28: Wind Farm and OfTW Shipping and Navigation; and Section 19: Wind Farm Aviation. The worst case scenario of the Project has been defined and is assessed in these chapters.
8. Full details on the range of options contained within the Rochdale Envelope for the Project are provided in Section 7: Project Description.

### **30.2.2 SCOPE OF ASSESSMENT**

9. Effects on shipping and navigation are considered in Sections 18 and 28, and Section 19 provides an assessment of impacts on aviation interests. These assessments are not repeated here.
10. Assessment of effects on marine waste and spoil disposal sites was scoped out of the EIA on the basis that all the marine disposal sites located within the Moray Firth lie outside the Wind Farm Site and OfTW corridor and are only used sporadically. Due to their coastal locations there are unlikely to be any effects on these sites from the Wind Farm. The closest marine disposal site to the OfTW lies to the north of Buckie approximately 2 km to the east of the OfTW landfall point. Given the distance of separation no effects are anticipated and effects are not considered further.
11. Effects on aggregate extraction areas have also been scoped out of this EIA on the basis that there are currently only two aggregate extraction areas in Scotland, one in the Firth of Forth, the second area is in the Firth of Tay, both of which have been inactive for several years. Due to the location of these sites in relation to the Wind Farm Site and OfTW corridor there will be no significant effects on these areas and effects are not considered further. There are currently no areas identified for future aggregate extraction activities in the Moray Firth.
12. There is significant potential for ports and harbours in, and associated with, the Moray Firth to be developed to support the offshore wind sector, in particular the manufacture and construction of the Wind Farm. However while these

opportunities for development are acknowledged, at this stage the manufacture and construction arrangements and longer term operations and maintenance arrangements for the Wind Farm and OfTW are still to be determined. An assessment of the effects on ports and harbours is presented in this Section however this is limited by the uncertainty associated with which ports will be used for the Project.

13. Effects on navigational safety and shipping collision risk is provided in Sections 18 and 28: Wind Farm and OfTW Shipping and Navigation.

### 30.3 CONSULTATION

14. Other marine users and operators of infrastructure in the Moray Firth have been consulted and responses are summarised in Table 30.1 below.

*Table 30.1 Summary of Consultation Undertaken*

Consultee	Summary of Consultation Response	Project Response
Defence Estates	Confirmed the OfTW route passes through Firing Practice Area D807. This is not considered an issue so long as information is provided on the construction programme.  No comment regarding military vessels utilising the Wind Farm site other than aviation. Aviation issues are considered in Section 19 of this ES.	An indicative Construction Programme is provided in Section 7 of this ES and a more detailed construction works programme would be provided to Defence Estates, and other marine operators prior to commencement of construction.  See Section 19 for assessment of effects on aviation activities. Assessment of effects on military vessels transiting the Wind Farm Site are provided in Section 30.6.1.
Caithness Petroleum	No response to scoping.	Assessment of effects on oil infrastructure provided in Section 30.6.5.
PA Resources	No particular comments or observations. Unable to contribute any additional baseline data at this time.	Assessment of effects on oil infrastructure provided in Section 30.6.5.
Talisman Energy	Reviewed the Transmission Works Scoping Report and had no comment.	-
Ithaca Energy	No response to scoping. During further consultation Ithaca expressed a concern relating to the proximity of the Project to the platforms.	BOWL have and are continuing to liaise with Ithaca in order to identify safe ways of managing the activities of the Project and the oil platforms. Aviation issues relating to the platforms is provided in Section 19.
Ofcom	No fixed link end(s) within or fixed link paths cross the specified coordinate area of NGR – ND 48135 28752 Radius 10km.	n/a

Consultee	Summary of Consultation Response	Project Response
Atkins Global	In relation to UHF Radio Scanning Telemetry communications there are no objections to the Wind Farm proposals.	n/a
Joint Radio Company (JRC)	JRC does not foresee any potential problems associated with the proposed developments based on known interference scenarios and data provided. However, should the details of the development change it will be necessary to re-evaluate the proposal. JRC does operate one microwave link which crosses the Moray Firth from Banffshire to Caithness. However, this is located approximately 25km from the Wind Farm Site and therefore will not be affected.	Should any details of the Wind Farm change JRC will be consulted on these changes.
CSSSpectrum Management Systems Ltd.	No operators identified.	n/a
Arqiva	Arqiva do not have any microwave radio links within 10km of the co-ordinates 348135 928752.	n/a
Cromarty Firth Port Authority	No concerns regarding any potential effects on shipping activities.	n/a
MORL	Consider that the study area used for the offshore transmission works scoping exercise is too narrow to consider cable routes outside of the MORL zone and the impact inside the zone has not been properly considered.	BOWL have considered alternative routes for the OfTW corridor throughout the EIA process please see Section 6.4, Section 6.4.2 and Section 6.4.3.
	Request that BOWL include MORL as a consultee.	MORL have been consulted throughout the EIA process through our collaboration and consultation as part of the MFOWDG. MORL have been added to the consultee list for the Environmental Statement
	Request that BOWL should complete an alternatives study to assess cable routes outside the MORL zone.	BOWL have considered alternative routes for the OfTW corridor throughout the EIA process please see Section 6.4, Section 6.4.2 and Section 6.4.3.
	Request that the impact of the cable on MORL's zone should be assessed.	An assessment of the effect of the OfTW corridor on the Moray Firth Round 3 Zone is provided in Section 30.7.

### **30.4 STUDY AREA**

16. Due to the varied nature of infrastructure relating to other marine uses, the study area for each type of infrastructure has been considered separately for each aspect and is directly related to the location of that infrastructure. Further information on the geographical extent of the infrastructure considered is presented throughout the sections below.

