

15 Human Environment

15.1 Commercial Fisheries

15.1.1 Summary

15.1.1.1 An assessment of the likely significant cumulative effect of the Project has been undertaken in conjunction with the Western Development Area (WDA) and BOWL and its associated offshore transmission infrastructure, and the following likely significant effects are considered:

- Complete loss or restricted access to fishing grounds;
- Safety issues to fishing vessels;
- Increased steaming time to fishing grounds;
- Obstacles on the seabed post-construction;
- Displacement of fishing activity; and
- Interference to fishing activities.

15.1.1.2 Cumulative effects on commercially exploited fish and shellfish populations and recreational fish populations are addressed in Chapter 14.2 (Fish and Shellfish Ecology).

15.1.1.3 Due to lack of detail about schedules and design parameters it has not been possible to carry out an assessment of the likely cumulative effects of some anticipated future developments. Instead a general commentary on the following developments has been provided, which has not ascribed significance ratings:

- Other offshore wind farms and renewable energy developments;
- The SHETL cable and offshore hub;
- Shipping and navigation;
- Relevant oil and gas activities; and
- Marine Protected Areas (MPAs) and other Closed or Restricted Areas.

15.1.1.4 It should be noted that cumulative effects upon the crab and lobster fishery and handline mackerel fishery undertaken in the vicinity of the inshore section of the MORL export cable route have not been identified as the vessels do not operate in the area of other planned developments. They have therefore been excluded from the cumulative assessment.

15.1.1.5 In the case of the WDA, it should be noted that the number of turbines exceeds the capacity for the MORL zone, i.e. the three proposed wind farm sites together with the WDA. However, if MORL do not develop the expected number of turbines in the eastern development area, up to 500 MW may be developed in the WDA. This has been taken into account in the cumulative assessment.

15.1.1.6 A summary of cumulative effects is listed in Table 15.1-1 below.

Table 15.1-1 Cumulative Effect Summary

| Effect / Receptor | MORL Total Project | BOWL (generating station and associated transmission infrastructure) | MORL Western Development Area (WDA) | Sensitivities for Telford, Stevenson and MacColl, and OFTO | Mitigation Method (if required) |
|--|--|--|--|---|---|
| Construction / Decommissioning | | | | | |
| Complete Loss or Restricted Access to Traditional Fishing Grounds | Moderate – scallop, squid, nephrops and crab and lobster fisheries Minor – whitefish fishery | Moderate during construction phase of associated transmission infrastructure | No significant additive effect to MORL Total Project | The sensitivities of the proposed individual wind farm sites are reduced to Minor for each individual site, taking account of the reduction in area of grounds affected | None currently proposed |
| Overall CIA for Complete Loss or Restricted Access to Traditional Fishing Grounds | Moderate for scallop, squid and nephrops fisheries Minor for whitefish fishery | | | | |
| Safety Issues for Fishing Vessels | Acceptable for turbines, met masts and gravity base OSPs installed during the construction phase, providing 50 m safety zones are applied Outside of acceptable limits for inter array cables | Acceptable for turbines, met masts and gravity base OSPs installed during the construction phase, providing 50 m safety zones are applied Outside of acceptable limits for inter array cables | No significant additive effect to MORL Total Project | N / A | Application of 50 m safety zones for infrastructure installed during the construction phase. Application of operational safety zones & ongoing consultation to reduce risks to acceptable limits |
| Overall CIA for Safety Issues for Fishing Vessels | Within acceptable limits for turbines, met masts and gravity base OSPs installed during the construction phase, providing 50 m safety zones are applied Outside of acceptable limits for inter array cables | | | | |
| Increased Steaming Times to Fishing Grounds | Minor | Minor | No significant additive effect to MORL Total Project | N / A | None proposed |
| Overall CIA for Increased Steaming Grounds to Fishing Grounds | Minor | | | | |

| Effect / Receptor | MORL Total Project | BOWL (generating station and associated transmission infrastructure) | MORL Western Development Area (WDA) | Sensitivities for Telford, Stevenson and MacColl, and OFTO | Mitigation Method (if required) |
|--|---|--|--|--|---|
| Displacement of Fishing Vessels into Other Areas | Moderate – scallop, squid, nephrops and crab and lobster fisheries Minor – whitefish fishery | Moderate during construction phase of associated transmission infrastructure | No significant additive effect to MORL Total Project | The sensitivities of the proposed individual wind farm sites are reduced to Minor for each individual site, taking account of the reduction in area of grounds impacted | None currently proposed |
| Overall CIA for Displacement of Fishing Vessels into Other Areas | Moderate for scallop, squid and nephrops fisheries Minor for whitefish fishery | | | | |
| Interference with Fishing Activities | Moderate for crab and lobster fishery | Minor – Moderate depending upon construction port | No significant additive effect to MORL Total Project | The sensitivities of the proposed individual wind farm sites are reduced to Minor for each individual site, taking account of the reduction in amount of traffic and frequency of vessels transiting | Development of construction management plan |
| Overall CIA for Interference with Fishing Activities | N / A – there is no cumulative effect identified for the crab and lobster fishery | | | | |
| Operation | | | | | |
| Complete Loss or Restricted Access to Traditional Fishing Grounds | Moderate –scallop and squid fisheries Minor – nephrops, and whitefish fisheries | Minor – all fisheries | No significant additive effect to MORL Total Project | The sensitivities of the proposed individual wind farm sites are reduced to Minor for each individual site, taking account of the reduction in area of grounds impacted | Fishing vessels will regain some degree of access to the proposed wind farm sites in the Moray Firth during operation, as well as complete access to the area of the associated OTI during the operational phase, providing appropriate post-installation and if necessary seabed rectification measures are undertaken |

| Effect / Receptor | MORL Total Project | BOWL (generating station and associated transmission infrastructure) | MORL Western Development Area (WDA) | Sensitivities for Telford, Stevenson and MacColl, and OFTO | Mitigation Method (if required) |
|--|---|---|---|--|--|
| Overall CIA for Complete Loss or Restricted Access to Traditional Fishing Grounds | Moderate for scallop and squid fisheries Minor for nephrops and whitefish fisheries | | | | |
| Safety Issues for Fishing Vessels | Acceptable for fully installed turbines, met masts and gravity base OSPs, providing 50 m safety zones are applied Within acceptable limits for inter array and export cables provided appropriate post installation measures are completed | Acceptable for fully installed turbines, met masts and gravity base OSPs, providing 50 m safety zones are applied Within acceptable limits for inter array and export cables provided appropriate post installation measures are completed | Acceptable for fully installed turbines, met masts and gravity base OSPs, providing 50 m safety zones are applied Within acceptable limits for inter array and export cables provided appropriate post installation measures are completed | N / A | Safety zones around operational wind farm infrastructure will be applied. Inter array and export cables will be buried where feasible and protected elsewhere so that fishing activities can be safely resumed during the operational phase. Post construction surveys will assess the status of the seabed and, if necessary, the appropriate seabed rectification measures will be undertaken |
| Overall CIA for Safety Issues for Fishing Vessels | Acceptable for fully installed turbines, met masts and gravity base OSPs, providing 50 m safety zones are applied Within acceptable limits for inter array and export cables provided appropriate post installation measures are completed | | | | |
| Increased Steaming Times to Fishing Grounds | Minor | Minor | No significant additive effect to MORL Total Project | N / A | No significant increase than that identified for the effects of the three proposed wind farm sites |
| Overall CIA for Increased Steaming Times to Fishing Grounds | Minor | | | | |
| Obstacles on the Seabed Post-Construction | Within acceptable limits provided appropriate post installation measures are completed | Within acceptable limits provided appropriate post installation measures are completed | No significant additive effect to MORL Total Project | N / A | Compliance with contractor obligations Post construction and installation surveys |

| Effect / Receptor | MORL Total Project | BOWL (generating station and associated transmission infrastructure) | MORL Western Development Area (WDA) | Sensitivities for Telford, Stevenson and MacColl, and OFTO | Mitigation Method (if required) |
|--|--|--|--|---|---|
| Overall CIA for Obstacles on the Seabed Post-Construction | Within acceptable limits provided appropriate post installation measures are completed | | | | |
| Displacement of Fishing Vessels into Other Areas | Moderate –scallop and squid fisheries Minor – nephrops and whitefish, fisheries | Minor – all fisheries | No significant additive effect to MORL Total Project | The sensitivities of the individual proposed wind farm sites are reduced to Minor for each individual site, taking account of the reduction in area of grounds impacted | None currently proposed |
| Overall CIA of Displacement of Fishing Vessels into Other Areas | Moderate for scallop and squid fisheries Minor for nephrops and whitefish fisheries | | | | |
| Interference with Fishing Activities | Minor | Minor | No significant additive effect to MORL Total Project | N / A | Development of construction management plan |
| Overall CIA for Interference with Fishing Activities | Minor | | | | |

15.1.2 Assessment of Cumulative Effects

- 15.1.2.1 This chapter presents the results of assessment of the likely significant cumulative effects upon commercial fisheries arising from the Project in conjunction with other existing or reasonably foreseeable marine and coastal developments and activities.
- 15.1.2.2 The cumulative and assessment takes into account the responses and concerns gathered during the stakeholder consultation process.
- 15.1.2.3 The study area of the assessment is the same as that described in the site specific impact assessment given in Chapter 8.1 (Commercial Fisheries) and focuses principally on cumulative effects in the Moray Firth.
- 15.1.2.4 It is recognised that fishing vessels may not spend all, or indeed a significant proportion, of their time in the Moray Firth and hence certain other offshore renewable developments may also affect them. This is most obviously the case for the scallop fishery, which is targeted by vessels that are largely nomadic, variously targeting grounds around the UK. As stated previously, although

individual vessels may spend more time in certain regional areas such as the Moray Firth, it is not possible within the scope of this assessment to consider the extent of an effect on a vessel by vessel basis. Instead, scallop grounds affected by the proposed projects in the Moray Firth have been considered within the context of available scallop grounds around the UK relevant to other offshore renewable developments.

- 15.1.2.5 It should be noted that cumulative effects upon the crab and lobster fishery and handline mackerel fishery undertaken in the vicinity of the inshore section of the MORL export cable route have not been identified as the vessels do not operate in the area of other planned developments. They have therefore been excluded from the cumulative assessment.
- 15.1.2.6 The developments and activities considered alongside the Project within the cumulative impact assessment are listed below:
- Western Development Area (WDA); and
 - Beatrice Offshore Wind Farm and associated transmission infrastructure.
- 15.1.2.7 Because there is inadequate information on the parameters and effects of the following developments, it has only been possible to present a high level commentary on the likelihood of cumulative effects:
- Other offshore wind farms and renewable developments;
 - Marine Energy Developments in the Pentland Firth and Orkney Waters;
 - The SHETL cable and offshore hub;
 - Shipping and navigation;
 - Relevant oil and gas activities; and
 - Marine Protected Areas (MPAs) and other Closed or Restricted Areas.
- 15.1.2.8 There is not currently any known port or harbour development planned in the Moray Firth which may cumulatively affect the fisheries affected by the site specific assessments, although MORL and BOWL will potentially have port facilities at locations which may require development.
- 15.1.2.9 There are not currently any licensed aggregate dredging areas in the Moray Firth, the closest being located in the Firth of Forth. Although it is recognised that loss of fishing area as a result of aggregate dredging may apply to certain vessels, it is not considered within the scope of this assessment and hence not considered to contribute a cumulative effect.

15.1.3 Methodology

- 15.1.3.1 The assessment methodology has followed that outlined in the Moray Firth Offshore Wind Developers Group Discussion Document (ERM, 2011; see Technical Appendix 1.3 D) and is consistent with the approach described in the site specific impact assessment in Chapter 8.1 (Commercial Fisheries).

Worst Case Scenario for Projects Where Detailed Assessment is Possible

- 15.1.3.2 The detailed assessment of the likely significant cumulative effects focuses on the Project in conjunction with the WDA and the Beatrice Offshore Wind Farm (BOWL) and associated offshore transmission infrastructure (OTI), as a result of their proximity and the level of Project information that has been made available.

15.1.3.3 The worst case parameters of wind farm design for the BOWL and MORL WDA in terms of commercial fisheries are provided below in Table 15.1-2 and, Table 15.1-3, respectively.

Table 15.1-2 Summary of the BOWL Worst Case Parameters for Commercial Fishing

| Worst Case Parameters | Specifications |
|---|---|
| Wind Farm Site | 277 x 3.6 MW turbines |
| Turbine Layout | |
| Minimum Spacing (crosswind) | 642 m |
| Minimum Spacing (downwind) | 642 m |
| Foundations and Substructure | |
| Foundation Type | Tubular Jacket and Gravity Base |
| Footprint of Individual Turbine | 1,963 m ² |
| Met Masts | |
| Maximum Number of Met Masts | 3 |
| Inter Array Cables | |
| Estimated Total Length | 325 km |
| Additional Offshore Infrastructure | |
| Maximum Number of OSPs | 3 |
| Export Cable | |
| Maximum Length of Offshore Cable | 58 km |
| Maximum Number of Cables | 4 |
| Export Cable Route | South of the development to landfall in the Spey Bay area |

Western Development Area

- 15.1.3.4 The Western Development Area (WDA) comprises part of the MORL Zone, within which the three proposed wind farm sites (Telford, Stevenson and MacColl) are located. The maximum capacity to be installed in the entire Zone is 1.5 GW and MORL has applied for a maximum of 1.5 GW within three proposed wind farm sites.
- 15.1.3.5 The WDA may be developed for a maximum of 500 MW of capacity if less than 1.5 GW of capacity is delivered by the Project in the EDA. In total, the consented capacity of the Project and the WDA will not exceed 1.5 GW.
- 15.1.3.6 The connection between the WDA and the three proposed wind farm sites necessitates a slightly different approach to assessment, as the effects arising from the "worst case" for the Project cannot simply be added to the "worst case" scenario for the WDA. Instead, assessment of the likely significant cumulative effects of the Project and the WDA will therefore follow a similar format to that undertaken for the sensitivity assessments of the individual wind farm proposals in Section 3.

15.1.3.7 Table 15.1-3 below details the worst case parameters considered for the WDA.

Table 15.1-3 Summary of the MORL WDA Worst Case Parameters for Commercial Fishing

| Realistic Worst Case Parameters | Specifications |
|--|----------------------|
| Wind Farm Site | 100 x 5 MW turbines |
| Turbine Layout | |
| Minimum Spacing (crosswind) | 600 m |
| Minimum Spacing (downwind) | 840 m |
| Foundations and Substructure | |
| Foundation Type | Gravity base |
| Footprint of Individual Turbine Foundation | 3,318 m ² |
| Met Masts | |
| Maximum Number of Met Masts | 1 x 4.5 m diameter |

Other Developments

15.1.3.8 Developments that are at an earlier stage, and for which there are limited development details, are also considered. Detailed cumulative impact assessment of these developments is not possible as insufficient information is available. Instead, a commentary on the potential for cumulative effects on the basis of the information available is presented, but no quantitative conclusions on the likely significance of any impacts can be drawn.

15.1.3.9 All marine renewable projects considered in the CIA are shown in Figure 1.3-1, Volume 6 a.

15.1.4 Detailed Impact Assessment

15.1.4.1 A detailed assessment of the cumulative effect of the Project in conjunction with BOWL and associated offshore transmission infrastructure is provided below. The following likely significant effects are considered:

- Adverse Effects on Commercially Exploited Fish and Shellfish Populations;
- Adverse Effects on Recreational Fish Populations;
- Complete Loss or Restricted Access to Fishing Grounds;
- Safety Issues to Fishing Vessels;
- Increased Steaming Time to Fishing Grounds;
- Obstacles on the Seabed Post-Construction;
- Displacement of Fishing Activity; and
- Interference to Fishing Activities.

15.1.4.2 The following receptors have been identified for the cumulative impact assessment:

- 15.1.4.3 Analysis of statistical datasets and information gathered through consultation with fishermen demonstrates that dredging for scallops occurs in areas throughout the Moray Firth and in the vicinity of the Project and BOWL and associated offshore transmission infrastructure. The majority of vessels are nomadic and will potentially target grounds around the UK. The amount of time spent in the Moray Firth varies annually and depends upon the productivity and availability of grounds here and elsewhere.
- 15.1.4.4 Analysis of fisheries statistical datasets and information gathered through consultation with fishermen demonstrates that the squid fishery in the Moray Firth is important on a national scale. There is also a squid fishery in the Firth of Forth, although this is less productive and landings vary significantly on an annual basis. In light of this, the cumulative effect upon the fishery will therefore predominantly arise from BOWL in conjunction with the Project, although there is a low level of fishing for squid within the BOWL site.
- 15.1.4.5 The nephrops fishery is the most important in the Moray Firth and is targeted by a range of vessels. Fishing grounds are principally concentrated in the southern half of the Moray Firth and outwith of the proposed wind farm sites but in the vicinity of export cable routes. Activity is generally constant on an annual basis. Larger category vessels have the operational range to target grounds in the wider North Sea, however smaller category vessels are limited in the operational range and tend to spend the majority of their time fishing grounds in the Moray Firth.
- 15.1.4.6 Although some whitefish activity (principally for haddock) is recorded in the BOWL in the north of the site), the majority of grounds are located outwith the development and associated offshore transmission infrastructure and as a result there is not considered to be a significant cumulative effect upon the fishery.
- 15.1.4.7 The crab and lobster fishery is located in the inshore area of the export cable landfall at Fraserburgh and, in the case of the loss or restricted access to fishing grounds, will principally be affected by the installation of the OfTI export cables. As a result, it is not considered that there will be a cumulative effect upon the fishery from infrastructure in addition to this.
- 15.1.4.8 The handline mackerel fishery is targeted by small, inshore vessels in the vicinity of the export cable landfall and as a result it is not considered that there will be a cumulative effect on the fishery.
- 15.1.4.9 A summary of the overall significance for each effect described below is given in Table 15.1-1 above.

MORL and BOWL Offshore Wind Farms and OfTI

Adverse Effects on Commercially Exploited Fish and Shellfish Populations

- 15.1.4.10 The principal commercial species targeted by gear type within the three proposed wind farm sites are: king scallops by boat dredge and, to a lesser extent, squid by modified *Nephrops* trawls and whitefish gear and haddock by whitefish gear (seine nets and demersal trawls, respectively. MORLs OfTI route additionally passes through *Nephrops* grounds and crab and lobster grounds.
- 15.1.4.11 Predicted cumulative adverse effects on commercially exploited fish and shellfish populations arising from the construction and operation of the proposed development are described in Chapter 14.2 (Fish and Shellfish Ecology).

Adverse Effects of Recreational Fish Populations

15.1.4.12 There is not considered to be regular or directed recreational fishing activity occurring within the boundary of MORLs proposed developments. It is however recognised that there may be cumulative effects upon migrating fish species such as salmon and sea trout, which have significant socio-economic importance as recreational fish species. Cumulative effects to salmon and sea trout populations are described in Chapter 14.2 (Fish and Shellfish Ecology).

Complete Loss or Restricted Access to Fishing Grounds

15.1.4.13 There is the potential for all fishing activity to be temporarily precluded from localised areas in the Project the BOWL site and export cable route during construction as a result of the temporary 500 m safety zones around all major construction activities. Cumulatively, assuming that the Project has six major construction events and the BOWL site will have a maximum of two construction events, there will be a total of 8 major construction events requiring 500 m safety zones within the proposed wind farm sites. There will be additional 500 m exclusion zones during the construction of the OfTI of the proposed developments.

15.1.4.14 Additionally during the construction phase, the safety risks associated with the installation of inter array cables and export cables for the Project and BOWL would result in the progressive loss of access to these areas as the construction schedule advances. Access to these areas will not resume until the appropriate post-construction surveys, and if necessary seabed rectification measures, confirm that normal fishing activities can safely resume.