### **30.5 BASELINE DESCRIPTION**

#### **30.5.1 MILITARY EXERCISE AREAS**

17. PEXA charts, produced by the UK Hydrographic Office, identify the military activity zones within the Moray Firth area. PEXAs are used for various military practice activities by the Royal Navy, the Army, the Royal Air Force and the MOD. Firing Practice Areas D807 and D809 are the closest areas (1 NM east and 2.6 NM south of the Wind Farm Site ) and the proposed OfTW corridor passes through Firing Practice Area D807. Tain RAF Bombing Range is located approximately 19 NM south west. These areas are illustrated on Figure 30.1.

#### **30.5.2 TELECOMMUNICATIONS**

18. Telecommunication links within the Moray Firth were identified through consultation with the operators and industry bodies identified in Table 30.1 above. The location of the JRC microwave link is shown in Figure 30.2.
19. The oil and gas platforms telecommunications are set up via satellite between platforms and the shore, and will not therefore be affected by the Project.
20. In addition to consultation with the operators listed above, information provided on the websites of the BBC and OFCOM was also reviewed.
21. The Shefa fibre-optic telecommunications cable is considered under the assessment of marine pipelines and cables below.

#### **30.5.3 PIPELINES AND MARINE CABLES**

22. The Kingfisher Cable Awareness Charts identify the main subsea cable routes around the coast of the UK. The Shefa Ltd fibre-optic telecommunications cable will run from the Faroe Islands to Banff in Moray. It runs north to south, to the east of the Wind Farm Site. The current consented route of the transmission cable proposed by Scottish Hydro Electric Transmission Limited (SHETL) for the Viking wind farm will pass approximately 7 km to the east of the Wind Farm Site (Figure 30.2). The final design has not been confirmed and consultation is ongoing with SHETL in relation to specific alignments of cables and final details on the exact location of their cables.
23. Pipelines relating to oil and gas activities are detailed in Section 30.5.5 below.
24. Figure 30.2 illustrates the Shefa Ltd cable and the proposed SHETL cable.

#### **30.5.4 PORTS AND HARBOURS**

25. There are a number of ports and harbours located within the Moray Firth and surrounding area. These include the important fishing ports of Wick off the north

east coast and Buckie Harbour on the south coast and the sheltered deepwater commercial ports and harbours of Inverness and the Cromarty Firth located at the head of the Moray Firth.

26. Inverness Harbour was expanded in 2008 to accommodate yachts and small cruise vessels. It also handles a wide range of cargoes including timber, coal, paper pulp, grains, road salt and other dry cargoes and is a main distribution centre for imported fuel oils in the north of Scotland.
27. Other major ports and harbours in the area include Fraserburgh on the southeast edge of the Moray Firth and Peterhead which lies approximately 30km north of Aberdeen. Fraserburgh is the largest prawn/nephrops landing port in the UK and one of the largest in Europe. It also handles a range of cargoes and provides services to the oil and gas industry including ship repairs. Peterhead provides essential services to the oil and gas industry (eg inspection, repair and maintenance, survey and diving support, offshore logistics, safety vessels and subsea construction and decommissioning). It is also one of the largest fishing ports in the UK and handles a range of commercial cargoes.
28. In addition to the main fishing and commercial ports, there are a number of ports that also provide berthing for recreational vessels including Inverness Harbour, Cromarty, Wick and Peterhead. There are also a number of smaller, former fishing harbours, that have been redeveloped as small marinas and these include Banff, Whitehills, Lossiemouth and Findhorn on the south coast of the Moray Firth and Helmsdale on the north coast (Figure 30.3). The area has direct links with the Caledonian Canal (Inverness) and is an ideal staging post for vessels heading on to Scandinavia or the Northern Isles.
29. The main ports and harbours located within the Moray Firth and surrounding area are illustrated in Figure 30.3.

#### 305.4.1 *Proposed Port Developments*

30. In January 2010 SE and HIE published Stage 1 of their three stage N-RIP (Scottish Enterprise, 2010). The N-RIP Stage 1 sets out the background and economic growth aims of the N-RIP and identifies the infrastructure required to support offshore wind, wave and tidal sectors to deliver growth. Stage 1 of the N-RIP includes the identification of a number of sites/locations that could be developed to create a series of bases around Scotland's coast for the manufacture, construction, assembly, operation and maintenance of offshore wind farms and wave and tidal developments.
31. In terms of offshore wind, three locations have been identified in/associated with the Moray Firth:
  - Peterhead Bay Harbour;
  - Cromarty Firth (Nigg Yard); and
  - Ardersier (Inverness).
32. Both Peterhead Bay Harbour and Cromarty Firth (Nigg Yard) were also identified in DECC's UK Offshore Wind Ports Prospectus which was published in May 2009

- (DECC, 2009). This report also identified Highland Deephaven on the Cromarty Firth as a possible location for offshore wind construction or manufacture.
33. In terms of providing services for the offshore wind industry, Peterhead Bay Harbour has recently expanded its facilities with the completion of Smith Quay, which is a new 200 m deepwater berth with 16,000 m<sup>2</sup> of adjacent working area. This all weather facility means that the port can now berth vessels that are up to 140 m length. The port also provides heavy crane facilities, office accommodation, open storage and has ready access to engineering and fabrication services.
34. The second of the locations identified in the N-RIP Stage 1 report is the sheltered deepwater facility at Nigg Yard on the Cromarty Firth. Nigg Yard is a large (96 ha) former fabrication yard with existing large fabrication warehousing and a dry dock facility. The yard already provides a range of services to the oil and gas industry including inspection, repair and maintenance of oil rigs and deep anchorages, and subsea engineering and construction. It was also used for the assembly and installation of the Beatrice demonstration turbines in 2006 and has established engineering supply chain. Consequently the facility has been identified in N-RIP as a key location for providing integrated manufacture support.
35. Ardersier is a reclaimed facility located 16 km along the coast from Inverness. The 109 ha site was used for oil and gas fabrication in the early 1970's and was the base from which a number of the North Sea oil and gas platforms and jackets were constructed and floated off by barge. With the benefits of having direct access to the Moray Firth and North Sea this site has also been identified in N-RIP as a possible location for providing integrated manufacturing services.
36. BOWL has ongoing investigations at a number of ports and harbours within the north east of Scotland for suitability for use during the construction and operation of the Project.

### **30.5.5 OIL AND GAS ACTIVITIES**

37. The main oil and gas activity in the Moray Firth area at present is the Beatrice oil field (Block 11/30a). This field was discovered in 1976 and began production in 1981. Activities are restricted to oil only. The oil field has produced over 160 million barrels of oil to date. Figure 30.4 illustrates oil infrastructure in the Moray Firth. Key structures include:
- the Beatrice Alpha, Bravo and Charlie platforms;
  - the Jacky platform;
  - seabed cables and pipelines linking the platforms; and
  - the Beatrice demonstrator wind turbines.
38. Beatrice oil is exported via a 66 km long 16 inch (0.4 m) pipeline from the Beatrice Alpha complex to a shore terminal at Nigg in the Cromarty Firth, where it is stored until offloaded by tanker shipment.
39. The Beatrice complex is linked to the mainland via a 132/33 kV seabed power cable from Dunbeath (Figure 30.2). The Beatrice demonstrator wind turbines provide approximately 30% of the Beatrice Alpha platform's electricity requirements.

40. Beatrice Alpha, Bravo and Charlie are owned by Talisman Energy and operated by Ithaca Energy. The Jacky platform is owned and operated by Ithaca Energy. Existing oil and gas infrastructure including wellheads are afforded certain exclusion zones, restricting certain types of activities and development within their proximity. It should be noted that exclusion zones are not prescriptive and a risk based approach is taken to their application. There is ongoing work to gather information to clarify the required separation of wind turbines from the Jacky platform.
41. A 500 m exclusion may apply around subsea wellheads during drilling and operation, subject to safety case. Abandoned but not decommissioned wells do not have exclusion zones but are marked on nautical charts.
42. In the 23rd Licensing Round (2005), Ithaca Energy was awarded, as one licence, several further blocks and part blocks which surround the Beatrice Field. The Polly prospect, 2.5 km east of Beatrice oil field is an emerging opportunity and straddles blocks 11/30a and 12/26c. The Polly oil field region is illustrated on Figure 30.4. Caithness Petroleum holds three licences awarded in the 23rd Licensing Round which cover five offshore blocks in the northern coastal area of the Inner Moray Firth and in the 25th licensing round, Caithness Petroleum were awarded two further licences for 12/22b and Block 12/23b. PA Resources hold an exploration licence in the Moray Firth.
43. During the 26<sup>th</sup> Licensing Round (2011/2012), Sendro was awarded a licence to 'promote' block 21b.

### **30.6 ASSESSMENT OF POTENTIAL EFFECTS**

44. The following sections present an assessment of the effect of the Project on other infrastructure in the Moray Firth.

#### **30.6.1 MILITARY ACTIVITIES**

##### *30.6.1.1 Construction and Decommissioning*

45. There is the potential that the physical presence of vessels involved in the construction of the Wind Farm and the installation of the OfTW (barges carrying cable drums, dredging vessels and/or ploughs) could lead to the temporary disruption or exclusion of military activities from the area within and adjacent to the Wind Farm Site and OfTW cable corridor. The Wind Farm Site is not within a PEXA, however the proposed route of the OfTW passes through Firing Practice Area D807, used annually for Joint Warrior exercises. The installation of the cable is a short term activity taking a maximum of 240 days for the whole length of the cable including protection. As only a portion of the OfTW corridor is located within the military zone, military activity will only be excluded from the area on a temporary basis. During the period of installing the OfTW within this area, the Applicant will liaise with the relevant military operatives to ensure the construction of the cable is undertaken in a safe manner, and that any disruption to the use of the area for military practice is minimised so as not to present an unacceptable effect on military activities. The effect is therefore considered to be not significant.



46. Decommissioning activities will be similar to construction however are expected to be of a shorter time scale and hence any effects would be less than those during construction. The same liaison with marine users such as military operators would be implemented during decommissioning as construction. No significant effects are therefore predicted during decommissioning.

*30.6.1.2 Operation*

47. Once installed the OfTW will not lead to any material interference with military activities in the area. Operation of the Wind Farm will introduce a permanent physical obstruction to the operation of vessels as discussed in Section 18 Shipping and Navigation. It is considered that this will result in the need for the military to adjust passage plans for military vessels and training exercises to ensure that they avoid the area. As the Wind Farm Site is not within a PEXA this is not considered to represent an unacceptable effect and is therefore not significant.

**30.6.2 TELECOMMUNICATIONS**

48. Effects on submarine telecommunication cables are assessed in section 30.6.3 Pipelines and Marine Cables.
49. The OfTW submarine cables will have no effect on airborne telecommunication links during construction, operation or decommissioning and this is not considered further in this assessment. The effects described below refer to the potential effects of the Wind Farm component of the Project on airborne telecommunications.

*30.6.2.1 Construction and Decommissioning*

50. Wind turbines can have an effect on telecommunications links through disruption of the signal when the turbines are operational. This disturbance will not be associated with the construction or decommissioning activities and therefore no effects on airborne telecommunications are anticipated during the construction or decommissioning of the Wind Farm.