15.1.4.15 Taking account of the gradual temporary loss of area during the construction phase in the development areas, the significance of the cumulative temporary loss of fishing grounds during the construction phase infrastructure is expected to be **moderate** for the scallop, squid and *Nephrops* fisheries and **minor** for the whitefish fishery.

15.1.4.16 Subsequent to any necessary seabed rectification measures being satisfactorily completed, it is considered that fishing vessels will regain some degree of access to fishing grounds within the proposed operational wind farm sites, although it is recognised that individual skippers, particularly those operating bottom towed gear, may consider it unsafe to continue fishing within the proposed operational wind farm sites because of the presence of infrastructure. The significance of the cumulative complete loss of fishing grounds during the operational phase is therefore expected to be **moderate** for the scallop and squid fisheries and **minor** for the *Nephrops* and whitefish fisheries.

Safety Issues to Fishing Vessels

15.1.4.17 Vessels travelling greater distances to fishing grounds may be affected by multiple developments. The proximity of the BOWL site to the Project associated infrastructure poses the greatest cumulative risk to the safety of fishing vessels in the area.

15.1.4.18 It is likely that there will be some overlap in the construction schedules of the Moray Firth developments. In line with standard practice, construction safety zones of 500 m will be in place around all offshore construction activities, from which all vessels, including fishing vessels, will be excluded. Assuming that the BOWL site will have a maximum of two construction events, in combination with

the six events in the three proposed wind farm sites, there will potentially be a maximum of eight 500 m exclusion zones across the sites. In addition, there will be additional 500 m exclusion zones during the construction of the offshore transmission works.

- 15.1.4.19 Risks to fishing vessels would only occur if there were infringements of these safety zones. It should also be recognised that in line with standard maritime practice, the ultimate responsibility with regards to safety lies with the master of a vessel. Compliance with the safety zones would put the safety risk **within acceptable limits**.
- 15.1.4.20 There is the potential for infrastructure outside of the designated safety zones to pose an additional risk to fishing vessels as a result of potentially hazardous interactions with fishing gear. These include turbines and inter array cables and OSPs and offshore export cables.
- 15.1.4.21 Infrastructure installed in the Telford, Stevenson, MacColl and the BOWL site will be required to be appropriately marked, in line with standard industry practice.
- 15.1.4.22 It is likely that operational safety zones will apply to all installed turbine and OSP infrastructure (likely to be 50 m for turbines and of a sufficient size for OSPs). Compliance with these safety zones will put the safety of fishing vessels relative to this infrastructure **within acceptable limits**.
- 15.1.4.23 The installation of inter-array and offshore export cables will require fishing vessels, particularly towed gear vessels, to be excluded from operating in their immediate vicinity because of the associated safety risks (i.e. snagging). The area this incorporates in the Moray Firth will be dependent upon the stage of development of the Project and BOWL development and the possible overlap in construction schedules. It is however recognised that by the time all of the cables are installed and until the appropriate post-installation surveys and necessary seabed rectification measures have been undertaken, fishing activities will not be able to be safely undertaken in these areas. The associated safety risks during this time would therefore be **outside of acceptable limits** for all commercial fisheries operating in the area.
- 15.1.4.24 It is expected that, subsequent to the appropriate post-construction and installation burial and protection measures being completed, normal fishing activities will be able to safely resume in the immediate vicinity of inter array and export cables during the operational phase. The safety risks would therefore be **within acceptable limits** for all commercial fisheries operating in the area.

Increased Steaming Time to Fishing Grounds

- 15.1.4.25 There is the potential for the maximum of eight 500 m exclusion zones (six simultaneous construction events within the Telford, Stevenson and MacColl sites and two in the BOWL site) to result in minor increases to steaming times during the construction phase. In addition, there will be additional 500 m exclusion zones during the construction of the transmission infrastructure for each development.
- 15.1.4.26 The Shipping and Navigation assessment for the Project considers that there is good prospect for fishing vessels to navigate within the proposed operational wind farm sites (including associated infrastructure), including BOWL site and associated infrastructure.

- 15.1.4.27 The significance of cumulative increases to steaming times is expected to be **minor** for all fisheries in the construction and operational phases.

Displacement of Fishing Activity

- 15.1.4.28 Concerns were raised during consultation with fishermen and their representatives that any loss or restricted access to fishing grounds as a result of wind farm development could result in increased competition for grounds outside of the Project boundaries. This might result in either potential conflict between vessels competing for the same resource, or between different fishing methods (i.e. static and towed gear vessels).
- 15.1.4.29 The extent of displacement will be a function of the temporary loss or restricted access to traditional fishing grounds during the construction phase, and as a result the significance of effect for this applies.
- 15.1.4.30 In the Moray Firth, there is the potential for all fishing activity to be precluded from the Moray Firth Round 3 Zone and BOWL during construction as a result of the safety risks associated with the installation of inter array cables. In addition, fishing vessels will be temporarily excluded from the area of the OfTI for each project, until post-installation surveys confirm the 'over-trawlable' status of the seabed.
- 15.1.4.31 Post-construction surveys, and, if necessary, seabed rectification procedures, in the wind farms will confirm the 'over-trawlable' status of the seabed. Fishing vessels will subsequently regain some degree of access to grounds within the operational wind farms. It is however recognised that individual skippers will ultimately decide whether they wish to resume fishing within the operational sites.
- 15.1.4.32 The significance of the cumulative displacement of fishing vessels during the construction phase is expected to be moderate for the scallop, squid and *Nephrops* fisheries and **minor** for the whitefish fishery.
- 15.1.4.33 Subsequent to the above measures being satisfactorily completed, it is considered that fishing vessels will regain some degree of access to fishing grounds within the proposed operational wind farm sites, although it is recognised that individual skippers, particularly those operating bottom towed gear, may consider it unsafe to continue fishing within the proposed operational wind farm sites because of the presence of infrastructure.
- 15.1.4.34 The significance of the cumulative displacement of fishing vessels during the operational phase is expected to be **moderate** for the scallop and squid fisheries and **minor** for the *Nephrops* and whitefish fisheries.

Interference to Fishing Activities

- 15.1.4.35 All of the likely cumulative effects included in this assessment would cause interference to fishing activities. An additional effect to be considered, however, is the potential for navigational conflicts arising between fishing vessels and construction, operations and maintenance vessels transiting to and from the sites, particularly in the case of static gear, or to a lesser degree, towed gear vessels being required to alter towing direction. This could include the fouling of static gear marker buoys and dhans. This interference has the potential to affect more fishing vessels than those operating in the immediate vicinity of the sites, depending upon the location of the construction, operations and maintenance ports, which is currently not known for any of the developments.

- 15.1.4.36 The implementation of a construction management plan that defines construction (and operations and maintenance) transit routes in consultation with the fishing industry will serve to mitigate the level of effect.
- 15.1.4.37 The significance of cumulative interference to fishing activities is expected to be **minor** for all fisheries in the construction and operational phases.

Obstacles on the Seabed Post-Construction

- 15.1.4.38 There is the potential for obstacles to be left on the seabed during and post-construction which could result in damage to, or loss of, fishing gears, as well as representing a safety hazard. Offshore works such as construction vessel anchoring, jack-up legs or cable trenching can produce seabed obstructions which have caused fastenings and damage to fishing gears. The cumulative effect of the Project and BOWL and associated offshore transmission infrastructure will be an increase in the scale of potential effect.
- 15.1.4.39 Offshore policy prohibits the discarding of objects or waste at sea. The reporting and recovery of any accidentally dropped objects is also required. In addition, post-construction and installation surveys and seabed rectification measures will be undertaken in area of all the proposed developments in the Moray Firth.

Assessment of WDA

Commercial Fisheries

- 15.1.4.40 There are no significant geographical differences between the WDA and EDA in terms of the commercial fisheries baseline, although annual fluctuations in the level and density are noted the conservative assumption has been made that the activity is broadly consistent across the sites. The cumulative assessment does not, therefore, result in any significant additional effects to that given for the assessment of the Project.

Salmon and Sea Trout Fisheries

- 15.1.4.41 There are no significant geographical differences between the WDA and EDA in terms of the salmon and sea trout fisheries baseline, and the cumulative assessment does not therefore result in a significant additive effect to that given for the assessment of the Project.

Commentary on Developments where there is Insufficient Information to Permit Assessment

Other Offshore Wind Farms

- 15.1.4.42 In certain instances, the wide operational range of certain fishing vessels (in some instances all around the UK) may potentially result in their being affected by the development of other offshore wind farms around the UK. This is particularly the case with the nomadic scallop fishery, where there is the potential for temporary and / or complete loss of fishing grounds and resulting displacement into other areas as a result of multiple offshore wind farm developments. The scale of displacement will depend upon the importance of scallop grounds in the vicinity of the developments, as well as the construction and operational programmes of each of the developments.
- 15.1.4.43 Additional consideration has been given to the nomadic scallop fishery. In the case of the nomadic scallop fleet, there are additionally a number of planned

offshore wind farm developments around the UK which could affect the fishery in addition to the Project, the WDA and BOWL. Proposed developments located in the vicinity of scallop fishing grounds are:

- Firth of Forth Round 3 Zone;
- Inch Cape (Scottish Territorial Waters (STW) site);
- Neart na Gaoithe (STW site);
- Argyll Array (STW site);
- Rampion Round 3 Zone; and
- Irish Sea Round 3 Zone.

15.1.4.44 The cumulative effect upon the nomadic scallop fishery is dependent upon the productivity of grounds affected and the scale of effect identified for each development. Detailed information about the projects listed above has not been provided and it is not therefore possible to quantify the scale of effect upon the nomadic scallop fishery. It is, however, considered that in each instance the scale of effect will be largely defined by the engineering design and construction schedules of individual developments and the ability of vessels to regain access to grounds once the sites are operational.

Marine Energy Developments in the Pentland Firth and Orkney Waters

15.1.4.45 The receptors affected by the proposed Telford, Stevenson and MacColl wind farm sites have not for the most part been identified as operating within the Pentland Firth and Orkney waters, although it is recognised that in certain years the squid fishery may attract vessels from around the Scottish coast, including the Orkney Islands, depending upon the productivity of the fishery. As a result, the marine developments in the Pentland Firth will not therefore have a cumulative effect.

SHETL Cable and Offshore Hub

15.1.4.46 As with the MORL and BOWL offshore export cables, the construction activities during the installation of the proposed SHETL cable and the construction and operation of the offshore hub have the potential to cumulatively affect fishing activities. The scale of effect will depend upon the construction / installation schedule and the status of the infrastructure in the operational phase.

Shipping and Navigation

15.1.4.47 The principal cumulative effect of shipping and navigation upon commercial fishing activities is discussed in Chapter 15.2 (Shipping and Navigation).

Offshore Oil and Gas Development

15.1.4.48 There is currently oil and gas development in the Greater Beatrice Area of the Moray Firth. This includes Beatrice Field infrastructure and the Jacky platform and corresponding subsea flow lines. All vessels are prohibited from within 500 m of any such infrastructure. Included within the oil and gas infrastructure are two operational demonstrator wind turbines. The existing Beatrice and Jacky infrastructure currently limits fishing activity in the Moray Firth as a result of these exclusion zones, and the Project, BOWL and the WDA will cumulatively add to this. It is also noted that the offshore demonstrator turbines currently operational in the

Moray Firth are located within the footprint of the safety exclusion zone currently encompassing the Greater Beatrice Field infrastructure.

- 15.1.4.49 Although it is recognised that loss of fishing area as a result of oil and gas development elsewhere may apply to certain vessels, it is not considered within the scope of this assessment and hence not considered to contribute a cumulative effect.

Marine Protected Areas (MPAs) and other Closed / Restricted Areas

- 15.1.4.50 MPAs currently in place have had the effect of restricting fishing activities in certain areas, particularly those activities affecting the seabed (i.e. bottom towed gear). For example: in Cardigan Bay (a designated SAC), all scallop dredging is prohibited. It is considered that the Marine Conservation Zone (MCZ) announcements in England and Wales and the Nature Conservation MPAs in Scotland will enforce additional limitations upon certain, if not all, fishing activities in the future.
- 15.1.4.51 The potential for cumulative effects of the Project, WDA and BOWL projects in conjunction with existing and proposed MPAs in the Moray Firth and wider area (with particular reference to the nomadic scallop fleet) is noted, although it is not possible to quantify the cumulative significance of the effect.
- 15.1.4.52 There are additional fisheries management policies in place which also restrict or prohibit certain or all type of fishing activities. Such restrictions may be seasonal or annual and are subject to review. There are not currently any restricted or closed areas in the Moray Firth.
- 15.1.4.53 Management policies around the UK which result in restricted access to grounds have the potential to affect the nomadic scallop fleet (for example: the closure in Isle of Man waters). It is possible that additional closed areas may apply in future.

15.1.5 Salmon and Sea Trout Fisheries

- 15.1.5.1 As a result of salmon and sea trout fisheries being either in-river or, to a lesser extent, coastal, there are not considered to be direct effects arising from the construction / decommissioning and operation of the proposed developments in the Moray Firth. Instead, any effects will be as a result of changes to the behaviour of the species in the offshore marine environment as a result of the developments. A full assessment of the likely significant cumulative effects upon the species is described in Chapter 14.2 (Fish and Shellfish Ecology).

15.1.6 References

Greater Beatrice area defined at: <http://www.ithacaeneray.com/beatrice.aspx>

This page has been intentionally left blank.

15.2 Shipping and Navigation

15.2.1 Assessment of Cumulative Impacts Summary

- 15.2.1.1 There is limited potential for cumulative effects to occur for commercial and non-commercial ship routing / collision risk given the low traffic volumes and available sea room in the Moray Firth for safe deviations around the wind farms.
- 15.2.1.2 Industry standard mitigation and ongoing consultation will continue as the developments progress into the planning and construction stages.
- 15.2.1.3 A summary of the likely significant cumulative effects is provided in Table 15.2-1 below for shipping and navigation.

Table 15.2-1 Cumulative Effect Summary

| Effect / Receptor | MORL Total Project | BOWL (generating station and associated transmission infrastructure) | WDA | Sensitivities for Telford, Stevenson and MacColl, and OFTO | Mitigation Method (if required) |
|---|--------------------|--|--------------------|--|---|
| Construction / decommissioning | | | | | |
| Commercial Ship Routing and Collision Risk | Minor | Minor | Moderate | N / A | Industry standard (See mitigation in Chapter 8.2) |
| Overall CIA on Commercial Shipping | Moderate | | | | |
| Fishing Vessel Routing and Collision Risk | Minor | Minor | No additive effect | N / A | Industry standard (See mitigation in Chapter 8.2) |
| Overall CIA on Fishing Vessel | Moderate | | | | |
| Recreation Vessel Routing and Collision Risk | Minor | Minor | No additive effect | N / A | Industry standard (See mitigation in Chapter 8.2) |
| Overall CIA on Recreation Vessel | Minor | | | | |
| Operation | | | | | |
| Commercial Ship Routing, Collision Risk including Radar Impacts and SAR | Minor | Minor | Moderate | N / A | Industry standard (See mitigation in Chapter 8.2) |
| Overall CIA on Commercial Shipping | Moderate | | | | |

| Effect / Receptor | MORL Total Project | BOWL (generating station and associated transmission infrastructure) | WDA | Sensitivities for Telford, Stevenson and MacColl, and OFTO | Mitigation Method (if required) |
|---|--------------------|--|--------------------|--|---|
| Fishing Vessel Routing, Collision Risk including Radar Impacts and SAR | Minor | Minor | No additive effect | N / A | Industry standard (See mitigation in Chapter 8.2) |
| Overall CIA on Fishing Vessel | Minor | | | | |
| Recreation Vessel Routing, Collision Risk including Radar Impacts and SAR | Minor | Minor | No additive effect | N / A | Industry standard (See mitigation in Chapter 8.2) |
| Overall CIA on Recreation Vessel | Minor | | | | |

15.2.2 Introduction

15.2.2.1 This section presents the results of assessment of the likely significant cumulative effects upon shipping and navigation arising from the Project in conjunction with other existing or reasonably foreseeable marine and coastal developments and activities. MORLs approach to the assessment of cumulative impacts is described in Chapter 1.3 (Environmental Impact Assessment).

15.2.2.2 This chapter presents details on likely significant cumulative effects with other developments in the area of the proposed Telford, Stevenson and MacColl offshore wind farms and offshore transmission infrastructure, giving account to the following which have been considered within the NRA:

- Changes to commercial, fishing and recreational vessel routing;
- Increase in collision risk (vessel-to-structure or vessel-to-vessel);
- Maximum loss of navigable sea area for SAR operations and helicopter access; and
- Radar interference on marine radar systems and potential decreased detection capability of smaller vessels due to turbines and substations masking targets.

15.2.3 Developments Considered in Assessment

15.2.3.1 The developments and activities considered in detail alongside the Project within the cumulative impact assessment are as follows:

- Marine renewable projects:
 - Beatrice Offshore Wind Farm and transmission infrastructure (BOWL); and
 - Marine Energy Developments in Pentland Firth and Orkney (includes all current leased, planned and developed sites).

15.2.3.2 In addition, the following developments have been identified which may have cumulative effects over the life of the Project but where there is insufficient information available for a detailed assessment of cumulative effects to be carried out:

- Proposed Scottish Hydro Electric Transmission Ltd (SHETL) hub cable and onshore infrastructure;
- Forth and Tay offshore wind developments (Near na Gaoithe, Inch Cape, Seagreen Phases 1-3);
- Aberdeen Offshore Wind Farm;
- Beatrice demonstrator turbines;
- SHEFA (Shetland-Faroes) telecoms cable;
- Oil and gas industry infrastructure:
 - Beatrice and Jacky platforms and associated infrastructure; and
 - The proposed Caithness and PA resources infrastructure for existing leases to extract small pockets of oil (anticipated to be standard infrastructure).
- Other marine activities in the Moray Firth:
 - Existing commercial shipping routes; and
 - Commercial fisheries (activity currently noted within the site and potential new sites created by the placement of turbines).
- Marine based military activities (vessel transits only, it is noted that are no water based PEXAs);
- Marine traffic to marine and port developments in the Moray Firth as follows:
 - Marine traffic to / from Nigg Oil Terminal, Platform Yard and site (LNG regasification vessels);
 - Marine traffic to / from Invergordon;
 - Marine traffic to / from Highland Deep Haven;
 - Marine traffic to / from Inverness Harbour; and
 - Marine traffic to / from Ardersier Fabrication Yard.
- Marine aggregate disposal sites within the Moray Firth.

15.2.3.3 Potential cumulative effects with these developments have been considered through the application of professional judgement.

15.2.4 Worst Case Scenario for Projects Where Detailed Assessment is Possible

15.2.4.1 A summary of the worst case parameters of wind farm design for the BOWL Wind Farm in terms of shipping and navigation is provided in Table 15.2-2 below.

15.2.4.2 The worst case parameters for the Telford, Stevenson and MacColl wind farms and the offshore transmission infrastructure are as provided in Chapters 8.2 and Chapter 11.2 (Shipping and Navigation).