*30.6.2.2 Operation*

51. Consultation with telecommunications operators identified one microwave link (JRC microwave link) which crosses the Moray Firth from Banffshire in the south to Caithness in the north west (see Figure 30.2). This link lies approximately 25 km to the west of the Wind Farm Site. An applicable buffer for a JRC microwave link within which a detailed assessment of the potential for turbines to cause disturbance may be required is 1 km. As the Wind Farm is outwith this 1 km buffer of the microwave link by some distance no effects are predicted. In addition there were no objections received from any of the operators known to have microwave links in this area. In conclusion there will be no effects on microwave links in the area.
52. Oil and gas telecommunications are operated via satellite. It is therefore concluded that there will be no effect on these links.
53. No significant effects on telecommunications are predicted as a result of operating the Wind Farm.

### 30.6.3 PIPELINES AND MARINE CABLES

54. The following pipelines and cables in the Moray Firth have the potential to be affected:
- Cables and pipelines associated with the Beatrice Oil Field (Block 11/30a);
  - Consented SHETL power cable; and
  - Shefa Ltd submarine telecommunications cable.
55. Figures 30.2 shows the location of existing and consented pipelines and cables.
56. Potential effects on pipelines and marine cables include the following:
- Effects from interference with other pipelines and cables where cable/ pipeline crossings are required;
  - Potential increased burial of existing cables and pipelines from the deposition of sediment suspended during construction activities including; dredging (preparation of the seabed for gravity base structures), drilling (required for pin pile installation) and cable installation (dredging, ploughing or jetting); and
  - Potential burial or exposure of existing cables and pipelines due to changes in wave and tidal regime and sediment transport regimes during the operation of the Wind Farm.
57. The following assessment draws on information included in Sections 9 and 21 Physical Processes and Geomorphology of this ES and these sections should be referred to for more detailed information on physical processes.

#### 30.6.3.1 *Construction and Decommissioning*

58. No crossings are proposed with any existing or consented pipelines or cables therefore no interference with other cables and pipelines due to cable crossings are predicted. For most of its length the OfTW cable route is located more than 10 km from the proposed SHETL cable route, although these cables do converge to approximately 600 m of each other at a point approximately 8km offshore from the landfall and 560 m of each other at the landfall. However, there is no requirement for these cables to cross at this location. Therefore the effect on the SHETL cable will be acceptable and therefore not significant.
59. With regard to the Wind Farm the findings from the physical process assessment in Section 9 of this ES concludes that for both preparation of the seabed for gravity base structures and drilling to aid pin pile installation, the maximum deposition of the sand fraction of the sediment released is likely to be rapidly deposited in the local area around the point of release (50 m to 100 m from the foundations). However, finer materials may be transported over larger distances leading to the potential for an accumulation of fine sediment in areas outside the Wind Farm Site.
60. For both activities detailed above the accumulations of fine sediment would be of variable thicknesses. These are likely to range from 0.006 m to 0.008 m for seabed preparation and 0.004 m to 0.006 m for drilling if the fine material released is poorly sorted and deposited in discrete locations. Considering the worse case the thickness of accumulations could range from 0.5 mm to 0.6 mm for dredging and

- 0.7 mm to 0.9 mm for drilling for poorly sorted discrete accumulations of fine sediment released consecutively from all 277 (worst case) foundations.
61. It should be noted that this is a very conservative worst case. However, for both activities the accumulated sediment would only have a temporary effect on the texture of the surface sediment in the area affected as the accumulations would be reworked and dispersed by natural processes (storms) over the short to medium term.
  62. On the basis that the fine materials may be transported up to 25 km from the Wind Farm site and transport of sediment is likely to occur in a mainly south by south west direction, there is potential for some accumulation on the seabed in areas where cables and pipelines associated with the Jacky, Beatrice Alpha, Bravo and Charlie platforms are present. However, it is likely that the fine material will be evenly graded and dispersed across a wider area, reducing the likelihood of discrete accumulations in this location. Material is also expected to be subject to continual erosion and dispersal from storm events during the construction period.
  63. Accumulations of fine sediment are less likely to occur in areas to the east of the Wind Farm Site (where the Shefa Ltd and SHETL subsea cables are located) as this would be against the natural direction of the tidal currents that pass through this area. Taking this into account it is predicted that the accumulated thickness for dredging and drilling, is more likely to range from 0.01 mm to 0.15 mm. Temporary changes of this thickness of accumulation on the seabed are unlikely to affect the integrity of the existing seabed or buried cables and pipelines. Therefore the effect on cables and pipelines from increased burial resulting from sediment released during dredging for gravity base structures or drilling for pin piles are likely to be acceptable and therefore not significant.
  64. For the OfTW the results from the physical processes assessment (Section 21) concluded that, while there is likely to be sediment released as a result of cable installation activities e.g. dredging, ploughing and jetting trenching, which may be of a magnitude that is in excess of the natural range of variability, most material (gravels and sands) is likely to be deposited within 5 m to 125 m of the point of release even for the worst case scenario (jetting trenching). The overall corridor for the OfTW export cables is dependent on the water depth. There will be up to three cable trenches of 3 m width, the separation distance of the trenches is four times the water depth which varies from 38 m to 100 m along the OfTW corridor. The cable corridor is expected to be less than 1 km in width for the majority of its length (varying between 575 m and 1.54 km dependent on water depth). Therefore, even where the corridor passes in close proximity to areas where existing cables and pipelines are present (such as the Beatrice Oil Production Area), it is expected that any material released during cable installation will be re-deposited locally and therefore is expected to be contained within the cable corridor rather than being dispersed elsewhere. Due to the localised and temporary nature of these accumulations, the effect on other existing and consented cables and pipelines will be acceptable and therefore not significant.