Table 15.2-2 Summary of BOWL Worst Case Parameters

| Worst Case Parameters | Scenario Assessed |
|---|---|
| Construction / Decommissioning of the BOWL Site | |
| Installation of Maximum Number of Turbines (277) | <p>Increased level of vessel activity with the BOWL site (irrespective of layout, foundation types and subsea cabling) and potential increase in vessel encounters and collisions.</p> <p>Re-routing of shipping (commercial vessels, fishing and recreation vessels) in the area due to construction / decommissioning works.</p> |
| Operation of the BOWL Site | |
| Installation of 277 Turbines | <p>Re-routing of shipping (commercial, fishing and recreation vessels) around the site.</p> <p>Collision between passing vessel and fixed structure within the wind farm (turbines and / or substation).</p> <p>Maximum loss of navigable sea area for SAR operations and helicopter access.</p> <p>Radar interference on marine radar systems and potential decreased detection capability of smaller vessels due to turbines and substations masking targets.</p> |

15.2.5 Western Development Area

- 15.2.5.1 The Western Development Area (WDA) comprises part of the MORL Zone, within which the three proposed wind farm sites (Telford, Stevenson and MacColl) are located. The maximum capacity to be installed in the entire Zone is 1.5 GW and MORL has applied for a maximum of 1.5 GW within three proposed wind farm sites.
- 15.2.5.2 The WDA may be developed for a maximum of 500 MW of capacity if less than 1.5 GW of capacity is delivered by the Project in the EDA. In total the consented capacity of the Project and the WDA will not exceed 1.5 GW.
- 15.2.5.3 The connection between the WDA and the three proposed wind farm sites necessitates a slightly different approach to assessment, as the effects arising from the "worst case" for the Project cannot simply be added to the "worst case" scenario for the WDA. Instead, assessment of the likely significant cumulative effects of the Project and the WDA will therefore follow a similar format to that undertaken for the sensitivity assessments of the individual wind farm proposals in Section 3.
- 15.2.5.4 Table 15.2-3 below details the worst case parameters considered for the WDA.

Table 15.2-3 Summary of WDA Worst Case Parameters

| Worst Case Parameters | Scenario Assessed |
|---|--|
| Construction / Decommissioning of the BOWL Site | |
| Installation of Maximum Number of Turbines (100) | <p>Increased level of vessel activity with the BOWL site (irrespective of layout, foundation types and subsea cabling) and potential increase in vessel encounters and collisions.</p> <p>Re-routing of shipping (commercial vessels, fishing and recreation vessels) in the area due to construction / decommissioning works.</p> |

| Worst Case Parameters | Scenario Assessed |
|-------------------------------------|--|
| Operation of the WDA Site | |
| Installation of 100 Turbines | Re-routing of shipping (commercial, fishing and recreation vessels) around the site. Collision between passing vessel and fixed structure within the wind farm (turbines and / or substation). Maximum loss of navigable sea area for SAR operations and helicopter access. Radar interference on marine radar systems and potential decreased detection capability of smaller vessels due to turbines and substations masking targets. |

Other Developments

- 15.2.5.5 Developments that are at an earlier stage, and for which there are limited development details at this stage, are also considered. Detailed cumulative impact assessment of these developments is not possible as insufficient information is available. Instead, a commentary on the potential for cumulative effects on the basis of the information available is presented, but no quantitative conclusions on the likely significance of any impacts can be drawn.
- 15.2.5.6 All marine renewable projects considered in the CIA are shown in Figure 1.3-1, Volume 6 a.

Cumulative Assessment Methodology

- 15.2.5.7 The assessment methodology has followed that outlined in the Moray Firth Offshore Wind Developers Group Discussion Document (ERM, 2011; see Technical Appendix 1.3 D).

Assessment of Cumulative Impacts

- 15.2.5.8 The effects of the Project on identified receptors (shipping, fishing, recreation and associated facilities) are assessed in the main Navigation Risk Assessment (NRA) (Technical Appendices 5.2 D and 5.2 E). The following paragraphs present details on likely significant cumulative impacts on those receptors arising from the Project in combination with other developments identified as relevant to this topic and listed at paragraph 15.2.3 (presented in Table 15.2-1 above). The assessment of cumulative effects has been made against the existing baseline conditions as presented in 5.2.3 of Chapter 5.2 (Shipping and Navigation). The effects upon shipping and navigation have been assessed using the same significance criteria as used in assessing the effect of the Project.
- 15.2.5.9 It is noted that the shipping survey data used within the NRA and impact assessment has been shared with the BOWL project, as the two survey vessels were operating at both areas during the periods of data collection in 2011 / 2012.
- 15.2.5.10 The BOWL site is located on the western boundary of the proposed wind farm sites in the Stevenson and Telford areas. Given the proximity of the Beatrice Offshore Wind Farm to the Project, MFOWDG was formed by MORL and BOWL in partnership with The Crown Estate, to work collaboratively on potential regional cumulative effects arising from their proposed offshore wind development.
- 15.2.5.11 As part of this collaborative approach, joint shipping and navigational Hazard Review workshop and a number of consultation meetings were carried out to

allow marine stakeholders to be consulted on both developments. The following marine stakeholders were consulted:

- Maritime Coastguard Agency;
- Chamber of Shipping;
- Royal Yacht Association / Cruising Association;
- Northern Lighthouse Board; and
- Oil & Gas operators).

Conclusions from BOWL Environmental Statement

15.2.5.12 It is noted that the BOWL Environmental Statement predicted that with embedded industry standard mitigation measures put in place for the proposed wind farm, the development will have a minor negative residual impact on shipping and navigation. No effects on shipping and navigation from the wind farm were considered to be significant.

15.2.6 Detailed Impact Assessment

Regional Wind Farm Development

15.2.6.1 In terms of the Project and BOWL, cumulatively there will be an increased effect on shipping and navigation routing (commercial and non-commercial vessels including fishing and recreational craft). Vessels will be required to deviate around the developments. In addition, there will be a potential increase in the collision risk, where vessels pass around the proposed wind farm sites into busier shipping channels, (i.e. the Pentland Firth route).

15.2.6.2 Given the low density of commercial shipping passing through the proposed wind farm sites and the available sea room outwith major shipping routes (i.e. the Pentland Firth route); the cumulative impact is considered to be **minor**.

15.2.6.3 The impact on smaller vessel routing is considered to be similar to that of commercial vessels. There is available sea room for vessels to deviate around the developments. However, in terms of vessels routing through the sites (dependant on site specific construction and operational safety zones), it will be up to individual masters to assess the risk of navigating between turbines based on vessel size, sea conditions and weather. Given the low traffic levels recorded during the shipping surveys, it is considered that this is likely to be an infrequent event and overall the cumulative impact is predicted to be **minor**.

15.2.6.4 In terms of the export cable works from the proposed sites and the BOWL Wind Farm, it is considered that there will be a **minor** cumulative impact on shipping and navigation, given the BOWL cable corridor is likely to run well clear of the three proposed sites and associated export cables. Construction and cable installation phases are unlikely to overlap with the BOWL project and any proposed development within the WDA, and overall the impact on vessel routing or collision risk from additional cable laying and works vessels is considered to be **minor**.

15.2.7 **Western Development Area**

- 15.2.7.1 The Western Development Area would not exceed the maximum capacity of 1.5 MW currently planned for the Zone, but has been considered for additive or cumulative effects with the proposed Eastern Development Area which will be related to the position of turbines.
- 15.2.7.2 Effects would be anticipated to be the same, due to the size of the development, to those considered within the Project Environmental Statement (ES) and Navigational Risk Assessments undertaken for the Eastern Development Area with the exception of potential for additional collision risk and encounters associated with vessels transiting to the Beatrice Oil field, leading to an effect of moderate significance.

15.2.8 **Developments where Insufficient Information is Available to Allow Detailed Assessment**

Subsea Cables

- 15.2.8.1 SHETL has made proposals for an offshore High Voltage Direct Current (HVDC) cable and hub, which is planned approximately 1 nm to the north east of the proposed Telford wind farm site. In addition, there is an existing SHEFA telecoms cable (Figure 2.1-1, Volume 6 a).
- 15.2.8.2 In general, commercial shipping density is relatively low within the area of the proposed wind farm sites, however vessels associated with the Wick route could be cumulatively affected in terms of routing and collision risk. It is predicted that vessels on the Wick route will be able to safely pass the proposed wind farms and Hub platform, as there is available sea room north of the developments. Overall, the cumulative impact on vessel routing or collision risk will be **minor**.

Oil and Gas Industry Infrastructure

- 15.2.8.3 In general, vessels and rigs tend to route to the Beatrice and Jacky Fields from the south and south east, which are clear of the proposed wind farm sites. Overall, the impact on access and towing drilling rigs to locations west of the proposed developments will be largely dependent on any turbines planned for the WDA; however there is available sea room to the south (and north / west) and therefore the cumulative impact is considered to be **minor**.
- 15.2.8.4 It was also noted that the proposed sites intersect UKCS Blocks 12 / 21b, 12 / 22, 12 / 23, 12 / 26, 12 / 27 and 12 / 28. A number of these blocks were on offer as part of the 26th round of UKCS licensing. At the time of writing the NRA (January 2012) a number of UKCS blocks intersecting the proposed sites were only to be licensed following an appropriate assessment and could be withheld from offer (subject to environmental consideration). Due to the uncertainty of development, these have not been considered within this assessment.

Other Developments

- 15.2.8.5 A high level review of the offshore developments was undertaken to exclude those that would not result in a cumulative impact on shipping and navigation. Details of the developments that were assessed and found to be of **negligible impact** are provided below:

- The offshore wind farms in the Outer and Firth of Forth (Near na Gaoithe, Inch Cape, Seagreen Phases 1-3) and the turbines planned at the Aberdeen European Offshore Wind Deployment Centre are of a scale and at a sufficient distance that there will not be a cumulative impact on shipping and navigation;
- The cumulative impact of the proposed wind farm developments with the two Beatrice Demonstrator Turbines are not considered to be significant, given the low levels of passing shipping in the area and the fact the turbines are operational and located inside 500 m safety exclusion zones;
- The Pentland Firth and Orkney Marine Energy developments (includes all current leased, planned and developed sites) have been screened out given that the majority of construction and operation / maintenance vessels will be routing from local support bases (e.g. Scrabster, Stromness, Kirkwall and Lybster) and as a result vessels will navigate well clear proposed offshore wind farms resulting in an negligible impact;
- There are a small number of chartered spoil grounds located within close proximity to the coast (approximately 4 nm). There is available sea room in the Moray Firth for transiting vessels and given the size of ships working from local ports / harbours, vessels are likely to use coastal routes. Therefore the cumulative impact is concluded to be **negligible**;
- Consultation with oil and gas operators identified the potential decommissioning of Jacky and Beatrice (Alpha, Bravo and Charlie) to be potential issues; however, this is largely dependent on other offshore developments in the area. During decommissioning or future drilling campaigns, a possible cumulative effect will be on access to the platforms in the Jacky and Beatrice Fields and other development locations including the Caithness and PA Resources blocks west of the proposed wind farm sites;
- Consultation also identified that Ithaca Energy is looking at the possibility of bringing in Liquid Nitrogen Gas (LNG) regasification vessels to do transfer operations at the Nigg Terminal. In addition, there is also a potential future option of tankers offloading in the area. Given the relatively low commercial shipping density in the Moray Firth and the availability of sea room east and west of the proposed wind farms developments, (i.e. for LNG tankers headed into the Moray Firth) it is considered that any cumulative impact of the Project in addition to new activity by LNG tankers will be negligible;
- A small number of military vessel transits were recorded during the maritime surveys within 10 nm of the proposed wind farms. The large majority of vessels were recorded on the Pentland Firth route, therefore the cumulative impacts on existing marine based military activities are not considered to be significant, hence **negligible** impact; and
- Marine and port developments in the Moray Firth include those at Nigg, Invergordon, Evanton, Inverness and Ardesier. Given the distance of the offshore wind farms to these marine / port developments and the available sea room in the Moray Firth (outwith the proposed wind farms), shipping associated with the developments will not be cumulatively impacted in terms of routing and collision risk. Overall, a **negligible** impact is predicted on the Moray Firth Marine and Port Developments.

15.3 Military and Civil Aviation

15.3.1 Summary of Effects and Mitigation

15.3.1.1 This chapter presents the results of the assessment of the likely significant cumulative effects upon Military and Civil Aviation (including Primary Radar Systems, PSR) arising from the proposed Telford, Stevenson and MacColl offshore wind farms and offshore transmission infrastructure in conjunction with other existing or reasonably foreseeable marine and coastal developments and activities. MORLs approach to the assessment of cumulative effects is described in Chapter 1.3 (Environmental Impact Assessment).

15.3.1.2 A summary of the likely significant cumulative effects is provided in Table 15.3-1 below.

Table 15.3-1 Cumulative Impact Summary

| Receptor | MORL Total Project | WDA | BOWL | Mitigation | Sensitivities for Telford, Stevenson and MacColl, and OFTO |
|--|--|--|---|--|--|
| Construction / Decommissioning | | | | | |
| NERL Allanshill PSR ASACS Buchan ADR RAF Lossiemouth PSR | Not Significant | Not Significant | Not Significant | Not Applicable | Not Applicable |
| Overall CIA for Radar | Not Significant | | | | |
| HMR X-Ray | Not Significant Construction infrastructure may present a physical obstruction hazard | Not Significant Construction infrastructure may present a physical obstruction hazard | Not Significant HMR X-Ray does not cross the lateral extent of the BOWL development area. Therefore, no effect on this receptor during the construction / decommissioning phases is assessed. | Notification of physical obstructions to NATS Aeronautical Information Service (AIS) for addition in to appropriate aviation related documentation and on to aviation mapping. i.e. location of constructed turbines and location / movement and maximum height of construction infrastructure | HMR X-Ray only crosses the MacColl development area and the WDA. There will be no effect from the Telford, Stevenson and BOWL wind farms. |
| Overall CIA for HMR X-Ray | Not Significant | | | | |

| Receptor | MORL Total Project | WDA | BOWL | Mitigation | Sensitivities for Telford, Stevenson and MacColl, and OFTO |
|---|--|---|---|---|---|
| Offshore Installations | Not Significant Construction infrastructure may present a physical obstruction hazard | Not Significant The existing Beatrice demonstrator turbines already constrain helicopter operations to the Beatrice offshore Installations. Construction infrastructure may present a physical obstruction hazard | Not Significant The existing Beatrice demonstrator turbines already constrain helicopter operations to the Beatrice offshore Installations. Construction infrastructure may present a physical obstruction hazard | Update helicopter operators of commissioned turbines and review of Airborne Radar Approach (ARA) Procedures in conjunction with Moray Firth helicopter operators. Regular review of mitigation to ensure continued suitability. | Not Applicable |
| Overall CIA for Offshore Installations | Not Significant | | | | |
| Minimum Safe Altitude | Not Significant Construction infrastructure may present a physical obstruction hazard | Not Significant Construction infrastructure may present a physical obstruction hazard | Not Significant Construction infrastructure may present a physical obstruction hazard | The requirement to raise the MSA to 1,700 ft to mitigate the three MORL developments turbines would be sufficient when incorporating the WDA and BOWL developments. | Not Applicable |
| Overall CIA for Minimum Safe Altitude | Not Significant | | | | |
| HIAL Wick Airport | Not Significant | Not Significant | Not Significant Construction infrastructure may present a physical obstruction hazard | Implementation of agreed mitigation strategy to rationalise the instrument approach procedures that will mitigate the physical obstruction effect of the BOWL development on Wick Airport Instrument flight procedures. | Only the BOWL development is likely to have an effect on Wick Airport operations. The MORL three development sites and MORL WDA are of significant distance away not to affect such operations. |
| Overall CIA for Wick Airport | Not Significant | | | | |

| Receptor | MORL Total Project | WDA | BOWL | Mitigation | Sensitivities for Telford, Stevenson and MacColl, and OFTO |
|---|---|---|---|---|--|
| Operation | | | | | |
| NERL Allanshill PSR ASACS Buchan ADR RAF Lossiemouth PSR | Not Significant Radar systems can be affected by the presence of wind turbines. These turbines can degrade the efficiency of the air traffic control radar service being provided in the region of the three proposed wind farm sites. | Not Significant Radar systems can be affected by the presence of wind turbines. These turbines can degrade the efficiency of the air traffic control radar service being provided in the region of the three proposed wind farm sites. | Not Significant Radar systems can be affected by the presence of wind turbines. These turbines can degrade the efficiency of the air traffic control radar service being provided in the region of the three proposed wind farm sites. | Implementation and integration of technical mitigation solutions | Not Applicable |
| Overall CIA for Radar | Not Significant | | | | |
| HMR X-Ray | Not Significant HMR X-Ray crosses the lateral area of the MacColl wind farm. | Not Significant HMR X-Ray crosses the lateral area of the WDA. | Not Significant HMR X-Ray does not cross the lateral extent of the BOWL development area | Update helicopter operators of commissioned turbines. Notification of physical obstructions to NATS Aeronautical Information Service (AIS) for addition in to appropriate aviation related documentation and on to aviation mapping. i.e. location of constructed turbines and location / movement and maximum height of construction infrastructure | Not Applicable |
| Overall CIA for HMR X-Ray | Not significant | | | | |

| Receptor | MORL Total Project | WDA | BOWL | Mitigation | Sensitivities for Telford, Stevenson and MacColl, and OFTO |
|---|---|---|---|--|--|
| Offshore Installations | Not Significant Turbine development within 9 nm (16.7 km) of offshore oil and gas installations has the potential to affect Instrument Flight Procedures to such installations in poor weather conditions. There may be an additional impact on the integrity of offshore platform safety cases where emergency scenarios are based on the use of helicopters to facilitate evacuation procedures. | Not Significant Turbine development within 9 nm (16.7 km) of offshore oil and gas installations has the potential to affect Instrument Flight Procedures to such installations in poor weather conditions. There may be an additional impact on the integrity of offshore platform safety cases where emergency scenarios are based on the use of helicopters to facilitate evacuation procedures. | Not Significant Turbine development within 9 nm (16.7 km) of offshore oil and gas installations has the potential to affect Instrument Flight Procedures to such installations in poor weather conditions. | Update helicopter operators of commissioned turbines and review of Airborne Radar Approach (ARA) Procedures in conjunction with Moray Firth helicopter operators. A variety of mitigation measures are being discussed, such as undertaking the ARA with a cross wind component, shuttling between platforms, circling approaches and descent over wind turbines. Review of extant mitigation to ensure continued suitability. | Not Applicable |
| Overall CIA for Offshore Installations | Not Significant | | | | |
| Minimum Safe Altitude | Not Significant Notification of physical obstructions to helicopter operators, i.e. location / movement and maximum height of turbines | Not Significant Notification of physical obstructions to helicopter operators, i.e. location / movement and maximum height of turbines | Not Significant Notification of physical obstructions to helicopter operators, i.e. location / movement and maximum height of turbines | Appropriate mitigation implemented at the construction stage will be extant. | Not Applicable |
| Overall CIA for Minimum Safe Altitude | Not significant | | | | |

| Receptor | MORL Total Project | WDA | BOWL | Mitigation | Sensitivities for Telford, Stevenson and MacColl, and OFTO |
|---|--------------------|-----------------|-----------------|---|---|
| HIAL Wick Airport | Not Significant | Not Significant | Not Significant | Implementation of agreed mitigation strategy at construction stage | <p>Turbines in the north western sector of the BOWL Wind Farm site will have the potential to have the greatest effect on published procedures at Wick Airport. The three MORL developments and the potential MORL WDA Wind Farm, due their lateral distance from the procedures will not add any cumulative impact.</p> <p>Mitigation for BOWL in the form of rationalisation of approach procedures will be implemented prior to the construction phase</p> |
| Overall CIA for Wick Airport | Not significant | | | | |
| Decommissioning | | | | | |
| NERL Allanshill PSR RAF Lossiemouth PSR ASACS Buchan ADR | Not Significant | Not Significant | Not Significant | Mitigation remains in operation whilst any turbines remain operational | Turbines in the WDA and BOWL are not predicted to have an impact on the ASACS Buchan ADR. |
| Overall CIA for Radar | Not significant | | | | |
| HMR X-Ray | Not Significant | Not Significant | Not Significant | Mitigation remains in operation whilst any turbines remain operational. | Not Applicable |
| Overall CIA for HMR X-Ray | Not significant | | | | |

| Receptor | MORL Total Project | WDA | BOWL | Mitigation | Sensitivities for Telford, Stevenson and MacColl, and OFTO |
|---|--|--|--|---|--|
| Offshore Installations | Not Significant Decommissioning infrastructure may present a physical obstruction hazard. | Not Significant Decommissioning infrastructure may present a physical obstruction hazard. | Not Significant Decommissioning infrastructure may present a physical obstruction hazard. | Update helicopter operators of decommissioned turbines. Review of existing mitigation measures. | Not Applicable |
| Overall CIA for Offshore Installations | Not significant | | | | |
| Minimum Safe Altitude | Not Significant Decommissioning infrastructure may present a physical obstruction hazard. | Not Significant Decommissioning infrastructure may present a physical obstruction hazard. | Not Significant Decommissioning infrastructure may present a physical obstruction hazard. | Update helicopter operators of decommissioned turbines. Review of existing mitigation measures. | Not Applicable |
| Overall CIA for Minimum Safe Altitude | Not significant | | | | |
| HIAL Wick Airport | Not Significant | Not Significant | Not Significant | Implementation of agreed mitigation strategy at construction stage remains in place until turbines decommissioned | Not Applicable |
| Overall CIA for Wick Airport | Not significant | | | | |

15.3.2 Assessment of Cumulative Impacts

15.3.2.1 The developments and activities considered within the cumulative impact assessment are listed below:

- Marine renewable projects:
 - Beatrice Offshore Wind Farm (BOWL);
 - MORL Western Development Area (WDA);
 - 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.