### 30.6.3.2 *Operation*

65. The physical processes assessment (Section 9) concludes that the Wind Farm would not have a significant effect on existing wave or tidal regimes. The assessment also concludes that on the basis that there will be no significant effects on the parameters that ultimately control sediment transport (wave and tidal regime) there will be no corresponding significant effects on either sediment transport or seabed from within the site. Potential effects during operation are therefore assessed as acceptable and not significant.
66. An additional assessment was also undertaken to quantify whether the Wind Farm would have any effects on the regional sediment transport regimes. Given that any changes to tidal currents or wave regimes are predicted to be confined to the extent of the Wind Farm Site (and of a magnitude that is less than the potential for natural variability with a lower magnitude elsewhere) it was concluded that there would be no corresponding effect on the rate of sediment supply to other parts of the Moray Firth.
67. Given that the physical processes assessment concluded that there would be no significant effects on sediment transport throughout the Moray Firth it can be concluded that there will be no significant effect on other cables or pipelines due to exposure or increased burial from changes in sediment transport or seabed form.
68. In addition there will be no significant effects on existing or consented pipelines or cables during operation of the OfTW.

### 30.6.4 **POTENTIAL EFFECTS ON PORTS AND HARBOURS**

69. The main potential effects on ports and harbours are as follows:
- Restricted access to ports and harbours during construction due to transportation of turbine parts/turbines to the Wind Farm site and presence of jack-up rigs and other construction/turbine installation vessels on routes to and from ports and harbours;
  - Interference/restricted access or disruption of movement of fishing vessels, cargo ships, tankers and recreation boats to and from ports and harbours during cable installation of the OfTW;
  - Restricted access to ports and harbours during the operation of the Wind Farm development; and
  - Opportunities for port development to support the manufacture, construction, operation and maintenance of the Project.
70. Further assessment relating to effects on navigational safety and the potential for collision risk between vessels associated with the Project and other vessels entering and exiting ports and harbours does not form part of this assessment and is assessed in Sections 18 and 28 Shipping and Navigation of this ES.

#### 30.6.4.1 *Construction and Decommissioning*

71. The closest port to the Wind Farm is Wick. Although most vessel movements are associated with the Pentland Firth shipping route that runs approximately 5 NM north by north east of the site, there are some vessel movements that pass through

- the Wind Farm Site. These are mainly related to small and medium cargo vessels travelling to and from Wick, Invergordon and Buckie and a recreation route with medium activity that runs between Wick and Peterhead.
72. Effects on commercial, recreation and fishing vessel movements within the Wind Farm Site and surrounding area may be subject to disruption and navigation risk. On the basis of the distance of the Wind Farm Site from Wick Harbour (approximately 9 NM), the potential risks associated with this are considered to be acceptable and not significant. No significant effects are predicted on access to or from other ports and harbours in the Moray Firth and surrounding area due to the construction of the Wind Farm.
73. There is potential for the vessels involved in cable installation activities associated with the OfTW to interfere with, or disrupt, the movement of fishing vessels, cargo ships and tankers and recreation boats to and from ports and harbours. The area where vessels are likely to experience the greatest disruption is along the southern coast of the Moray Firth, in particular vessels heading to and from the larger ports of Inverness and Cromarty at the head of the Moray Firth.
74. There may also be some disruption to smaller vessels/recreational boats accessing Lossiemouth Marina to the west of the cable route and fishing boats accessing Buckie Harbour to the east of the cable route. However, where disruption occurs, this will largely be localised and short term during the temporary construction phase. BOWL will liaise with the relevant authorities to ensure that information about the construction activities is provided to minimise disturbance. The likely effect on ports and harbours in terms of restricted access due to the construction of the OfTW will be short term and acceptable. As such the effect will be not significant.
75. As noted in both the N-RIP Stage 1 report (and reinforced in the N-RIP Stage 2 report which was published in July 2010) (Scottish Enterprise, 2010) and the DECC UK Offshore Wind Ports Prospectus (DECC, 2009), there is significant potential for ports and harbours in and associated with the Moray Firth to be developed to support the offshore wind sector, in particular the manufacture and construction of the Wind Farm.
76. However, while these opportunities for development are acknowledged, at this stage the manufacture and construction arrangements for the Wind Farm are still to be determined. At present it is not known which ports and harbours will be used for the construction of the Project and hence it is not possible to assess the positive effects which will be delivered to these facilities by the increased investment.
77. The effects during decommissioning would be the same or less than during construction and hence have not been assessed separately.
- 30.6.4.2 *Operation*
78. There will be no unacceptable and therefore no significant effects on access to and from Wick Harbour or other ports and harbours in the Moray Firth and surrounding area during the operation of the Project.

79. While there may be opportunities for some ports and harbours within the Moray Firth or the surrounding area to be developed to support the longer term operations and maintenance of the offshore wind sector. As stated in the construction section above, at present it is not known which ports and harbours will be used for the Project and hence it is not possible to assess the positive effects which will be delivered to these facilities by the increased investment.

### **30.6.5 OIL AND GAS ACTIVITIES**

80. Potential effects on oil activities in the Moray Firth area include the following:

- Accidental damage to oil infrastructure during construction of the Wind Farm and OfTW;
- Interference with oil operational vessel activities during construction of the Wind Farm and OfTW;
- Interference with oil operational vessel activities during operation of the Wind Farm; and
- Interference with helicopter operators servicing oil infrastructure during operation of the Wind Farm.