15.3.3 Methodology

15.3.3.1 The assessment methodology has followed that outlined in the Moray Firth Offshore Wind Developers Group Discussion Document (ERM, 2011; see Technical Appendix 1.3 D).

15.3.3.2 The appraisal of the likely significant cumulative effect of the three proposed wind farms, the MORL Western Development Area (WDA) and the proposed Beatrice Offshore Wind Farm on these systems is based on an aviation operational risk assessment in accordance with Civil Aviation Authority CAA publication CAP 764, referencing all relevant operational and safety regulations. Radar performance and propagation modelling has been carried out (Technical Appendix 5.3 C) to determine the likely detection of proposed turbines from the regions civil and military radar infrastructure.

15.3.3.3 At a maximum height of 70 m above Lowest Astronomical Tide (LAT), the Offshore Substation Platforms (OSPs) will be lower in height than the projected turbines proposed for the three proposed wind farm sites. Additionally, the buried and / or protected cabling on the sea bed and underground onshore and the onshore substation will not affect aviation operations. In conclusion, it is identified that the proposed transmission infrastructure will not pose a physical obstruction to routine aviation operations in the area, and consequently, will not pose any negative obstruction effect on aviation activities. In conclusion, all transmission infrastructures is scoped out of this assessment.

Worst Case Scenario for Developments Where Detailed Assessment is Possible

15.3.3.4 For the assessments of likely significant effects in this chapter with regard to Military and Civil Aviation, it is presumed that the entirety of the area of each of the BOWL Wind Farm development and MORL WDA will be populated with wind turbines at their maximum planned tip heights of respectively 198.4 m and 204 m above Lowest Astronomical Tide (LAT). A larger area of turbines detected by radar, irrespective of their size, will create a larger area of clutter / radar degradation leading to a greater impact on the provision of navigation services.

15.3.3.5 The summary of the BOWL worst case parameters is at Table 15.3-2 below.

Table 15.3-2 Summary of BOWL Worst Case Parameters

| Worst Case Parameters | Scenario Assessed |
|-------------------------------------|---|
| Impact on PSR systems | |
| Installation of 277 Turbines | Largest planned tip height of 198.4 m increases the likelihood of radar system detectability. |

| Worst Case Parameters | Scenario Assessed |
|--|--|
| Impact on Existing Helicopter Route | |
| Installation of 277 Turbines | Largest planned tip height of 198.4 m increases the possibility of turbines presenting a physical obstruction to aircraft. |
| Impact on Helicopter Operations to Offshore Installations | |
| Installation of 277 Turbines | Largest planned tip height of 198.4 m increases the possibility of turbines presenting a physical obstruction to aircraft. |
| Impact on the area Minimum Safe Altitude (MSA) | |
| Installation of 277 Turbines | Largest planned tip height of 198.4 m increases the possibility of turbines presenting a physical obstruction to aircraft. |
| Impact on Wick Airport | |
| Installation of 277 Turbines | Largest planned tip height of 198.4 m increases the possibility of turbines presenting a physical obstruction to aircraft operating on airport Instrument Flight Procedures. |

Western Development Area

- 15.3.3.6 The Western Development Area (WDA) comprises part of the MORL Zone, outside of which the three proposed wind farm sites (Telford, Stevenson and MacColl) are located. The maximum capacity to be installed in the entire Zone is 1.5 GW and MORL has applied for a maximum of 1.5 GW within three proposed wind farm sites in the Eastern Development Area (EDA).
- 15.3.3.7 The WDA may be developed for a maximum of 500 MW of capacity if less than 1.5 GW of capacity is delivered by the Project in the EDA. In total the consented capacity of the Project and the WDA will not exceed 1.5 GW.
- 15.3.3.8 The connection between the WDA and the three proposed wind farm sites necessitates a slightly different approach to assessment, as the effects arising from the "worst case" for the Project cannot simply be added to the "worst case" scenario for the WDA. Instead, assessment of the likely significant cumulative effects of the Project and the WDA will therefore follow a similar format to that undertaken for the sensitivity assessments of the individual wind farm proposals in the Offshore Generating Station Impact Assessment chapters.
- 15.3.3.9 The summary of the WDA worst case parameters is at Table 15.3-3 below.

Table 15.3-3 Summary of MORL WDA Worst Case Parameters

| Worst Case Parameters | Scenario Assessed |
|--|--|
| Impact on PSR systems | |
| Installation of 100 x 5 MW Turbines | Largest planned tip height of 204 m increases the likelihood of radar system detectability. |
| Impact on Existing Helicopter Route | |
| Installation of 100 x 5 MW Turbines | Largest planned tip height of 204 m increases the possibility of turbines presenting a physical obstruction to aircraft. |

| Worst Case Parameters | Scenario Assessed |
|--|--|
| Impact on Helicopter Operations to Offshore Installations | |
| Installation of 100 x 5 MW Turbines | Largest planned tip height of 204 m increases the possibility of turbines presenting a physical obstruction to aircraft. |
| Impact on the Area Minimum Safe Altitude (MSA) | |
| Installation of 100 x 5 MW Turbines | Largest planned tip height of 204 m increases the possibility of turbines presenting a physical obstruction to aircraft. |
| Impact on Wick Airport | |
| Installation of 100 x 5 MW Turbines | No impact due to distance from Wick Airport flight procedures. |

Eastern Development Area

15.3.3.10 As detailed in Chapter 8.3 (Military and Civil Aviation), it is presumed that the entirety of the area of the three proposed wind farms within the EDA will be populated with wind turbines at the maximum tip height of 204 m above Lowest Astronomical Tide (LAT).

15.3.4 Detailed Cumulative Impact Assessment

15.3.4.1 Because likely significant effects on aviation interests are related to the proportional area taken up, it is considered appropriate that a worst case cumulative impact assessment assumes development in the three proposed wind farm sites (up to 1.5 GW and not exceeding 1.5 GW in the entire MORL Zone), the BOWL development and the WDA (up to 500 MW and not exceeding 1.5 GW in the entire MORL Zone) with regard to the identified aviation receptors. There are, therefore, two broad cumulative cases:

- If WDA is 0.5 GW, then EDA is maximum of 1.0 GW; and
- If EDA is 1.5 GW, then WDA is zero.

15.3.4.2 The potential receptors that are considered in this cumulative impact assessment are:

- Primary Surveillance Radar (PSR) Systems;
- Helicopter Main Routes;
- Helicopter Approach Procedures to Offshore Platforms;
- Minimum Safe Altitude; and
- HIAL Wick Airport.

Radar Systems

Construction

15.3.4.3 Turbine construction processes will have no significant effect on the identified radar systems, and the impact on radar systems is only present once a turbine is operational.

Operation

- 15.3.4.4 The theoretical detection of wind turbines within the Project, WDA and BOWL may cause unwanted radar returns to be presented on the NERL Allanshill, ASACS Buchan Air Defence Radar (ADR) and RAF Lossiemouth PSRs. This could hamper the operators' ability to distinguish actual aircraft returns from those created by the proposed wind farms.
- 15.3.4.5 Civilian and Military ATC provide navigational services to aircraft in the Moray Firth region. Both a Traffic Service and a Deconfliction Service require the use of a PSR system. Such PSR systems can be affected by the presence of wind turbines. These turbines can degrade the efficiency of the air traffic control radar service being provided in the region of the three proposed wind farm sites.
- 15.3.4.6 Radar modelling (Technical Appendix 5.3 C) predicts that turbines within the Project, WDA and BOWL will be detected by the PSR systems at NERL Allanshill and RAF Lossiemouth, and there will be a cumulative effect on the identified affected PSR systems to occur. Consequently the cumulative impact is significant.
- 15.3.4.7 A collaborative approach to mitigating the effects of the three developments with the other adjacent developments is being taken to ensure a negligible effect on the existing PSR systems. Turbines in coverage areas of ASACS Buchan ADR could shield the radar from genuine aircraft targets and / or hide genuine aircraft targets from the ASACS controller. Any of these effects would affect the controller's ability to provide a safe service to aircraft and use the radar data to monitor the UK air picture. Radar modelling predicts that turbines within the MORL WDA and BOWL will not be detected by the ASACS Buchan ADR and therefore there will be no cumulative impact.

Decommissioning

- 15.3.4.8 Turbine decommissioning processes will have no significant effect on the PSR systems. The static nature of the infrastructure is such that it will not be processed and presented onto control displays by the radar.

Helicopter Main Routes (HMRs)

Construction

- 15.3.4.9 Consultation with helicopter operators in the Moray Firth confirmed that aircraft routinely operate along HMR X-Ray between 2,000 ft (610 m) and 3,000 ft (914 m), depending on prevailing meteorological conditions. This altitude band is sufficient to prevent any helicopters operating on the HMR from coming into direct physical conflict with wind turbines within the proposed wind farm sites under normal operating conditions. Helicopters unable to operate on HMR X-Ray under icing conditions would use the available overland route if necessary.
- 15.3.4.10 Turbine construction processes will have no significant effect on aircraft operating on HMR X-Ray route due to the separation distances involved and the existence of the alternative overland route if required for use in icing conditions.

Operation

- 15.3.4.11 Due to the existence of the alternative route for use in icing conditions, and adequate separation between helicopters operating on the HMR and the wind turbines under normal operating conditions, it has been assessed that the cumulative effect is not significant.

Decommissioning

- 15.3.4.12 As discussed in paragraph 15.3.4.10 above, turbine decommissioning processes will have no significant effect on HMR X-Ray due to the separation distances involved and the alternative overland route.

Helicopter Approach Procedures to Offshore Platforms

Construction

- 15.3.4.13 Turbine construction infrastructure could be considered as physical obstructions and infringe the minimum obstacle clearance criteria of 1,000 ft. The minimum obstacle clearance dictates the height at which helicopters can transit in the region of the Project, WDA and BOWL wind farms, and the height that instrument approaches to offshore platforms may commence. The effect is not however likely to be significant due to the constraints of the existing obstructions (the existing demonstrator turbines and the oil platforms themselves).

Operation

- 15.3.4.14 There are helidecks established on Beatrice platforms A, B and C. Whilst there is no permanently established helideck on the Jacky platform, there is a capability to establish one if required. The current operators and owners of the Beatrice (and Jacky) platforms have provided the following indicative flight schedules to each of the platforms (Technical Appendix 5.3 B):

- Beatrice Alpha – three flights per week throughout the year – 156 flights per annum;
- Beatrice Bravo – three visits by an engineering team every month with flights to drop-off and collect the team – six flights per month or 72 per annum;
- Beatrice Charlie – two visits by an engineering team every three months with flights to drop off and collect the team – 16 flights per annum; and
- Jacky – when a jack-up is present (expected for six to eight weeks per annum) there will be two flights per week – maximum 16 flights per annum.

- 15.3.4.15 There are two existing wind turbines within the Beatrice field which are located to the south east of the Beatrice A platform. These two turbines already constrain instrument approaches into the Beatrice A platform where restrictions exist between the 130° and 190° radials out to 3 nm (5.6 km) from the platform.

- 15.3.4.16 In the absence of mitigation, anticipated numbers of flights likely to be prevented from reaching the platforms because of wind turbines within the Project, WDA and BOWL have been calculated as follows (Technical Appendix 5.3 B):

- Beatrice Alpha – approx. three to four flights per annum;
- Beatrice Bravo – approx. three to four flights per annum;

- Beatrice Charlie – approx. one flight in two years;
- Jacky – approx. one flight per annum.

15.3.4.17 A number of mitigation options are being discussed and will be agreed with the Moray Firth helicopter operators prior to construction.

Decommissioning

15.3.4.18 Decommissioning infrastructure may present a physical obstruction hazard although the effect is not likely to be significant due to the constraints of the existing obstructions and the mitigation which will be in place for the turbines of the Project, WDA and BOWL.

Minimum Safe Altitude

Construction

15.3.4.19 The minimum safe altitude (MSA) for aircraft operations in Instrument Meteorological Conditions (IMC), essentially poor weather, in the Moray Firth region is 1,500 ft (457 m). This allows for a minimum of 1,000 ft (305 m) clearance from known en-route obstacles (the highest point of the Beatrice platform complex). The requirement to raise the MSA to 1,700 ft to mitigate the three MORL developments turbines would be sufficient when incorporating the WDA and BOWL developments.

15.3.4.20 Turbine construction processes associated with the cumulative developments will have no overall additional effect as there is no impact associated with raising the MSA.

Operation

15.3.4.21 Turbine operation will have no further effect on the MSA in the area of the cumulative sites, as the MSA will be raised upon construction of the first turbine.

Decommissioning

15.3.4.22 Turbine decommissioning processes will have no further effect on the MSA in the area of the three developments, as the MSA will be raised upon construction of the first turbine.

HIAL Wick Airport

Construction

15.3.4.23 Turbines in the north western sector of the BOWL Wind Farm site will have a significant effect on published procedures at Wick Airport. The presence of construction infrastructure may require an increase in the height of the current defined procedure minima at the airport in this eventuality; this increase was confirmed as being unacceptable to HIAL and the aircraft operators. Mitigation in the form of rationalisation of the instrument approach procedures is currently being conducted by CAA Directorate of Airspace Policy (DAP) on behalf of Wick Airport.

- 15.3.4.24 The turbines proposed for the three proposed wind farms and the potential MORL WDA Wind Farm, due to their lateral distance from the current published Instrument Approach Procedures at Wick Airport will not add any cumulative effect.

Operation

- 15.3.4.25 Turbine operation will have a significant effect on the published procedures of Wick Airport due to the BOWL turbines; however the removal of the wider approach procedures for Category C and D aircraft will allow the proposed development to co-exist safely with aircraft operations to and from HIAL Wick Airport and the overall effect is not significant.

Decommissioning

- 15.3.4.26 Turbine decommissioning processes will have no significant effect on the revised Wick Airport operations due to their lateral distance from the current published Instruments Approach Procedures at Wick Airport.

15.3.5 Summary

- 15.3.5.1 In the absence of mitigation, significant cumulative effects on the following identified aviation stakeholders will occur:

- NERL Allanshill PSR; and
- RAF Lossiemouth PSR.

- 15.3.5.2 However mitigation is under discussion with NERL and MoD and a cumulative mitigation approach will be in place where required. When suitable technological mitigation is procured, there will be a negligible residual effect on the NERL Allanshill PSR and RAF Lossiemouth PSR systems.

- 15.3.5.3 There will be no cumulative effect on ASACS Buchan ADR as the only predicted effect is from the Project.

- 15.3.5.4 There will be no cumulative effect on HIAL Wick Airport as the only predicted effect is from BOWL.

- 15.3.5.5 With regard to helicopter approach procedures to offshore platforms, mitigation will consider the cumulative effects of the Project, the WDA and BOWL wind turbines and the mitigation measures are still under discussion with the Moray Firth helicopter operators. It is anticipated that through continued discussions and implementation of mitigation measures, it will be agreed that the residual effect will be manageable.

- 15.3.5.6 A summary of the expected cumulative effects is provided in Table 15.3-1.

15.3.6 References

Civil Aviation Policy (CAP) 393 Air Navigation: The Order and the Regulations;
CAP 670 ATS Safety Requirements;
CAP 764 CAA Policy and Guidelines on Wind Turbines;
UK Aeronautical Information Publications (Civil and Military).

This page has been intentionally left blank.

15.4 Seascape, Landscape and Visual Receptors

15.4.1 Summary

- 15.4.1.1 The cumulative assessment of seascape, landscape and visual receptors assesses the additional effect of the three proposed wind farm sites and OSPs in relation to the other wind farms assumed to be part of the landscape in three scenarios: operation, consented and application stage.
- 15.4.1.2 Beatrice Offshore Wind Farm is considered as an application stage site. In this scenario, the three proposed wind farm sites and OSPs will have 'in combination' effects with Beatrice Offshore Wind Farm from the coastal edge and immediate hinterland, with the three proposed wind farm sites and OSPs located behind Beatrice Offshore Wind Farm. The three proposed wind farm sites and OSPs will also have 'in succession' and 'sequential' effects with onshore wind farms near the coast, such as Buolfruch, Dunbeath, Upper Smerral, Burn of Whilk, Stroupster and 'sequential' effects with onshore wind farms further inland such as Causeymire, Halsary, Spittal Hill.
- 15.4.1.3 The cumulative assessment identifies no significant cumulative effects on viewpoints in the operational and consented scenarios. Significant cumulative effects on two viewpoints (Dunbeath and Berriedale) have been identified in the application stage scenario – where the Development increases the developed horizon in addition to Beatrice Offshore Wind Farm. Significant cumulative effects are also identified on the closest section of the A9, over a limited stretch between Berriedale and Latheron, in the context of onshore wind farms and Beatrice Offshore Wind Farm.
- 15.4.1.4 In general, the potential for cumulative effects is limited by the location of the three proposed wind farm sites and OSPs, which are 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 three proposed wind farm sites and OSPs are generally seen in succession with onshore wind farms, visually separated from the pattern of onshore wind farm development.
- 15.4.1.5 The three proposed wind farm sites and OSPs are located largely behind Beatrice Offshore Wind Farm, which limits the cumulative influence and prominence of the three proposed wind farm sites and OSPs. Although the three proposed wind farms sites increase the density of turbines visible in the array in combination with Beatrice Offshore Wind Farm, the cumulative effect of Beatrice Offshore Wind Farm with the three proposed wind farm sites and OSPs is not much greater than Beatrice Offshore Wind Farm alone, with the exception of a limited area of Caithness around Dunbeath and Berriedale, where the three proposed wind farm sites increase the extent of the developed skyline in relation to Beatrice Offshore Wind Farm and are considered significant.
- 15.4.1.6 The assessment identified no significant cumulative effects on viewpoints in Moray, where there is a low to negligible change, and no significant cumulative effects on landscape / seascape character. The cumulative effect of the Telford, Stevenson and MacColl wind farms in addition to the WDA is generally to increase the horizontal extent of turbines on the developed horizon, either forming a connecting extension to the EDA or a separate wind farm feature on

the skyline, viewed at the southern end of the wind farm from Caithness, and the western side of the wind farm from Moray and Aberdeenshire. The cumulative effect of the Telford, Stevenson and MacColl wind farms in addition to the WDA is assessed as significant from receptors over a limited part of the southern Caithness coastline in the study area, but of an equal or lower magnitude / significance from the northern parts of Caithness (north of Wick), and from Moray and Aberdeenshire.