#### *30.6.5.1 Construction and Decommissioning*

81. There is the potential for accidental damage to existing oil infrastructure. This could occur, for example, as a result of construction vessels breaking free from their moorings during storm events or due to technical failure. Although it is possible that collision could occur, the likelihood of this is extremely low. The potential risk of collision is therefore considered to be acceptable and not significant.
82. There may also be some interference with oil and gas industries operational activities such as oil support vessels and seismic surveys. On the basis that most construction activities will occur within the Wind Farm Site located to the north east of the Jacky, Beatrice Alpha, Bravo and Charlie platforms, or to the south of the Beatrice Oil Production Area the likelihood of any vessel interference with oil operations and activities is low. These activities will be temporary and of short duration. There is ongoing work to gather information to clarify the required separation of wind turbines from the Jacky platform to ensure both facilities can be operated in a safe manner. BOWL will liaise with the relevant authorities to inform them of construction activities. The effects on oil and gas activities will be acceptable and therefore not significant.
83. Further assessment relating to effects on navigational safety and collision risk is provided in Sections 18 and 28 of this ES, which concludes that no significant effects are predicted.
84. The effects resulting from decommissioning would be the same or less than those during construction.

#### *30.6.5.2 Operation*

85. Potential effects on oil operator vessels are considered in Sections 18 and 28 Navigation and Shipping, which concludes that no significant effects are predicted.

86. Potential effects on helicopter operators servicing the oil infrastructure are considered in Section 19 Aviation, i.e. approach procedures associated with existing routes to helidecks of oil and gas infrastructure which concludes that measures will be implemented to ensure acceptable interaction between uses.
87. BOWL will during operation continue to liaise with the oil platform operators to ensure the facilities are managed in a safe manner and no unacceptable and therefore significant effects arise.
88. Once operational, the OfTW's are not anticipated to affect oil activities and no operational effects are anticipated. In the event of decommissioning of the platforms jack-up vessels will be restricted to use away from the BOWL cables to ensure no safety issues arise. This will be managed in coordination with the platform operators to ensure no unacceptable and therefore significant effects arise.

### **30.7 OTHER WIND FARM DEVELOPMENTS**

1. There is the potential for the OfTW to impact on the Moray Firth Round 3 Zone WDA. However, at the time this assessment was undertaken no details on the proposed location of assets within the Moray Firth Round 3 Zone WDA were available from MORL. When such details become available BOWL and MORL will engage to further understand the interaction of their respective developments, and work together to minimise effects on either project where feasible. As such there are not considered to be any significant effects on the Moray Firth Round 3 Zone WDA as a result of the OfTW.

### **30.8 AIR QUALITY AND CARBON EMISSIONS**

2. This section takes into consideration both the positive and negative contributions in relation to air quality and Carbon Dioxide (CO<sub>2</sub>) emissions as a result of the construction, operation and decommissioning phases of the Project. This Section does not present a full carbon balance for the Project including the manufacture of the required turbines and transport to site but focuses on the operational balance relating to the generation of energy from renewable sources compared to fossil fuels.

#### **30.8.1 CONSTRUCTION / DECOMMISSIONING PHASES**

3. The movement of ships and construction sea-traffic onsite would create CO<sub>2</sub> emissions.
4. Given the short-term nature of the construction and decommissioning period's impacts on local air quality are predicted to be acceptable and therefore not significant.

#### **30.8.2 OPERATION**

5. The Project aims to generate electricity from a renewable source of energy, i.e., the wind, and therefore once operational, will offset the need for power generation from the combustion of fossil fuels. This will result in the electricity produced creating a saving in emissions of CO<sub>2</sub>, with associated environmental benefits.

6. Throughout its operational lifespan, the Project has the potential to displace electricity generated from fossil fuels, and subsequently prevent CO<sub>2</sub> from being released. In order to calculate the exact amount of CO<sub>2</sub> released through electricity generation in the UK, it is necessary to know the electricity generation rate of machinery at any given time. This mix changes on a daily basis, and will change in the future as UK generating plant is replaced and its efficiency improved, and as a consequence it is not possible to predict the exact amount of how much CO<sub>2</sub> the Project will prevent over its life time.
7. DECC produces an annual document, the Digest of UK Energy Statistics 2011 (DUKES), which highlights that in 2010, 364 tonnes of CO<sub>2</sub> was released per gigawatt hour (GWh) when generating electricity from gas and 872 tonnes per GWh from coal. The average CO<sub>2</sub> release from all fossil fuel mix, including oil, was 434 tonnes per GWh.
8. Based on the above figures, the Project, with an estimated energy yield of approximately 24 GWh per year (based on 900 MW installed capacity with a capacity factor of 26.9% of offshore wind farms in 2010 could displace a minimum of 920,514 tonnes of CO<sub>2</sub> from the average CO<sub>2</sub> release of all fossil fuel mix each year from entering the atmosphere.
9. The operational phase of the Project has the potential to also displace gases other than CO<sub>2</sub>, such as those associated with acid rain (Sulphur Dioxide (SO<sub>2</sub>) and oxides of nitrogen (NO<sub>x</sub>)).
10. The Project will act as a major contributor for reducing the amount of CO<sub>2</sub> released in the atmosphere and hence help meet targets forming part of Scotland's commitments on climate change action to reduce greenhouse gases.
11. The energy generated from the Project compared to the generation of that energy from fossil fuel sources presents a positive difference in terms of the generation of CO<sub>2</sub>.