- 15.4.1.7 This chapter contains relevant information on the OnTI to allow Scottish Ministers and Marine Scotland to make decisions on the applications for Section 36 consents and Marine Licences for the three proposed wind farm sites and the OfTI. Discussions are ongoing with landowners to determine the exact location and layout of the substation(s) on their land within the preferred onshore substation area. This will be finalised following production of a masterplan by the owner / operator of the Peterhead Power Station compound which forms part of the preferred area. Once the precise location and layout for the onshore substation(s) and export cable location has been confirmed, an application for planning permission for the OnTI will be submitted to Aberdeenshire Council and will be supported by this ES and such further information as is required to support the planning application.

15.4.2 Assessment of Cumulative Impacts

- 15.4.2.1 The following paragraphs present the results of assessment of the likely significant cumulative impacts upon seascape, landscape and visual receptors arising from the proposed Telford, Stevenson and MacColl offshore wind farms and OSPs (herein referred to as 'the three proposed wind farm sites') in conjunction with other existing or reasonably foreseeable marine and coastal developments and activities. MORLs approach to the assessment of cumulative effects is described in Chapter 1.3: Environmental Impact Assessment.

Cumulative Assessment Methodology

- 15.4.2.2 The assessment methodology has followed that outlined in the Moray Firth Offshore Wind Developers Group Discussion Document (ERM, 2011; see Technical Appendix 1.3 D).
- 15.4.2.3 The Cumulative Seascape, Landscape and Visual Impact Assessment (CSLVIA) describes, illustrates and assesses the ways in which the three proposed wind farm sites and OfTI will have additional effects when considered together with other existing, consented or proposed wind farms and identifies any related significant cumulative effects arising from the three proposed wind farm sites. The CSLVIA does not assess the total effect arising from all of these wind farms, but assesses the additional effects arising from the three proposed wind farm sites in relation to the other wind farms assumed to be part of the landscape in each scenario.
- 15.4.2.4 The CSLVIA assesses the effect in three scenarios: operation, consented and application stage. The 'operational scenario' involves the assessment of the addition of the three proposed wind farm sites to the existing baseline, which includes only operational wind farms. The 'consented scenario' involves the assessment of the addition of the three proposed wind farm sites to operational wind farms (identified in the first scenario) and other wind farms which have been granted planning consent (i.e. approved schemes which are likely to be constructed). The 'application scenario' involves the assessment of the addition

of the three proposed wind farm sites to existing and consented wind farms (identified in the first and second scenario), together with valid (but as yet undetermined) wind energy planning applications. The Beatrice Offshore Wind Farm (BOWL) is considered as an application stage site in the assessment. In the application scenario, the cumulative effect of the three proposed wind farm sites are assessed in the context of onshore and offshore wind farms, so that the cumulative effect of the three proposed wind farm sites can be considered with and without Beatrice.

- 15.4.2.5 The ultimate scenario that may arise (i.e. the total number of wind farms that are built) is uncertain and therefore speculative, as the scenarios include wind farms which are in the process of being determined by the relevant planning authority, and those which have not yet been built. Not all proposals will necessarily gain planning approval or be built. Judgements made from the conclusions of this theoretical assessment therefore need to be weighed up and balanced according to the likelihood of the effect arising.
- 15.4.2.6 The terminology used in the CSLVIA refers to the Telford, Stevenson and MacColl sites and OSPs as 'the three proposed wind farm sites' (as per Chapter 8.4) and refers to other 'cumulative' wind farms by name.
- 15.4.2.7 The CSLVIA is supported with figures contained in Volume 7, which includes cumulative wind farm maps (Figure 15.4-1), Cumulative Zone of Theoretical Visibility (CZTV) mapping (Figures 15.4-2 to 15.4-22) and cumulative wireline views from the assessment viewpoints (Figures 15.4-23 to 15.4-46). Visual representations for the cumulative assessment are produced in accordance with best practice (SNH, 2009). There are no equivalent Highland Council visualisation standards for cumulative visualisations.

Cumulative Assessment Scope

- 15.4.2.8 The CSLVIA includes operational, consented and application stage wind energy developments within the study area up to 25th January 2012, as listed in Table 15.4-1 below and shown in Figure 15.4-1, Volume 7 and illustrated in the wirelines in Figures 15.4-23 to 15.4-46, Volume 7. Scoping stage wind farms are shown in these figures, but they are not assessed in any detail, due to the uncertainty regarding their future and regarding information available for pre-application stage wind farms. Domestic and feed in tariff scale single wind turbines, with a height less than 50 m to blade tip, have been scoped out of the assessment as agreed with Scottish Natural Heritage (SNH) and The Highland Council (THC) and it is considered that the three proposed wind farm sites will not have significant effects in addition to these small scale turbines.
- 15.4.2.9 An initial assessment of the relationship and intervisibility of other wind farms with the three proposed wind farm sites has been undertaken, in order to determine which wind farms have the potential to contribute to a significant cumulative effect following the addition of the three proposed wind farm sites. The assessment focuses on the wind energy developments with potential for significant cumulative effects with the three proposed wind farm sites.
- 15.4.2.10 Wind energy developments in the study area are listed in Table 15.4-1 below and shown in Figure 15.4-1, Volume 7. They illustrate the emerging pattern of wind energy distribution in the region. There is one operational offshore wind cluster in the study area – Beatrice Demonstrator, consisting of two turbines at the Beatrice

Oil Platform, located 10 km to the west of the three proposed wind farm sites (MacColl). In addition to the operational Beatrice demonstrator turbines, Beatrice Offshore Wind Farm Ltd (BOWL) are proposing Beatrice Offshore Wind Farm, located within Scottish Territorial Waters to the immediate west of the Telford, Stevenson and MacColl sites. The proposed Beatrice Offshore Wind Farm is an application stage wind farm in the cumulative assessment, as agreed in consultation with SNH / THC.

- 15.4.2.11 There are two operational onshore wind farms in the Caithness part of the study area – Buolfrich and Causeymire; and two operational wind clusters, consisting of 3 turbines or less – Achairn and Flex Hill. Achairn (29.7 km) and Flex Hill (32.4 km) are located 'closest' to the proposed development, approximately 8 km inland within mixed agricultural land to the west of Wick. Buolfrich is located in the sweeping moorlands to the north of Dunbeath, 34.3 km from the three proposed wind farm sites and Causeymire is located further inland in the flat peatlands, 42.5 km from the three proposed wind farm sites. There is one operational onshore wind farm in the Aberdeenshire part of the study area, Boyndie Wind Farm, located 46.9 km from the three proposed wind farm sites.
- 15.4.2.12 In addition to these operational wind farms, Camster Wind Farm is currently under construction in the coniferous plantation / moorlands at Camster Forest, 30.5 km from the three proposed wind farm sites. There are several wind energy developments which have consent, but have not yet been built, of most relevance to the proposed development are Burn of Whilk, Wathegar and Stroupster. When constructed, Burn of Whilk will be the closest onshore wind farm to the three proposed wind farm sites (25.1 km). Wathegar is located adjacent to Flex Hill and will create the impression of a larger wind farm formed by Achairn, Flex Hill and Wathegar. Stroupster is located further north, at distance of 36.3 km from the three proposed wind farm sites.
- 15.4.2.13 In addition to the operational and consented wind farms in the study area, there are several current, but as yet underdetermined planning applications for wind energy developments in the study area. Those of most relevance for the proposed development are Wathegar 2, Dunbeath and Upper Smerral. The Hearing and Inquiry sessions for Dunbeath Wind Farm were held in July 2011 and the reporter is currently preparing his report to Ministers. Upper Smerral is currently pending consideration. A planning application for Wathegar 2 Wind Farm was submitted to Highland Council in October 2011 and is also pending consideration. There is an emerging pattern of wind energy developments in the sweeping moorlands and coniferous plantations on the inland edge of the eastern Caithness coast, to the west of the A9, which is of particular relevance for further assessment. There is one application stage wind farm in Moray, Aultmore Wind Farm, located approximately 49.2 km from the proposed development.
- 15.4.2.14 Several scoping stage wind farm developments, with relevance to the proposed development, were identified as shown in Figure 15.4-1, Volume 7. An indicative location of these scoping stage sites is shown in the wirelines, but they are not assessed in any further detail due to the uncertainty regarding their future and regarding information available for these pre-application sites.

Table 15.4-1 Cumulative Impact Assessment Scope

| Wind Farm | Turbine Number | Turbine Height (blade tip m) | Distance from Proposed Developments (km) |
|---------------------------|----------------|------------------------------|--|
| Operational | | | |
| Achairn | 3 | 100 | 29.7 |
| Beatrice Demo Turbines | 2 | 151 | 9.9 |
| Boyndie & Extension | 8 | 100.5 | 46.9 |
| Buolfruch | 15 | 75 | 34.3 |
| Causeymire | 21 | 100 | 40.5 |
| Flex Hill / Bilbster | 3 | 90 | 32.4 |
| Under Construction | | | |
| Camster | 25 | 120 | 30.5 |
| Consented | | | |
| Burn of Whilk | 9 | 116 | 25.1 |
| Causeymire Extension | 3 | 100 | 42.5 |
| Stroupster | 12 | 112 | 36.3 |
| Wathegar | 5 | 101 | 31.8 |
| Application | | | |
| Aultmore | 13 | 110 | 49.2 |
| Beatrice Offshore | 142 | 221 | |
| Dunbeath | 22 | 125 | 36.2 |
| Halsary | 18 | 100 | 39.2 |
| Plover Hill | 1 | 78 | 37.9 |
| Spittal Hill | 30 | 100 / 110 | 42.1 |
| Upper Smerral | 4 | 80 | 33.5 |
| Wathegar 2 | 9 | 100 | 30.5 |
| Scoping | | | |
| Bad a Cheo | 13 | 105 | 39.8 |
| Camster Forest | 16 to 20 | Unknown | 29.0 |
| Cogle Moss Wind Cluster | 7 | Unknown | 34.7 |

| Wind Farm | Turbine Number | Turbine Height (blade tip m) | Distance from Proposed Developments (km) |
|-------------------|----------------|------------------------------|--|
| Earl's Cairn | 13 | Unknown | 40.0 |
| Lower Seater | 4 | Unknown | 39.4 |
| Nottingham Mains | 2 | Unknown | 31.1 |
| Rumster | 3 | 100 | 32.6 |
| Westerdale | 50 to 60 | Unknown | 33.0 |
| West of Flex Hill | 3 | Unknown | 47.3 |

15.4.2.15 The CSLVIA focuses on the cumulative effect of the proposed development in particular with the two offshore wind farms: Beatrice Demonstrator and Beatrice Offshore Wind Farm (BOWL) and the closest onshore wind farms in Caithness. The cumulative situation changes frequently as applications are made or withdrawn, and the layouts of submitted application wind farms are changed. 21 March 2012 has been used as a cut-off for this cumulative assessment - any changes in the cumulative situation after that date are not incorporated in the assessment.

Worst Case Scenarios

15.4.2.16 A summary of the worst case parameters of wind farm design for the Beatrice Offshore Wind Farm in terms of seascape, landscape and visual receptors is provided in Table 15.4-2 below. The worst case parameters for the Telford, Stevenson and MacColl wind farms and the offshore transmission infrastructure are as provided in Chapter 8.4 (Seascape, Landscape and Visual Receptors).

Table 15.4-2 Summary of BOWL Worst Case Parameters for SLVIA

| Worst case parameters | Scenario assessed |
|----------------------------|--------------------------------------|
| Rating | 7 MW |
| Maximum Number of Turbines | 142 turbines |
| Maximum Blade Tip Height | 198.4 m |
| Maximum Rotor Diameter | 165 m |
| Maximum Hub Height | 115.9 m |
| Turbine Foundations | Use of jacket foundations |
| Spacing | 1,155 m (crosswind) x 990 (downwind) |

15.4.2.17 The Western Development Area (WDA) comprises part of the MORL Zone, within which the three proposed wind farm sites (Telford, Stevenson and MacColl) are located. The maximum capacity to be installed in the entire Zone is 1.5 GW and MORL has applied for a maximum of 1.5 GW within three proposed wind farm sites.

- 15.4.2.18 The WDA may be developed for a maximum of 500 MW of capacity if less than 1.5 GW of capacity is delivered by the Project in the EDA. In total the consented capacity of the Project and the WDA will not exceed 1.5 GW.
- 15.4.2.19 The connection between the WDA and the three proposed wind farm sites necessitates a slightly different approach to assessment, as the effects arising from the “worst case” for the Project cannot simply be added to the “worst case” scenario for the WDA. Instead, assessment of the likely significant cumulative effects of the Project and the WDA will therefore follow a similar format to that undertaken for the sensitivity assessments of the individual wind farm proposals in Chapter 8.4 (Seascape, Landscape and Visual Receptors) and Technical Appendix 5.4 C.
- 15.4.2.20 A summary of the worst case parameters of wind farm design for the potential MORL Western Development Area (WDA) in terms of seascape, landscape and visual receptors is provided in Table 15.4-3 below.

Table 15.4-3 Summary of MORL WDA Worst Case Parameters for SLVIA

| Worst Case Parameters | Scenario Assessed |
|----------------------------|--|
| Rating | 5 MW |
| Maximum Number of Turbines | 100 |
| Maximum Blade Tip Height | 167 m |
| Maximum Rotor Diameter | 135 m |
| Maximum Hub Height | 99.5 m |
| Turbine Foundations | Use of jacket foundations |
| Spacing | 840 m (crosswind) x 600 (downwind) |
| Location of Turbine | Turbines located at western end of WDA |

Cumulative ZTV

- 15.4.2.21 Cumulative Zones of Theoretical Visibility (CZTV) have been produced (Figures 15.4-2 to 15.4-22, Volume 7) to identify the cumulative visibility of the proposed development with each of the other wind farms in the study area. The CZTV show that the three proposed wind farm sites will have the following broad patterns of combined visibility with other wind farms:
- Combined visibility with **Achairn, Flex Hill** and **Wathegar** from limited areas around and to the west of Wick; scattered visibility from the inland areas of mixed agriculture and settlement to the north of Wick and from the A99 to the north of Wick. Limited combined visibility from areas to the south of Wick including A99;
 - Combined visibility with **Beatrice Demonstrator** and **Beatrice Offshore Wind Farm** (BOWL) from much of coastal edge and immediate hinterland between Brora and Wick, with the three proposed wind farm sites located behind Beatrice Offshore Wind Farm. Combined visibility extends inland across elevated moorlands and mountains in southern part of Caithness, forming a view-shed which screens views from the flat peatlands. Scattered

visibility filtering inland at long distances in northern part of Caithness in the study area. Theoretical combined visibility from Moray coast is limited by long distance to the three proposed wind farm sites, with BOWL located over 50 km from Moray coast;

- Combined visibility with wind farms in Moray / Aberdeenshire is generally limited by distance of **Boyndie** and **Aultmore** wind farms in this part of the study area which are located over 46 km from the three proposed wind farm sites;
- Combined visibility with **Buolfruch** contained to area of higher sweeping moorland to the west of Buolfruch and from limited parts of the coastal edge near Dunbeath, including part of the A9 on approach to Dunbeath;
- Combined visibility with **Camster** from limited areas around and to the west of Wick; scattered visibility from the inland areas of mixed agriculture and settlement to the north of Wick and from the A99 to the north of Wick. Limited combined visibility from areas to the south of Wick including A9;
- Combined visibility with **Causeymire**, **Halsary** and **Spittal Hill** is contained to scattered visibility from the inland areas of mixed agriculture and settlement to the north of Wick / A882 and from lone mountains to the south of the Caithness part of the study area. Limited / no combined visibility from coastal areas to the south of Wick including A9, with inland hills forming clear viewshed;
- Combined visibility with **Burn of Whilk** scattered over coastal edge of east Caithness between Berriedale and Wick, extending inland to high ground in central / southern parts of study area and scattered locations in the northern part of the study area;
- Combined visibility with **Stroupster** and **Plover Hill** from scattered areas to the north of Wick and from the A99 to the north of Wick. Limited combined visibility from areas to the south of Wick, including coastal edge and A9; and
- Combined visibility with **Dunbeath** and **Upper Smerral** largely from the elevated ground and mountains in southern part of Caithness in the study area, and from scattered locations along the coastal edge / hinterland between Berriedale and Lybster.

Key Issues

15.4.2.22 The pattern of wind energy development and intervisibility identified in the study area and the CZTVs raises several key issues for the CLVIA, as follows:

- Cumulative effect of the three proposed wind farm sites with Beatrice Offshore Wind Farm, as the closest offshore wind farm, to which the proposed development will directly relate and be viewed in combination;
- Cumulative landscape and visual effect of the three proposed wind farm sites on the coastal edge and hinterland of east Caithness, with Beatrice Offshore Wind Farm (BOWL) and onshore wind farms near the coast (Buolfruch, Dunbeath, Upper Smerral, Burn of Whilk, Stroupster);
- Simultaneous and sequential cumulative visual effects on views experienced by motorists on the A9 and A99 road corridors with Beatrice Offshore Wind Farm (BOWL) and onshore wind farms visible from coastal edge;
- Cumulative effect of the proposed development with onshore wind farms in the peatlands, moorland and coniferous plantations to the south of the A822

(Causeymire, Halsary, Spittal Hill, Flex Hill, Achairn, Wathegar and Camster), in views from the inland area of mixed agriculture and settlement to the north of the study area;

- Simultaneous and sequential cumulative visual effects on views experienced by motorists on the A822; and
- Extent to which the addition of the three proposed wind farm sites may increase the influence of wind farms as a characteristic element or create a character change to a 'wind farm seascape / landscape'.

15.4.2.23 These aspects are assessed in detail in the following assessment of cumulative effects on seascape / landscape character and views and a series of conclusions are drawn which address these key issues. The cumulative assessment is undertaken for the landscape and visual receptors identified in Chapter 5.4 and assessed in Chapter 8.4 (Seascape, Landscape and Visual Receptors). The range of viewpoints is representative and adequate for cumulative assessment purposes.

15.4.3 Cumulative Visual Effects – with Operational, Consented and Application Wind Farms

Viewpoints

15.4.3.1 The assessment of cumulative effects on views is carried out from the same visual receptors and viewpoints described in Chapter 8.4 (Seascape, Landscape and Visual Receptors). The methodology for the assessment of cumulative effects on views is described in Technical Appendix 5.4 A. The cumulative visual assessment does not select viewpoints specifically for cumulative assessment and all of the wirelines (Figures 15.4-23 to 15.4-46, Volume 7) show the operational, consented and application stage wind energy developments which may be visible from each viewpoint. In this way, the cumulative effect of the proposed development can be assessed in a balanced manner from the visual receptors present, rather than selecting 'cumulative viewpoints' specifically from locations where multiple wind energy developments are visible (e.g. elevated hill top locations). The viewpoint assessment includes locations where the proposed development will not have cumulative effects (i.e. where it is not seen in combination with other wind energy developments) and areas where there is potential for cumulative effects to arise (i.e. where it is seen in combination or sequentially, with other wind energy developments).

15.4.3.2 The assessment of cumulative effects on views assesses the additional effects arising from the three proposed wind farm sites in relation to the other wind farms assumed to be part of the landscape in three scenarios: operation, consented and application. The sensitivity of each viewpoint is repeated from the viewpoint assessment in Chapter 8.4 (Seascape, Landscape and Visual Receptors) and the cumulative magnitude of change is described further for each viewpoint in each scenario. As described in Technical Appendix 5.4 A, the cumulative magnitude of change on views is an expression of the degree to which the views will be changed by the addition of the three proposed wind farm sites to wind farms that are already operational, consented or at application stage and is dependent on the following variables:

- The location of the three proposed wind farm sites in relation to other wind farms;

- The extent of the developed skyline;
- The number and scale of the developments seen simultaneously, successively or sequentially;
- The turbine size or scale comparison with other wind farms;
- The 'consistency of image' of the three proposed wind farm sites in relation to other wind farms;
- The distance of the three proposed wind farm sites from the viewpoint or receptor; and
- The magnitude of change of the three proposed wind farm sites in its own right.