### **30.9 MITIGATION MEASURES**

12. No significant effects are predicted and no mitigation is therefore proposed.
13. However a number of good practice measures will be implemented during construction and operation to further reduce any effects and to ensure the Project is a good neighbour to other existing or consented marine uses:
  - During construction and operation of the Wind Farm there will be ongoing liaison with the operators of all infrastructure in the Moray Firth. This will ensure that BOWL are aware of any concerns and can act upon them. In particular further consultation is required with Oil Operators in relation to exclusion zones around platforms. Further details of this consultation process are provided in Section 19 Aviation;
  - There are currently no existing or consented pipelines or cables that require crossing. If there is a future need to cross cables or pipelines BOWL will negotiate formal crossing agreements with the cable and pipeline owners;



- Measures will be taken to control and minimise levels of suspended sediment generated during construction and associated deposition rates. These measures are discussed in detail in Sections 9 and 21 Physical Processes and Geomorphology;
- Measures will be taken to ensure that the risk of accidental damage to oil infrastructure from vessel movements associated with construction is reduced. Details of these measures are provided in Sections 18 and 28 Shipping and Navigation of this ES along with measures to ensure any disruption to other vessel movements is minimised;
- During construction and operation BOWL will liaise with operators of Ports and Harbours in the Moray Firth to ensure BOWL are aware of any concerns and can act upon them;
- Measures will be taken to ensure that any disruption to vessel movements to and from ports and harbours is minimised. Details of these measures are provided in Section 18 and 28 Shipping and Navigation;
- During construction of the Wind Farm, safety zones will be in operation to ensure military vessels will be excluded from areas of the site. Section 18 Shipping and Navigation further details measures to reduce interference with military activities i.e. movement of vessels and disruption to training activities; and
- Minimum separation distances will be maintained from cables and pipelines as per best practice ensuring there is no risk of damage to these cables during construction and operation of the Project.

### 30.10 RESIDUAL EFFECTS

14. Residual effects are as stated in Section 30.6 and are summarised in Table 30.2.

*Table 30.2 Residual Effects*

Residual Effect	Nature	Significance of Effect
Temporary disruption to military activities	Negative	Not significant
Permanent interference and disruption to military activities	Negative	Not significant
Effects on telecommunications	Negative	Not significant
Burial of existing cables and pipelines during construction	Negative	Not significant
Interference with other cables and pipelines due to cable crossings	Negative	Not significant
Temporary disruption of access to ports and harbours during construction.	Negative	Not significant
Disruption of access to ports and harbours during operation	Negative	Not significant
Collision with oil and gas infrastructure	Negative	Not significant
Interference with oil activities	Negative	Not significant

### **30.11 ASSESSMENT OF CUMULATIVE EFFECTS**

15. Given below is the assessment of cumulative impacts upon other existing marine users arising from the Project in conjunction with other existing or foreseeable planned project/development activities
16. A CIADD (MFOWDG, 2011) was produced which set out the developments to be considered in the cumulative assessment for Oil and Gas Cables and Pipelines (Section 4.14 of the CIADD) and the assessment method which forms the basis of this assessment. The CIADD is presented in Annex 5B.

#### **30.11.1 SCOPE OF ASSESSMENT**

17. The scope and method of this assessment with regard to oil and gas cables and pipeline was previously described in the CIADD (MFOWDG, 2011). This remains unchanged from the method presented in the CIADD (Annex 5B).
18. With regard to other marine users the scope of the assessment has been agreed through consultation as presented in Sections 30.2.2 and 30.3 above.
19. The assessment of significance of cumulative effects has used the same method as presented in Section 30.2.
20. The assessment of cumulative impact has been made against the existing baseline conditions as presented in Section 30.5.

##### *30.11.1.1 Consultation*

21. The CIADD (MFOWDG, 2011) was presented to stakeholders for review in April 2011 for comment.
22. Further consultation on the assessment of other issues was undertaken as presented in Table 30.1 and included a discussion of cumulative effects.

##### *30.11.1.2 Developments Considered in Assessment*

23. Section 4.14.1 of the CIADD (MFOWDG, 2011) (Annex 5B) presented the developments for which it was considered an assessment of cumulative impacts with the BOWL project should be undertaken for Oil and Gas Cables and Pipelines. These were:
  - The Jacky platform;
  - Beatrice Alpha, Bravo and Charlie platforms;
  - Seabed cables and pipelines linking the platforms;
  - The Beatrice oil pipeline (66 km long 16 inch pipeline from the Alpha complex to a shore terminal at Nigg in the Cromarty Firth); and
  - The Beatrice complex a 132/33 kV seabed power cable from Dunbeath.
24. All of the above developments are already in existence and hence have been considered in the baseline and associated assessment presented in Section 30.6 above.
25. The CIADD (MFOWDG, 2011) was presented to Marine Scotland for review in April 2011. In relation to other marine uses considered within this Section there

were no responses received from relevant stakeholders (e.g. oil operators) that altered the proposed scope or approach to that detailed within the CIADD.

26. In addition to the cumulative assessment of Oil and Gas Cable and Pipelines discussed in the CIADD, the following developments were considered appropriate for inclusion in the cumulative assessment for the effects on other users:

- Moray Firth Round 3 Development Zone;
- Moray Firth Round 3 Development Zone OfTW;
- The proposed Viking SHETL cable; and
- Pentland Firth Wave and Tidal Sites.

### 30.11.2 PREDICTED EFFECTS

#### 30.11.2.1 *Military Activities*

27. In terms of potential cumulative effects resulting from other developments within the Moray Firth (Moray Firth Round 3 Development Zone, Moray Firth Round 3 Development Zone OfTW and the proposed Viking SHETL Cable) there is potential for increased activity in this area associated with the construction, decommissioning and operation of these developments. This could lead to increased levels of disruption and interference with military activities and vessel movements within this area. This increased disruption and interference could have an effect on military activity which will need to be managed through consultation with the military operators to ensure no unacceptable effects and therefore no significant effects occur.
28. There is potential for a slight increase in the levels of disruption and interference with military activities and military vessel movements during the construction and operation of other offshore wind farms off the east coast of Scotland. However, due to the distances between these developments and the Project the cumulative effects are considered acceptable and therefore not significant.
29. There are no unacceptable and therefore significant cumulative effects anticipated with development of the Pentland Firth wave and tidal sites due to the distance between the developments.

#### 30.11.2.2 *Telecommunications*

30. The Project is predicted to have no effect on telecommunications links therefore there will be no cumulative effects.

#### 30.11.2.3 *Pipelines and Marine Cables*

31. Cable crossings are project specific effects and as the Wind Farm infrastructure and OfTW do not cross any existing or consented cables or pipelines, no significant cumulative effects are identified. The OfTW cable route crosses the site of the Moray Firth Round 3 Development Zone Western Development Area. In the event cable crossings occur within this area MORL and BOWL would develop suitable agreements to manage these crossings.
32. Section 9 Physical Processes provides a cumulative assessment of simultaneous installation of the Moray Firth Round 3 Development Zone turbines and inter-array

cables with the Wind Farm turbines and inter-array cables and indicates that this could result in a slight increase in suspended sediment concentrations and deposition thicknesses. These cumulative effects are assessed in Section 9 and are expected to be localised and contained within the development site boundaries. Therefore cumulative effects on other cables and pipelines are considered to be acceptable and not significant.

33. Due to the proximity of the Moray Firth Round 3 Development Zone Western Development Area site and the Wind Farm Site to the cables and pipelines associated with the Beatrice Oilfield, there is the potential for sediment deposition resulting in cumulative effects. There is also potential for effects on the Shefa Ltd and SHETL cables which pass through the MORL site. However, the Project will not contribute to this as there is unlikely to be sediment dispersal from the Project in an easterly direction due to tidal currents. No unacceptable and therefore no significant cumulative effects are predicted as a result of the Project.
34. Potential cumulative effects on tidal and wave regimes and associated sediment transport have been assessed in Section 21 Physical Processes as not significant. Therefore there are no unacceptable and therefore no significant cumulative effects anticipated on other pipelines and marine cables in terms of increased burial or exposure.

#### 30.11.2.4 Ports and Harbours

35. Potential effects on navigation safety and collision risk have been assessed in Sections 18 and 28 Shipping and Navigation.
36. In terms of cumulative effects on access to ports and harbours, the Wind Farm and OfTW and Moray Firth Round 3 Development Zone and OfTW are not expected to have any significant effects on access to ports and harbours due to the distance from the coast and presence in an area with a low intensity of vessel movements. However, there is potential for the construction and installation of the Wind Farm and OfTW, cumulatively with the installation of the SHETL cable, and Moray Firth Round 3 Development Zone and OfTW to disrupt access to ports and harbours along the south coast of the Moray Firth and the head of the Moray Firth.
37. It is expected that the disruptions associated with the installation of the export cables will be temporary and short term in nature. However, in addition to possible displacement of vessels or disruptions to vessel movements through the Wind Farm Site and Moray Firth Round 3 Development Zone (although not significant individually) this could result in a cumulative effect on access to ports and harbours however this is considered to be acceptable and not significant.
38. Cumulatively, the simultaneous development of the Moray Firth Round 3 Development Zone and the Project could further increase the opportunities for developing and using existing ports and harbours to support these developments. However, given that manufacture, construction, operations and maintenance arrangements for these developments are still to be determined the extent of these opportunities and positive effects is not assessed further.

### 30.11.25 *Oil and Gas Infrastructure*

39. It is possible that cumulative effects may arise from the Wind Farm being constructed or decommissioned in parallel or in sequence with the nearby Moray Firth Round 3 Development Zone. These could result from accidental damage to existing oil and gas infrastructure, for example, as a result of a construction vessel breaking free from its moorings. Although collision could occur, the likelihood of this occurring is extremely low. The risk of collision is therefore considered acceptable and therefore not significant.
40. There may be increased interference with oil activities (vessel movements etc) should construction of the Wind Farm, and development of the western area of the Moray Firth Round 3 Development Zone, occur simultaneously. The increase in vessel movements is not considered to be unacceptable and is therefore not significant. In addition there may be increased interference with oil activities should installation of the OFTW along the eastern edge of the Beatrice oil production area occur simultaneously with the construction of the Wind Farm and development of the Moray Firth Round 3 Development Zone. This effect is temporary and is considered to be acceptable and therefore not significant.
41. Cumulative impacts relating to helicopter operations for oil infrastructure in the Moray Firth are dealt with in Section 19 Aviation which concludes that effects will be managed to be acceptable.
42. Potential effects on navigation safety are assessed in Section 18 and 28 of this ES.

### **30.11.3 MITIGATION MEASURES (POST CUMULATIVE)**

43. No significant cumulative effects are predicted and no mitigation is proposed.
44. On-going consultation and liaison with oil operators, port and harbour operators and military activity operators will be continued to ensure any effects are acceptable and therefore not significant.

### **30.11.4 RESIDUAL CUMULATIVE EFFECTS (POST CUMULATIVE)**

45. Residual cumulative effects are as stated in Section 30.10.2.

### **30.11.5 SUMMARY OF CUMULATIVE EFFECTS**

46. There is the potential for cumulative effects on military activities, pipelines and marine cables, ports and harbours and oil activities during the construction of the Wind Farm, the Moray Forth Round 3 Zone and the installation of associated OFTWs. Communication will be maintained with the relevant operators and authorities to ensure these effects are acceptable and therefore not significant.

### **30.12 STATEMENT OF SIGNIFICANCE**

47. The Project is not anticipated to have any significant effects on other marine uses. Furthermore, no significant cumulative effects on other marine uses are anticipated. Any potential effects will be managed to acceptable levels through ongoing consultation with operators.

48. The assessment has identified that there are opportunities for using and developing or enhancing certain ports and harbours in the Moray Firth and surrounding area to support the construction, operation and decommissioning of the Project and other offshore wind developments. The extent to which these opportunities can be realised will be explored as more information emerges on the manufacturing, construction, operations, maintenance and supply arrangements.

### 30.13 REFERENCES

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