15.4.3.3 The assessment of cumulative effects on views is presented in Table 15.4-4 below.

Table 15.4-4 Assessment of Cumulative Effects on Views

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-----------|----------------|---------------|--------------------------|---------------------------------|---|-----------------------------------|
| 1. | Duncansby Head | Medium - high | Operational ² | Beatrice Demonstrator (60.4 km) | <ul style="list-style-type: none"> • Only one other wind farm visible, which is small scale (2 turbines) and located over 60 km from viewpoint. <p>Magnitude of change: negligible</p> | Not significant |
| | | | Consented | Stroupster (8.4 km) | <ul style="list-style-type: none"> • Limited visibility of Stroupster, with only five turbine blade tips visible above skyline. • Visual separation between proposed developments and Stroupster. <p>Magnitude of change: low</p> | Not significant |
| | | | Application | Beatrice (36.7 km) | <ul style="list-style-type: none"> • Visible in combination with Beatrice such that the two wind farms will appear as one larger wind farm in the view. • Visible at long distance from the viewpoint, located largely behind Beatrice. • Due to their location behind Beatrice, the three proposed wind farm sites will increase the density of turbines visible in the array in combination with Beatrice. • Extends developed skyline to the north of Beatrice (by approximately 8 degrees), but at long distances over 42 km from the viewpoint. • Scale and form will appear consistent with Beatrice and forms a consistent image. | Not significant |

¹ Onshore wind farms located over 50 km from viewpoint have not been listed

² Operational scenario includes wind farms under construction.

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-----------|-----------------------------------|---------------|-------------------------|---|--|-----------------------------------|
| 1. | Duncansby Head (continued) | Medium - high | Application (continued) | Beatrice (36.7 km) | <ul style="list-style-type: none"> Due to its location largely behind Beatrice, will only marginally increase the influence and prominence of wind farm development in the application stage view. | Not significant |
| | | | | | <ul style="list-style-type: none"> No other application stage wind farms visible. <p>Magnitude of change in context of onshore wind farms: low</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: low</p> | |
| 2. | Keiss Pier | Medium - high | Operational | Achairn (11.5 km) Flex Hill (11.6 km) Camster (15.6 km) Causeymire (20.8 km) | <ul style="list-style-type: none"> Causeymire blade tips visible below horizon at long distance to south west. | Not significant |
| | | | | | <ul style="list-style-type: none"> Achairn, Camster and Flex Hill appear as one larger wind farm in the view inland across Sinclair's Bay. | |
| | | | | | <ul style="list-style-type: none"> Proposed developments are visually separated from this group, located on skyline beyond and behind Noss Head. | |
| | | | | | <ul style="list-style-type: none"> Wind farms will compete with existing focal points at Noss Head and the mountains at Morven / Scaraben. | |
| | | | | | <ul style="list-style-type: none"> Proposed developments add wind farm influence into new part of the view of Sinclair's Bay, such that wind farms will be visible on the inland and offshore skylines. | |
| | | | | | <ul style="list-style-type: none"> Proposed developments are not seen in full, with much screened behind Noss Head, therefore occupying a relatively narrow part of wide panorama and located at long distance over 34 km from the viewpoint. <p>Magnitude of change: medium-low</p> | |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|---|---------------------------|---------------|---------------------|---|--|-----------------------------------|
| 2. | Keiss Pier (continued) | Medium - high | Consented | Wathegar (12 km) Burn of Whilk (19.8 km) | <ul style="list-style-type: none"> Wathegar will combine with Achairn, Camster and Flex Hill to appear as one larger wind farm in the view inland across Sinclair's Bay. | Not significant |
| | | | | | <ul style="list-style-type: none"> Several turbines at Burn of Whilk will appear as a separate wind farm on rising ground on the skyline to the east of this group. | |
| <ul style="list-style-type: none"> Proposed developments are visually separated from this group, located on skyline beyond and behind Noss Head. | | | | | | |
| <ul style="list-style-type: none"> Wind farms will compete with existing focal points at Noss Head and the mountains at Morven / Scaraben. | | | | | | |
| <ul style="list-style-type: none"> Proposed developments will add wind farm influence into new part of the view of Sinclair's Bay, such that wind farms will be visible on the inland and offshore skylines. | | | | | | |
| <ul style="list-style-type: none"> Proposed developments will not be visible in full, with much screened behind Noss Head, therefore occupying a relatively narrow part of wide panorama and located at long distance over 34 km from the viewpoint. <p>Magnitude of change: medium-low</p> | | | | | | |
| | | | Application | Plover Hill (8.7 km) Wathegar 2 (11.5 km) Spittal Hill (16.5 km) Halsary (18.7 km) Beatrice (27.4 km) | <ul style="list-style-type: none"> Wathegar 2 will combine with Achairn, Camster, Flex Hill and Wathegar to appear as one larger wind farm in the view inland across Sinclair's Bay. Halsary, Spittal Hill and Plover Hill will be screened by intervening built development in Keiss. Proposed developments will be visible in combination with Beatrice such that the two wind farms will appear as one larger wind farm in the view. | Not significant |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-----------|------------------------|---------------|-------------------------|---|---|-----------------------------------|
| 2. | Keiss Pier (continued) | Medium - high | Application (continued) | Plover Hill (8.7 km) Wathegar 2 (11.5 km) Spittal Hill (16.5 km) Halsary (18.7 km) Beatrice (27.4 km) | <ul style="list-style-type: none"> Beatrice turbine blade tips will appear to break the skyline of Noss Head giving the impression of onshore wind farm development located behind the headland. | Not significant |
| | | | | | <ul style="list-style-type: none"> Wind farm development will occupy many parts of the skyline enclosing Sinclair's Bay and as a series of repeating elements round the bay from its inland extents to its headland at Noss Head. Proposed developments will be visible at long distance from the viewpoint (over 34 km), and as it is located largely behind Beatrice, will increase the density of turbines visible in the array and slightly extend developed skyline to the east of Beatrice. | |
| | | | Operational | Flex Hill (11.3 km) Achairn (12.4 km) Camster (14.8 km) | <ul style="list-style-type: none"> Due to its location largely behind Beatrice, will only marginally increase the influence and prominence of wind farm development in the application stage scenario view. <p>Magnitude of change in context of onshore wind farms: medium-low</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: low</p> | |
| | | | | | <ul style="list-style-type: none"> Camster and Flex Hill appear as one larger wind farm on the skyline in the view and Achairn appears as a separate wind cluster to the east of this group. Proposed developments are visually separated from this group, located at long distance (40 km) on skyline to south east. | Not significant |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-------------|---|--|-------------------------|--|---|-----------------------------------|
| 3. | Sortat | Medium-low | Operational (continued) | Flex Hill (11.3 km) Achairn (12.4 km) Camster (14.8 km) | <ul style="list-style-type: none"> Proposed developments are not seen in full, with much screened behind intervening landform, such that only turbine blade tips are visible above skyline with some partial screening by topographic features. <p>Magnitude of change: low-negligible</p> | Not significant |
| | | | Consented | Stroupster (5.2 km) Wathegar (11.8 km) Burn of Whilk (21 km) | <ul style="list-style-type: none"> Wathegar will combine with Camster and Flex Hill to appear as one larger wind farm in the view and Achairn appears as a separate wind cluster to the east of this group. | Not significant |
| | | | | | <ul style="list-style-type: none"> Burn of Whilk will appear as a separate, more distant wind farm on rising ground on the skyline between this group and Achairn. Proposed developments will retain visual separation from this group, located at long distance (40 km) on skyline to south east. Proposed developments will not be seen in full, with much screened behind intervening landform, such that only turbine blade tips will be visible above skyline with some partial screening by topographic features. <p>Magnitude of change: low</p> | |
| Application | Wathegar 2 (11.9 km) Plover Hill (4.0 km) Spittal Hill (11.7 km) Halsary (15.2 km) Beatrice (32.5 km) | <ul style="list-style-type: none"> Wathegar 2 will combine with Achairn, Camster, Flex Hill and Wathegar to join this group and appear as one larger wind farm in the view. Halsary (blade tips), Plover Hill and Spittal Hill will also be visible as separate wind farm features on the inland skyline. Proposed developments will be visible in combination with Beatrice such that the two wind farms will appear as one wind farm. | Not significant | | | |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-----------|-----------------------|-------------|----------------------------|---|---|-----------------------------------|
| 3. | Sortat (continued) | Medium-low | Application (continued) | Wathegar 2 (11.9 km) | <ul style="list-style-type: none"> Beatrice turbine blade tips will appear to break the skyline giving the impression of onshore wind farm development located behind the skyline. | Not significant |
| | | | | Plover Hill (4.0 km) | <ul style="list-style-type: none"> Wind farm development will occupy many parts of the skyline and form a series of repeating elements. | |
| | | | | Spittal Hill (11.7 km) | <ul style="list-style-type: none"> Proposed developments will retain visual separation from this group, located at long distance (40 km) on skyline to south east. | |
| | | | | Halsary (15.2 km) | <ul style="list-style-type: none"> Proposed developments will not be visible in full, with much screened behind intervening landform, such that only turbine blade tips will be visible above skyline with some partial screening by topographic features. | |
| | | | | Beatrice (32.5 km) | <ul style="list-style-type: none"> Due to its location largely behind Beatrice, will only marginally increase the influence of wind farm development in the application stage scenario view. <p>Magnitude of change in context of onshore wind farms: low</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: negligible</p> | |
| 4. | Wick Bay | Medium-high | Operational | Achairn (6.8 km) | <ul style="list-style-type: none"> Achairn is visible on skyline in view west inland and is seen in the context of settlement of Wick in the foreground. | Not significant |
| | | | | Camster (10.9 km) | <ul style="list-style-type: none"> Camster is screened by intervening buildings in Wick and will not be visible from this viewpoint. | |
| | | | | <ul style="list-style-type: none"> Proposed developments are visually separated from Achairn, but add wind farm influence into new part of the view of view of open sea skyline from Wick Bay. <p>Magnitude of change: low-negligible</p> | | |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|---|-------------------------|-------------|---------------------|--|---|-----------------------------------|
| 4. | Wick Bay (continued) | Medium-high | Consented | Wathegar (9 km) Burn of Whilk (11.9 km) | <ul style="list-style-type: none"> Wathegar will be visible behind Achairn in view west inland, combining to appear as one larger wind farm in the view and is seen in the context of settlement of Wick in the foreground. | Not significant |
| | | | | | <ul style="list-style-type: none"> Burn of Whilk will be screened by intervening buildings in Wick and will not be visible from this viewpoint. | |
| <ul style="list-style-type: none"> Proposed developments will be visually separated from Achairn and Wathegar, but add wind farm influence into new part of the view of view of open sea skyline from Wick Bay. <p>Magnitude of change: low</p> | | | | | | |
| | | | Application | Wathegar 2 (7.7 km) Halsary (17.8 km) Beatrice (18.1 km) | <ul style="list-style-type: none"> Wathegar 2 will be visible between Achairn and Wathegar in view west inland, combining to appear as one larger wind farm in the view and is seen in the context of settlement of Wick in the foreground. Limited visibility of distant Halsary blade tips in same view direction. | Not significant |
| | | | | | <ul style="list-style-type: none"> Visible in combination with Beatrice such that the two wind farms will appear as one larger wind farm in the view. | |
| | | | | | <ul style="list-style-type: none"> Visible at long distance (26 km) from the viewpoint, located largely behind Beatrice. | |
| | | | | | <ul style="list-style-type: none"> Due to their location behind Beatrice, the three proposed wind farm sites will increase the density of turbines visible in the array in combination with Beatrice and will form a small extension to developed skyline to the north of Beatrice. | |
| | | | | | <ul style="list-style-type: none"> Scale and form will appear consistent with Beatrice and forms a consistent image. | |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-------------|------------------------------------|---|-------------------------|--|---|-----------------------------------|
| 4. | Wick Bay (continued) | Medium-high | Application (continued) | Wathegar 2 (7.7 km) Halsary (17.8 km) Beatrice (18.1 km) | <ul style="list-style-type: none"> Due to its location largely behind Beatrice, will only marginally increase the influence and prominence of wind farm development in the application stage view. <p>Magnitude of change in context of onshore wind farms: low</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: medium-low</p> | Not significant |
| 5. | Sarclet (Sarclet Haven Info Board) | Medium | Operational | Beatrice Demonstrator (30.4 km) | <ul style="list-style-type: none"> Only one other wind farm visible, which is small scale (2 turbines) and located over 30 km from viewpoint. <p>Magnitude of change: low</p> | Not significant |
| | | | Consented | Burn of Whilk (5.7 km) | <ul style="list-style-type: none"> Several turbines at Burn of Whilk will appear as a separate wind farm on rising ground on the inland skyline to the south west. | Not significant |
| | | | | | <ul style="list-style-type: none"> Proposed developments will be visually separated from this wind farm, but add wind farm influence into new part of the view on open sea skyline to the south east. | |
| | | | | | <ul style="list-style-type: none"> Proposed developments will be visible at long distance (over 22 km) from the viewpoint. | |
| Application | Beatrice (14.0 km) | <ul style="list-style-type: none"> Burn of Whilk will occupy a relatively small part of skyline and as such the cumulative effect of the three proposed wind farm sites on the skyline is relatively limited. <p>Magnitude of change: low</p> | Not significant | | | |
| | | <ul style="list-style-type: none"> Visible in combination with Beatrice such that the two wind farms will appear as one larger wind farm in the view. | | | | |
| | | | | | <ul style="list-style-type: none"> Visible at long distance from the viewpoint, located largely behind Beatrice. | |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-------------|--|---|-------------------------|---------------------------------|---|-----------------------------------|
| 5. | Sarclet (Sarclet Haven Info Board) (continued) | Medium | Application (continued) | Beatrice (14.0 km) | <ul style="list-style-type: none"> The three proposed wind farm sites will increase the density of turbines visible in the array in combination with Beatrice and forms small extension to developed skyline to the south of Beatrice. | Not significant |
| | | | | | <ul style="list-style-type: none"> Scale and form will appear consistent with Beatrice and forms a consistent image. | |
| | | | | | <ul style="list-style-type: none"> Due to its location largely behind Beatrice, will only marginally increase the influence and prominence of wind farm development in the application stage view. | |
| | | | | | <ul style="list-style-type: none"> No other application stage wind farms visible. <p>Magnitude of change in context of onshore wind farms: low</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: low</p> | |
| 6. | Hill O' Many Stanes | Medium-high | Operational | Beatrice Demonstrator (26.4 km) | <ul style="list-style-type: none"> Only one other wind farm visible, which is small scale (2 turbines) and located over 26 km from viewpoint. <p>Magnitude of change: low</p> | Not significant |
| | | | Consented | Burn of Whilk (2.5 km) | <ul style="list-style-type: none"> Burn of Whilk will be visible in the view north in close proximity to the viewpoint. | Not significant |
| | | | | | <ul style="list-style-type: none"> Proposed developments will be visually separated from Burn of Whilk, being visible in view east, but add wind farm influence into new part of the view on open sea skyline. | |
| Application | Beatrice (16.8 km) | <ul style="list-style-type: none"> Proposed developments will be visible at long distance (over 24 km) from the viewpoint. <p>Magnitude of change: medium-low</p> | Not significant | | | |
| | | | | | <ul style="list-style-type: none"> Visible in combination with Beatrice such that the two wind farms will appear as one larger wind farm in the view. | Not significant |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-----------|---------------------------------|-------------|-------------------------|--|--|-----------------------------------|
| 6. | Hill O' Many Stanes (continued) | Medium-high | Application (continued) | Beatrice (16.8 km) (continued) | <ul style="list-style-type: none"> Visible at long distance from the viewpoint (24.2 km), located largely behind Beatrice. | Not significant |
| | | | | | <ul style="list-style-type: none"> The three proposed wind farm sites will increase the density of turbines visible in the array in combination with Beatrice and forms small extension to developed skyline to the south of Beatrice. | |
| | | | | | <ul style="list-style-type: none"> Scale and form will appear consistent with Beatrice and forms a consistent image. | |
| | | | | | <ul style="list-style-type: none"> Due to its location largely behind Beatrice, will only marginally increase the influence and prominence of wind farm development in the application stage view. | |
| | | | | | <ul style="list-style-type: none"> No other application stage wind farms visible. <p>Magnitude of change in context of onshore wind farms: medium-low</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: low</p> | |
| 7. | Lybster (end of Main Street) | Medium-high | Operational | Beatrice Demonstrator (25 km) | <ul style="list-style-type: none"> Only one other wind farm visible, which is small scale (2 turbines) and located approximately 25 km from viewpoint. <p>Magnitude of change: low</p> | Not significant |
| | | | Consented | Burn of Whilk (7.2 km) | <ul style="list-style-type: none"> Burn of Whilk is screened by intervening buildings in Lybster and will not be visible from this viewpoint. <p>Magnitude of change: low</p> | Not significant |
| | | | Application | Upper Smerral (8.4 km) Dunbeath (12.8 km) Beatrice (19.3 km) | <ul style="list-style-type: none"> Dunbeath and Upper Smerral are screened by intervening buildings in Lybster and will not be visible from this viewpoint. Visible in combination with Beatrice such that the two wind farms will appear as one larger wind farm in the view. | Not significant |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-----------|--|-------------|-------------------------|--|---|-----------------------------------|
| 7. | Lybster (end of Main Street) (continued) | Medium-high | Application (continued) | Upper Smerral (8.4 km) Dunbeath (12.8 km) Beatrice (19.3 km) | <ul style="list-style-type: none"> Visible at long distance from the viewpoint (26.7 km), located largely behind Beatrice. | Not significant |
| | | | | | <ul style="list-style-type: none"> The three proposed wind farm sites will increase the density of turbines visible in the array in combination with Beatrice and forms small extension to developed skyline to the south of Beatrice. | |
| | | | | | <ul style="list-style-type: none"> Scale and form will appear consistent with Beatrice and forms a consistent image. | |
| | | | | | <ul style="list-style-type: none"> Due to its location largely behind Beatrice, will only marginally increase the influence and prominence of wind farm development in the application stage view. <p>Magnitude of change in context of onshore wind farms: low</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: medium-low</p> | |
| 8. | Latheron (A9) | Medium-high | Operational | Beatrice Demonstrator (27.2 km) | <ul style="list-style-type: none"> Only one other wind farm visible, which is small scale (2 turbines) and located over 27 km from viewpoint. <p>Magnitude of change: low</p> | Not significant |
| | | | Consented | None | <ul style="list-style-type: none"> No consented wind farms will be visible in the view. <p>Magnitude of change: low</p> | Not significant |
| | | | Application | Beatrice (23.1 km) | <ul style="list-style-type: none"> Visible in combination with Beatrice such that the two wind farms will appear as one larger wind farm in the view. | Not significant |
| | | | | | <ul style="list-style-type: none"> Visible at long distance from the viewpoint (30.7 km), located largely behind Beatrice. | |
| | | | | | <ul style="list-style-type: none"> The three proposed wind farm sites will increase the density of turbines visible in the array in combination with Beatrice and extend the developed skyline to the south of Beatrice (by approximately 13 degrees). | |
| | | | | | <ul style="list-style-type: none"> Scale and form will appear consistent with Beatrice and forms a consistent image. | |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-----------|-------------------------------|-------------|-------------------------|---|---|-----------------------------------|
| 8. | Latheron (A9) (continued) | Medium-high | Application (continued) | Beatrice (23.1 km) (continued) | <ul style="list-style-type: none"> Due to its location largely behind Beatrice, will only marginally increase the influence and prominence of wind farm development in the application stage view. | Not significant |
| | | | | | <ul style="list-style-type: none"> No other application stage wind farms visible. <p>Magnitude of change in context of onshore wind farms: low</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: medium-low</p> | |
| 9. | Dunbeath (nr Heritage Centre) | Medium-high | Operational | Buolfrulich (5.7 km) Beatrice Demonstrator (26.4 km) | <ul style="list-style-type: none"> Limited visibility of blade tips of several Buolfrulich turbines in view north. Beatrice Demonstrator is the only one other wind farm visible, which is small scale (2 turbines) and located over 26 km from viewpoint. <p>Magnitude of change: low</p> | Not significant |
| | | | Consented | None | <ul style="list-style-type: none"> No consented wind farms will be visible in the view. <p>Magnitude of change: low</p> | |
| | | | Application | Dunbeath (3.2 km) Upper Smerral (4.0 km) Beatrice (25.7 km) | <ul style="list-style-type: none"> Upper Smerral will be visible in the view north and extremity of several turbine blade tips visible in view west. Visible at long distance from the viewpoint (33.7 km), located largely behind Beatrice. | <p>Significant</p> |
| | | | | | <ul style="list-style-type: none"> The three proposed wind farm sites will increase the density of turbines visible in the array in combination with Beatrice and extend the developed skyline to the south of Beatrice (by approximately 14 degrees). The MacColl site will form the visible extension to Beatrice on the skyline, increasing the horizontal width of the overall wind farm by approximately one-third. Scale and form will appear consistent with Beatrice and forms a consistent image. | |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-------------|---|---|-------------------------|---|--|-----------------------------------|
| 9. | Dunbeath (nr Heritage Centre) (continued) | Medium-high | Application (continued) | Dunbeath (3.2 km) Upper Smerral (4.0 km) Beatrice (25.7 km) | <ul style="list-style-type: none"> Location behind Beatrice limits the influence and prominence of proposed developments in the application stage view, but increase in developed horizon is notable. <p>Magnitude of change in context of onshore wind farms: low</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: medium</p> | Significant |
| 10. | Berriedale (A9) | Medium-high | Operational | Beatrice Demonstrator (26.1 km) | <ul style="list-style-type: none"> Only one other wind farm visible, which is small scale (2 turbines) and located over 26 km from viewpoint. <p>Magnitude of change: low</p> | Not significant |
| | | | Consented | Burn of Whilk (22.7 km) | <ul style="list-style-type: none"> Burn of Whilk will be visible in the view north, at long distance, on the skyline of the coastal hinterland of Dunbeath Bay. | Not significant |
| | | | | | <ul style="list-style-type: none"> Proposed developments will be visually separated from Burn of Whilk, being visible in view east, but add wind farm influence into new part of the view on open sea skyline. Proposed developments will be visible at long distance (over 36 km) from the viewpoint. <p>Magnitude of change: low</p> | |
| Application | Dunbeath (5.1 km) Upper Smerral (9.4 km) Beatrice (27.9 km) | <ul style="list-style-type: none"> Dunbeath and Upper Smerral will be visible in view north, on the skyline of the coastal hinterland inland of Dunbeath Bay. Dunbeath, Upper Smerral and Burn of Whilk will appear as a series of separate but repeated wind farm features along this skyline and will be visible in the context of the coastline and seascape of Dunbeath Bay. Proposed developments are visually separated from this pattern of onshore wind farm development, located on open water skyline to the east of Dunbeath Bay. | Significant | | | |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-----------|------------------------------------|-------------|-------------------------|--|---|-----------------------------------|
| 10. | Berriedale (A9) (continued) | Medium-high | Application (continued) | Dunbeath (5.1 km) Upper Smerral (9.4 km) Beatrice (27.9 km) (continued) | <ul style="list-style-type: none"> Proposed developments add wind farm influence into new part of the view, such that wind farms will be visible on the inland and offshore skylines. Proposed developments visible at long distance from the viewpoint (36.1 km), located largely behind Beatrice. The three proposed wind farm sites will increase the density of turbines visible in the array in combination with Beatrice and extend the developed skyline to the south of Beatrice (by approximately 16 degrees). The MacColl site will form the visible extension to Beatrice on the skyline, increasing the horizontal width of the overall wind farm by approximately one-third. Scale and form will appear consistent with Beatrice and forms a consistent image. Location behind Beatrice limits the influence and prominence of proposed developments in the application stage view, but increase in developed horizon is notable. <p>Magnitude of change in context of onshore wind farms: medium</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: medium</p> | Significant |
| 11. | Morven | Medium-high | Operational | Buolfruch (16.6 km) Causeymire (25.3 km) Camster (31.1 km) Flex Hill (35.4 km) Beatrice Demonstrator (39.2 km) | <ul style="list-style-type: none"> Elevation of viewpoint in comparison to other landforms in Caithness allows perspective view of regional landscape context. | Not significant |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-----------|--------------------|-------------|-------------------------|---|---|-----------------------------------|
| 11. | Morven (continued) | Medium-high | Operational (continued) | Buolfrulich (16.6 km) Causeymire (25.3 km) Camster (31.1 km) Flex Hill (35.4 km) Beatrice Demonstrator (39.2 km) (continued) | <ul style="list-style-type: none"> Causeymire, Flex Hill, Camster and Buolfrulich appear as a series of separate but repeated wind farm features in the forested moorlands / flat peatlands in view north east, with Buolfrulich located nearest the coast. | Not significant |
| | | | | | <ul style="list-style-type: none"> Proposed developments are visually separated from this pattern of onshore wind farm development, located in the Moray Firth at long distance to the east (48.9 km), forming a distinct feature in its own right below the open water skyline, surrounded by open sea. | |
| | | | | | <ul style="list-style-type: none"> Amongst the best visibility conditions will be required to see the three proposed wind farm sites at this distance. <p>Magnitude of change: low</p> | |
| | | | Consented | Causeymire Extension (26.22 km) Burn of Whilk (30.9 km) Wathergar (35.2 km) Stroupster (49.5 km) | <ul style="list-style-type: none"> All of the consented wind farms are located at long distances to the north east of the view and will continue the pattern of onshore wind farm development in the view north east over Caithness, often extending existing wind farms e.g. Causeymire Extension; joining existing wind farms to create larger wind farm groups in the view e.g. Wathergar with Achairn, Camster and Flex Hill; or appearing as separate features in new parts of the view e.g. Stroupster, Burn of Whilk. | Not significant |
| | | | | | <ul style="list-style-type: none"> Proposed developments will be visually separated from this pattern of onshore wind farm development, located in the Moray Firth at long distance to the east (48.9 km), forming a distinct feature in its own right below the open water skyline, surrounded by open sea. | |
| | | | | | <ul style="list-style-type: none"> Amongst the best visibility conditions will be required to see the three proposed wind farm sites at this distance. <p>Magnitude of change: low</p> | |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-----------|---------------------------|-------------|---------------------|---|--|-----------------------------------|
| 11. | Morven (continued) | Medium-high | Application | Dunbeath (10.7 km) Upper Smerral (16.5 km) Beatrice (40.8 km) Ploverhill (40.7 km) | <ul style="list-style-type: none"> Clustered pattern of large scale wind farm developments will be extended by application stage wind farms, particularly Spittal Hill and Halsary, which give the impression of a wind farm landscape in the area around Causeymire; and Wathergar 2 which joins with Achairn, Flex Hill, Camster and Wathergar to create the impression of a single larger wind farm. Application stage wind farms at Upper Smerral and Dunbeath will introduce wind farm features in a new part of the view, in the view east towards the coast and in the case of Dunbeath Wind Farm, in the landscape context of the lone mountains of the Scaraben range. Proposed developments will be visible in the view at distance beyond Dunbeath Wind Farm, forming a distinct feature in its own right below the open water skyline, surrounded by open sea, but will be seen in the context of intervening onshore wind farm development (Dunbeath) in the middle distance. Proposed developments visible at long distance from the viewpoint (48.9 km), located largely behind Beatrice. The three proposed wind farm sites will increase the density of turbines visible in the array in combination with Beatrice and extend the developed skyline to the south of Beatrice (by approximately 12 degrees). The MacColl site will form the visible extension to Beatrice on the skyline, but is located at long distance approximately 49 km from the viewpoint. Scale and form will appear consistent with Beatrice and forms a consistent image. | Not significant |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-----------|---------------------------|-------------|-------------------------|---|--|-----------------------------------|
| 11. | Morven (continued) | Medium-high | Application (continued) | Dunbeath (10.7 km) Upper Smerral (16.5 km) Beatrice (40.8 km) Ploverhill (40.7 km) | <ul style="list-style-type: none"> Due to its location largely behind Beatrice, will only marginally increase the influence and prominence of wind farm development in the application stage view. <p>Magnitude of change in context of onshore wind farms: medium-low</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: medium-low</p> | Not significant |
| 12. | Navidale | Medium-high | Operational | Beatrice Demonstrator (32.9 km) | <ul style="list-style-type: none"> Only one other wind farm visible, which is small scale (2 turbines) and located over 32 km from viewpoint. | Not significant |
| | | | | | <ul style="list-style-type: none"> The three proposed wind farm sites will extend across the horizon behind the two existing Beatrice Demonstrator turbines, at a distance of over 44 km from the development. | |
| | | | | | <ul style="list-style-type: none"> Vertical scale will appear consistent with Beatrice demonstrator turbines which will appear to be viewed as part of the MacColl site. <p>Magnitude of change: low</p> | |
| | | | Consented | None | <ul style="list-style-type: none"> No consented wind farms will be visible in the view. <p>Magnitude of change: low</p> | Not significant |
| | | | Application | Beatrice (38.1 km) | <ul style="list-style-type: none"> Proposed developments visible at long distance from the viewpoint (44.6 km), located largely behind Beatrice. | Not significant |
| | | | | | <ul style="list-style-type: none"> The three proposed wind farm sites will increase the density of turbines visible in the array in combination with Beatrice and extend the developed skyline to the south of Beatrice (by approximately 14 degrees). | |
| | | | | | <ul style="list-style-type: none"> The MacColl site will form the visible extension to Beatrice on the skyline. | |
| | | | | | <ul style="list-style-type: none"> Scale and form will appear consistent with Beatrice and forms a consistent image. | |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-----------|-----------------------------|-------------|-------------------------|--|--|-----------------------------------|
| 12. | Navidale (continued) | Medium-high | Application (continued) | Beatrice (38.1 km) (continued) | <ul style="list-style-type: none"> Due to its location largely behind Beatrice, will only marginally increase the influence and prominence of wind farm development in the application stage view. <p>Magnitude of change in context of onshore wind farms: low</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: medium-low</p> | Not significant |
| 13. | Catchory | Medium | Operational | Flex Hill (5.7 km) | <ul style="list-style-type: none"> Achairn, Flex Hill and Camster appear as separate wind farms on the skyline to the south in the view. Limited visibility of Causeymire blade tips over skyline to south west. | Not significant |
| | | | | Achairn (7.8 km) Camster (8.7 km) Causeymire (11.3 km) | <ul style="list-style-type: none"> Proposed developments are located at long distance (38.8 km) on skyline to south east. Proposed developments are not seen in full, with much screened behind intervening landform, such that only turbine blade tips are visible above skyline with some partial screening by topographic features. <p>Magnitude of change: negligible</p> | |
| | | | Consented | Wathegar (6.3 km) | <ul style="list-style-type: none"> Wathegar will combine with Flex Hill to appear as one larger wind farm in the view. | Not significant |
| | | | | Stroupster (11.2 km) | <ul style="list-style-type: none"> Burn of Whilk will appear as a separate, more distant wind farm on rising ground on the skyline behind Flex Hill. | |
| | | | | Burn of Whilk (15.7 km) | <ul style="list-style-type: none"> Stroupster visible as a separate wind farm to the north east. | |
| | | | | | <ul style="list-style-type: none"> Proposed developments located at long distance (38.8 km) on skyline to south east. | |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-----------|----------------------|-------------|-----------------------|--|---|-----------------------------------|
| 13. | Catchory (continued) | Medium | Consented (continued) | Wathegar (6.3 km) Stroupster (11.2 km) Burn of Whilk (15.7 km) (continued) | <ul style="list-style-type: none"> Proposed developments will not be seen in full, with much screened behind intervening landform, such that only turbine blade tips will be visible above skyline with some partial screening by topographic features. <p>Magnitude of change: low-negligible</p> | Not significant |
| | | | Application | Plover Hill (2.65 km) Spittal Hill (6.7 km) Wathergar 2 (6.8 km) Halsary (9.1 km) Beatrice (30 km) | <ul style="list-style-type: none"> Wathegar 2 will combine with Achairn, Flex Hill and Wathegar to join this group and appear as one larger wind farm in the view. Halsary and Spittal Hill will also be visible as separate wind farm features on the inland skyline. Beatrice turbine blade tips will appear to break the skyline giving the impression of onshore wind farm development located behind the skyline to the south east. Proposed developments will be visible in combination with Beatrice such that the two wind farms will appear as one wind farm. Wind farm development will occupy many parts of the skyline and form a series of repeating elements. Proposed developments will not be visible in full, with much screened behind intervening landform, such that only turbine blade tips will be visible above skyline with some partial screening by topographic features. | Not significant |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-----------|---------------------------------------|-------------|-------------------------|--|--|-----------------------------------|
| 13. | Catchory (continued) | Medium | Application (continued) | Plover Hill (2.65 km) Spittal Hill (6.7 km) Wathergar 2 (6.8 km) Halsary (9.1 km) Beatrice (30 km) | <ul style="list-style-type: none"> Due to its location largely Beatrice, will only marginally increase the influence of wind farm development in the application stage scenario view. <p>Magnitude of change in context of onshore wind farms: low</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: low</p> | Not significant |
| 14. | Minor Rd, south side of Stemster Hill | Medium-low | Operational | Camster (8.6 km) Beatrice Demonstrator (32.1 km) | <ul style="list-style-type: none"> Limited visibility of Camster blade tips over skyline to the north east. Beatrice demonstrator visible, which is small scale (2 turbines) and located over 32 km from viewpoint. <p>Magnitude of change: low</p> | Not significant |
| | | | Consented | Burn of Whilk (8.9 km) | <ul style="list-style-type: none"> Burn of Whilk will be visible in view east, on the skyline of the coastal hinterland inland of Dunbeath Bay. Proposed developments will be visible at long distance (33.5 km) south east of Burn of Whilk. Onshore and offshore wind farm developments are evident in the same portion of view, which contributes to a blurring of the boundary between land and sea. <p>Magnitude of change: medium</p> | Not significant |
| | | | Application | Dunbeath (11.4 km) Beatrice (26.4 km) | <ul style="list-style-type: none"> Limited visibility of Dunbeath blade tips over skyline to the south west. Visible in combination with Beatrice such that the two wind farms will appear as one larger wind farm in the view. Visible at long distance from the viewpoint, located largely behind Beatrice. | Not significant |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-----------|---|-------------|-------------------------|--|---|-----------------------------------|
| 14. | Minor Rd, south side of Stemster Hill (continued) | Medium-low | Application (continued) | Dunbeath (11.4 km) Beatrice (26.4 km) (continued) | <ul style="list-style-type: none"> The three proposed wind farm sites will increase the density of turbines visible in the array in combination with Beatrice and extend the developed skyline to the south of Beatrice (by approximately 9 degrees). | Not significant |
| | | | | | <ul style="list-style-type: none"> The MacColl site will form the visible extension to Beatrice on the skyline, but is located at greater distance over 38 km from the viewpoint. | |
| | | | | | <ul style="list-style-type: none"> Scale and form will appear consistent with Beatrice and forms a consistent image. | |
| | | | | | <ul style="list-style-type: none"> Due to its location largely behind Beatrice, will only marginally increase the influence and prominence of wind farm development in the application stage view. <p>Magnitude of change in context of onshore wind farms: medium</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: medium-low</p> | |
| 15. | Whaligoe Steps | Medium-high | Operational | Beatrice Demonstrator (27.7 km) | <ul style="list-style-type: none"> Only one other wind farm visible, which is small scale (2 turbines) and located over 26 km from viewpoint. <p>Magnitude of change: low</p> | Not significant |
| | | | Consented | None | <ul style="list-style-type: none"> No consented wind farms will be visible in the view. <p>Magnitude of change: low</p> | Not significant |
| | | | Application | Beatrice (15.4 km) | <ul style="list-style-type: none"> Visible in combination with Beatrice such that the two wind farms will appear as one larger wind farm in the view. Visible at long distance from the viewpoint (23.1 km), located largely behind Beatrice. The three proposed wind farm sites will increase the density of turbines visible in the array in combination with Beatrice but does not extend the developed skyline as it is located almost entirely behind Beatrice in this view. Scale and form will appear consistent with Beatrice and forms a consistent image. | Not significant |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-----------|----------------------------|-------------|-------------------------|--|---|-----------------------------------|
| 15. | Whaligoe Steps (continued) | Medium-high | Application (continued) | Beatrice (15.4 km) (continued) | <ul style="list-style-type: none"> Due to its location largely behind Beatrice, will only marginally increase the influence and prominence of wind farm development in the application stage view. | Not significant |
| | | | | | <ul style="list-style-type: none"> No other application stage wind farms visible. <p>Magnitude of change in context of onshore wind farms: low</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: low</p> | |
| 16. | Lossiemouth Harbour | Medium | Operational | Beatrice Demonstrator (43.2 km) Boyndie (38.4 km) | <ul style="list-style-type: none"> Theoretical visibility of two other wind farms, but only blade tips visible over skyline and located over 38 km from viewpoint. <p>Magnitude of change: low</p> | Not significant |
| | | | Consented | None | <ul style="list-style-type: none"> No consented wind farms will be visible in the view. <p>Magnitude of change: low</p> | Not significant |
| | | | Application | Beatrice (53.4 km) Aultmore (25.7 km) | <ul style="list-style-type: none"> Aultmore will be visible in the view south east, in the opposite view direction to the three proposed wind farm sites to the north, such that the three proposed wind farm sites will be a visually separated feature. The upper parts of the turbines of Beatrice wind farm will be theoretically visible 53.4 km to the north of the viewpoint, but will only be visible in the clearest weather conditions at this distance. The three proposed wind farm sites are theoretically visible extending from the eastern edge of Beatrice, such that they will appear as one distant wind farm on the skyline. The three proposed wind farm sites located at long distance from the viewpoint (45.7 km), such that only limited, upper parts of the turbines are visible, which form small scale, vertical features on the distant sea skyline only in the clearest weather conditions. <p>Magnitude of change in context of onshore wind farms: low</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: low</p> | Not significant |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-----------|---|-------------|---------------------|--|---|-----------------------------------|
| 17. | Buckie, Cliff Terrace | Medium-low | Operational | Beatrice Demonstrator (47 km) | <ul style="list-style-type: none"> Only one other wind farm visible, which is small scale (2 turbines) and located over 47 km from viewpoint. <p>Magnitude of change: negligible</p> | Not significant |
| | | | Consented | None | <ul style="list-style-type: none"> No consented wind farms will be visible in the view. <p>Magnitude of change: negligible</p> | Not significant |
| | | | Application | Aultmore (7.4 km) Beatrice Offshore (54.7 km) | <ul style="list-style-type: none"> Aultmore will be visible in the view south east, in the opposite view direction to the three proposed wind farm sites to the north, such that the three proposed wind farm sites will be a visually separated feature. The upper parts of the turbines of Beatrice wind farm will be theoretically visible 54.7 km to the north of the viewpoint, but will only be visible in the clearest weather conditions at this distance. The three proposed wind farm sites are theoretically visible extending from the eastern edge of Beatrice, such that they will appear as one distant wind farm on the skyline. The three proposed wind farm sites located at long distance from the viewpoint (44.2 km), such that only limited, upper parts of the turbines are visible, which form small scale, vertical features on the distant sea skyline only in the clearest weather conditions. <p>Magnitude of change in context of onshore wind farms: low</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: low</p> | Not significant |
| 18. | Portnockie - Bow Fiddle Rock Info Point | Medium-high | Operational | Beatrice Demonstrator (45.43 km) | <ul style="list-style-type: none"> Only one other wind farm visible, which is small scale (2 turbines) and located over 45 km from viewpoint. <p>Magnitude of change: negligible</p> | Not significant |
| | | | Consented | None | <ul style="list-style-type: none"> No consented wind farms will be visible in the view. <p>Magnitude of change: negligible</p> | Not significant |

| Viewpoint | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|--|-------------|---------------------|---|---|-----------------------------------|
| 18. Portnockie - Bow Fiddle Rock Info Point (continued) | Medium-high | Application | Beatrice (52 km) | <ul style="list-style-type: none"> The upper parts of the turbines of Beatrice wind farm will be theoretically visible 52 km to the north of the viewpoint, but will only be visible in the clearest weather conditions at this distance. The three proposed wind farm sites are theoretically visible extending from the eastern edge of Beatrice, such that they will appear as one distant wind farm on the skyline. | Not significant |
| | | | | <ul style="list-style-type: none"> The three proposed wind farm sites located at long distance from the viewpoint (41.1 km), such that only limited, upper parts of the turbines are visible, which form small scale, vertical features on the distant sea skyline only in the clearest weather conditions. <p>Magnitude of change in context of onshore wind farms: low</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: low</p> | |
| 19. Cullen, Viaduct & cycle path | Medium-high | Operational | Beatrice (47.5 km) | <ul style="list-style-type: none"> Only one other wind farm visible, which is small scale (2 turbines) and located over 47 km from viewpoint. <p>Magnitude of change: negligible</p> | Not significant |
| | | Consented | None | <ul style="list-style-type: none"> No consented wind farms will be visible in the view. <p>Magnitude of change: negligible</p> | Not significant |
| | | Application | Aultmore (8.2 km) Beatrice (53.8 km) | <ul style="list-style-type: none"> Aultmore will be visible in the view south west, in the opposite view direction to the three proposed wind farm sites to the north, such that the three proposed wind farm sites will be a visually separated feature. | Not significant |
| <ul style="list-style-type: none"> The upper parts of the turbines of Beatrice wind farm will be theoretically visible 53.8 km to the north of the viewpoint, but will only be visible in the clearest weather conditions at this distance. The three proposed wind farm sites are theoretically visible extending from the eastern edge of Beatrice, such that they will appear as one distant wind farm on the skyline. | | | | | |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-----------|---|-------------|-------------------------|--|--|-----------------------------------|
| 19. | Cullen, Viaduct & cycle path (continued) | Medium-high | Application (continued) | Aultmore (8.2 km) Beatrice (53.8 km) (continued) | <ul style="list-style-type: none"> The three proposed wind farm sites located at long distance from the viewpoint (42.8 km), such that only limited, upper parts of the turbines are visible, which form small scale, vertical features on the distant sea skyline only in the clearest weather conditions. <p>Magnitude of change in context of onshore wind farms: low</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: low</p> | Not significant |
| 20. | Bin Hill | Medium | Operational | Boyndie (13.4 km) Beatrice Demonstrator (49.4 km) | <ul style="list-style-type: none"> Boyndie will be visible in the view west along the coastline towards Aberdeenshire near Boyndie Bay. Beatrice demonstrator theoretically visible, which is small scale (2 turbines) and located over 49 km from viewpoint. <p>Magnitude of change: low</p> | Not significant |
| | | | Consented | None | <ul style="list-style-type: none"> No consented wind farms will be visible in the view. <p>Magnitude of change: low</p> | Not significant |
| | | | Application | Aultmore (4.6 km) Beatrice (56.4 km) | <ul style="list-style-type: none"> Aultmore will be visible in the view south, in the opposite view direction to the three proposed wind farm sites to the north, such that the three proposed wind farm sites will be a visually separated feature. Beatrice wind farm will be theoretically visible 56.4 km to the north of the viewpoint, but will only be visible in the clearest weather conditions at this distance. The three proposed wind farm sites are theoretically visible extending from the eastern edge of Beatrice, such that they will appear as one distant wind farm on the skyline. | Not significant |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-----------|-----------------------------|-------------|-------------------------|--|---|-----------------------------------|
| 20. | Bin Hill (continued) | Medium | Application (continued) | Aultmore (4.6 km) Beatrice (56.4 km) (continued) | <ul style="list-style-type: none"> The three proposed wind farm sites located at long distance from the viewpoint (45.5 km), such that the turbines form small scale, vertical features on the distant sea skyline only in the clearest weather conditions. <p>Magnitude of change in context of onshore wind farms: low</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: low</p> | Not significant |
| 21. | Findlater Castle | Medium-high | Operational | Boyndie (7.7 km) Beatrice Demonstrator (48.5 km) | <ul style="list-style-type: none"> Boyndie will be visible in the view west along the coastline towards Aberdeenshire near Boyndie Bay. Beatrice demonstrator theoretically visible, which is small scale (2 turbines) and located over 48 km from viewpoint. <p>Magnitude of change: low</p> | Not significant |
| | | | Consented | None | <ul style="list-style-type: none"> No consented wind farms will be visible in the view. <p>Magnitude of change: low</p> | Not significant |
| | | | Application | Aultmore (10.1 km) Beatrice (54.3 km) | <ul style="list-style-type: none"> Limited visibility of Aultmore blade tips in the view south, in the opposite view direction to the three proposed wind farm sites to the north, such that the three proposed wind farm sites will be a visually separated feature. Beatrice wind farm will be theoretically visible 54.3 km to the north of the viewpoint, but will only be visible in the clearest weather conditions at this distance. The three proposed wind farm sites are theoretically visible extending from the eastern edge of Beatrice, such that they will appear as one distant wind farm on the skyline. | Not significant |
| | | | | | | |

| Viewpoint | | Sensitivity | Cumulative Scenario | Wind Farms Visible ¹ | Cumulative Magnitude of Change | Significance of Cumulative Effect |
|-----------|------------------------------|-------------|-------------------------|--|--|-----------------------------------|
| 21. | Findlater Castle (continued) | Medium-high | Application (continued) | Aultmore (10.1 km) Beatrice (54.3 km) (continued) | <ul style="list-style-type: none"> The three proposed wind farm sites located at long distance from the viewpoint (43.2 km), such that the turbines form small scale, vertical features on the distant sea skyline only in the clearest weather conditions. <p>Magnitude of change in context of onshore wind farms: low</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: low</p> | Not significant |
| 22. | Portsoy | Medium-high | Operational | Beatrice Demonstrator (51.1 km) | <ul style="list-style-type: none"> Beatrice demonstrator theoretically visible, which is small scale (two turbines) and located over 51 km from viewpoint. <p>Magnitude of change: negligible</p> | Not significant |
| | | | Consented | None | <ul style="list-style-type: none"> No consented wind farms will be visible in the view. <p>Magnitude of change: negligible</p> | Not significant |
| | | | Application | Beatrice (56.1 km) | <ul style="list-style-type: none"> Beatrice wind farm will be theoretically visible 56.1 km to the north of the viewpoint, but will only be visible in the clearest weather conditions at this distance. The three proposed wind farm sites are theoretically visible extending from the eastern edge of Beatrice, such that they will appear as one distant wind farm on the skyline. <ul style="list-style-type: none"> The three proposed wind farm sites located at long distance from the viewpoint (44.8 km), such that the turbines form small scale, vertical features on the distant sea skyline only in the clearest weather conditions. <p>Magnitude of change in context of onshore wind farms: negligible</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: low</p> | Not significant |

15.4.4 Route Corridors

15.4.4.1 Cumulative effects on visual amenity from route corridors consist of combined visibility and sequential effects. Combined visibility occurs where the observer is able to see two or more developments from one viewpoint. Combined visibility may either be 'in combination', where several wind farms are within the observer's main angle of view at the same time, or 'in succession', where the observer has to turn to see the various wind farms. Sequential effects occur when the observer has to move to another viewpoint to see different developments. The occurrence of sequential effects range from 'frequently sequential' (the features appear regularly and with short time lapses between, depending on speed of travel and distance between the viewpoints) to 'occasionally sequential' (long time lapses between appearances, because the observer is moving slowly and / or there are large distances between the viewpoints). The cumulative visual effect of the three proposed wind farm sites is assessed for the route corridors identified in the main assessment: the A882, A9 and A992 in Table 15.4-5 below.

Table 15.4-5 Assessment of Cumulative Visual Effects on Route Corridors

| Route Corridor | Sensitivity to Change | Cumulative Scenario | Wind Farms Visible | Cumulative Magnitude of Change | Significance of Effect |
|----------------|-----------------------|---------------------|---|--|------------------------|
| A882 | Low | Operational | Achair Causeymire Flex Hill | Majority of 23 km route between Wick and Halkirk has no visibility (approximately 18 km of route). | Not significant |
| | | | | Short, fleeting sections of visibility of 1 to 50 turbine blade tips from three separate sections of the road (approximately 5 km of route in total) at distances over 33 km from proposed developments (Telford). | |
| | | | | Generally views of proposed development screened by intervening skyline, with just extremity of blade tips visible over horizon. | |
| | | | | In combination visibility with Achair and Flex Hill on eastbound journey from these fleeting sections of the route. | |
| | | | | Occasional sequential visibility with Achair, Flex Hill and Causeymire Magnitude of change: low Limited visibility and long distance of proposed developments results in a minor cumulative addition. | |
| | | Consented | Burn of Whilk Stroupster Wathegar | In combination visibility with Burn of Whilk and Wathegar on eastbound journey from three short, fleeting sections of the route. | Not significant |
| | | | | In succession visibility with Stroupster located at long distance to the north. | |
| | | | | Occasional sequential visibility with Burn of Whilk, Stroupster and Wathegar. | |

| Route Corridor | Sensitivity to Change | Cumulative Scenario | Wind Farms Visible | Cumulative Magnitude of Change | Significance of Effect |
|------------------------|---|-----------------------|--|---|------------------------|
| A882 (continued) | Low | Consented (continued) | Burn of Whilk Stroupster Wathegar (continued) | Proposed developments located at distances over 33 km from proposed developments (Telford) and generally views of proposed development screened by intervening skyline, with just extremity of blade tips visible over horizon. Magnitude of change: low Limited visibility and long distance of proposed developments results in a minor cumulative addition. | Not significant |
| | | Application | Beatrice Halsary Plover Hill Spittal Hill Wathegar 2 | In combination visibility with Spittal Hill and Wathegar 2 on eastbound journey from short, fleeting sections of the route. In succession visibility with Halsary located to the south and Plover Hill to the north. Occasional sequential visibility with Halsary, Plover Hill, Spittal Hill and Wathegar 2 from eastbound journey. Proposed developments located at distances over 33 km from proposed developments (Telford) and generally views of proposed development screened by intervening skyline, with just extremity of blade tips visible over horizon. Magnitude of change in context of onshore wind farms: low Magnitude of change in context of onshore wind farms and Beatrice: low Limited visibility and long distance of proposed developments results in a minor cumulative addition. | Not significant |
| A9 (Brora to Latheron) | Medium to medium-high (Brora to Latheron section of A9 has direct relationship with the sea / coast) | Operational | Beatrice demonstrator Buolfruch | Beatrice demonstrator visible from majority of route, which is small scale (2 turbines) and located over 25 km from route. Combined visibility mainly in combination with Beatrice demonstrator from majority of the A9 between Brora and Helmsdale (over 44 km to MacColl) and intermittently between Helmsdale and Berriedale. Largely continuous, combined visibility between Berriedale and Latheron at distances between 30 – 36 km, with proposed developments oblique to road. | Not significant |

| Route Corridor | Sensitivity to Change | Cumulative Scenario | Wind Farms Visible | Cumulative Magnitude of Change | Significance of Effect |
|---|--|----------------------------|--|--|---|
| A9 (Brora to Latheron) (continued) | Medium to medium-high (Brora to Latheron section of A9 has direct relationship with the sea / coast) (continued) | Operational (continued) | Beatrice demonstrator Buolfruich (continued) | Limited stretch of in succession visibility with Buolfruich from section of A9 past Dunbeath and Latheronwheel, where it is visible in the inland portion of views and not visible in combination with proposed developments. Magnitude of change: low Small scale and long distance of Beatrice demonstrator, long distance of proposed developments and visual separation with onshore wind farm at Buolfruich, results in a minor cumulative addition. | Not significant |
| | | Consented | Burn of Whilk | In succession visibility with Burn of Whilk from section of A9 between Berriedale and Latheronwheel where it is visible as a distant and visually separate feature on the skyline of the coastal hinterland of Dunbeath Bay. | Not significant |
| | | | | Proposed developments will be visually separated from Burn of Whilk, being visible in view east, but add wind farm influence into new part of the view on open sea skyline. | |
| | | | | Proposed developments will be visible at long distance (over 36 km) from the viewpoint. Magnitude of change: low Limited visibility of consented wind farms, visible only in succession from short stretch of A9 where proposed developments appears as a visually separate feature, results in a minor cumulative addition. | |
| | | Application | Beatrice Dunbeath Upper Smerral | Combined visibility mainly in combination with Beatrice from majority of the A9 between Brora and Helmsdale (over 44 km to MacColl) and intermittently between Helmsdale and Berriedale. | Brora to Berriedale: not significant Berriedale to Latheron: significant |
| | | | | Largely continuous, combined visibility between Berriedale and Latheron at distances between 30 – 36 km, with proposed developments oblique to road. | |
| Visible at long distance from the viewpoint (33.7 km), located largely behind Beatrice. | | | | | |

| Route Corridor | Sensitivity to Change | Cumulative Scenario | Wind Farms Visible | Cumulative Magnitude of Change | Significance of Effect |
|---|--|---------------------|--|---|---|
| A9 (Brora to Latheron) (continued) | Medium to medium-high (Brora to Latheron section of A9 has direct relationship with the sea / coast) (continued) | Application | Beatrice Dunbeath Upper Smerral | The three proposed wind farm sites will increase the density of turbines visible in the array in combination with Beatrice and extend the developed skyline to the south of Beatrice. | Brora to Berriedale: not significant Berriedale to Latheron: significant |
| | | | | The MacColl site will form the visible extension to Beatrice on the skyline, increasing the horizontal width of the overall wind farm by approximately one-third. | |
| | | | | Limited stretch of in succession visibility with Upper Smerral from section of A9 past Dunbeath and Latheronwheel, where it is visible in the inland portion of views and not visible in combination with proposed developments. Magnitude of change in context of onshore wind farms: medium-low Magnitude of change in context of onshore wind farms and Beatrice: medium | |
| | | | | Location behind Beatrice limits the influence and prominence of proposed developments in the application stage view, but increase in developed horizon results in a notable contribution to the cumulative situation. | |
| A9 (Latheron to Thurso) | Medium – low (Latheron to Thurso section of A9 has little / no relationship with the sea / coast) | Operational | Beatrice demonstrator Buolfruch Causeymire | Majority of 37 km route between Wick and Halkirk has no visibility (approximately 36 km of route). | Not significant |
| | | | | 1 km section of visibility of 201 to 216 turbine blade tips from one section of road near Upper Latheron (approximately 1 km of route). | |
| | | | | Visibility at distances over 30 km from proposed developments (MacColl). | |
| | | | | In combination visibility with Beatrice demonstrator in view south for 1 km section of route near Upper Latheron. | |
| | | | | In succession visibility with Buolfruch for 1 km section of route near Upper Latheron. | |

| Route Corridor | Sensitivity to Change | Cumulative Scenario | Wind Farms Visible | Cumulative Magnitude of Change | Significance of Effect |
|---|---|----------------------------|--|--|------------------------|
| A9 (Latheron to Thurso) (continued) | Medium – low (Latheron to Thurso section of A9 has little / no relationship with the sea / coast) (continued) | Operational (continued) | Beatrice demonstrator | Sequential visibility with Causeymire, Buolfruch and Beatrice Demonstrator on southbound journey, with only 1 km section of visibility of proposed developments near Upper Latheron. Magnitude of change: low | Not significant |
| | | | Buolfruch Causeymire (continued) | Limited visibility, short duration of view and long distance of proposed developments results in a minor cumulative addition. | |
| | | Consented | Causeymire Extension Burn of Whilk | No combined or in succession visibility with consented wind farms. | Not significant |
| | | | | Occasional sequential visibility with Causeymire Extension and Burn of Whilk on southbound journey, with only 1 km section of visibility of proposed developments near Upper Latheron. Magnitude of change: low Limited visibility, short duration of view, long distance of proposed developments and lack of combined / in succession views with other wind farms results in a minor cumulative addition. | |
| | | Application | Beatrice Dunbeath Halsary Spittal Hill Upper Smerral | In combination visibility with Beatrice from short, 1 km stretch of route near Upper Latheron, where proposed developments located at long distance and is largely behind Beatrice in the view. | Not significant |
| | | | | In succession visibility with Upper Smerral in view south for 1 km section of route near Upper Latheron. | |
| Occasional sequential visibility with Halsary and Spittal Hill visible mainly from northern part of route at long distance from isolated section of visibility of proposed developments. Magnitude of change in context of onshore wind farms: low Magnitude of change in context of onshore wind farms and Beatrice: low Limited visibility, short duration of view and long distance of proposed developments largely behind Beatrice, results in a minor cumulative addition. | | | | | |

| Route Corridor | Sensitivity to Change | Cumulative Scenario | Wind Farms Visible | Cumulative Magnitude of Change | Significance of Effect |
|---------------------------|---|--|--|--|------------------------|
| A99 (Latheron to Wick) | Medium | Operational | Achair Beatrice demonstrator Buolfruch Camster Flex Hill | No visibility of proposed developments between Thrumster and Wick and past Lybster. | Not significant |
| | | | | Largely continuous visibility for remainder of route between Latheron and Thrumster at distances over 25 km, with proposed developments oblique to road. | |
| | | | | Beatrice demonstrator visible in combination from majority of this section, which is small scale (Two turbines) and located over 26 km from route. | |
| | | | | Limited stretch of in succession visibility with Achair and Camster from 3 km section of A9 between Lybster and Thrumster, where Achair is visible in the inland portion of views and not visible in combination with proposed developments. | |
| | | | | Short stretch of in succession visibility with Buolfruch over 1.5 km stretch of southbound journey approaching Lybster. | |
| | | | | Occasional sequential visibility with Achair, Camster and Flex Hill, which are mainly visible in inland portion of views from contained stretch of A9 passing Thrumster, and then with Buolfruch on the approach to Lybster. | |
| | | Magnitude of change: medium Proposed developments will be visually separate from the pattern of onshore wind farms on the western, inland side of this stretch of the A99, with limited in combination visibility, but the addition of offshore wind farm influence into a new part of the views to the east of the A99 on open sea skyline results in a notable contribution to the cumulative situation. | | | |
| Consented | Burn of Whilk Stroupster Wathegar | In succession visibility with Burn of Whilk from much of A9 between Thrumster and Lybster, where Burn of Whilk is visible in the inland portion of views and not visible in combination with proposed developments. | Not significant | | |
| | | Occasional sequential visibility with Stroupster and Wathegar, which are mainly visible in the inland portion of views to the north east from stretch of A9 between Thrumster and Wick. | | | |

| Route Corridor | Sensitivity to Change | Cumulative Scenario | Wind Farms Visible | Cumulative Magnitude of Change | Significance of Effect |
|--|-----------------------|--------------------------|--|--|------------------------|
| A99 (Latheron to Wick) (continued) | Medium (continued) | Consented (continued) | Burn of Whilk Stroupster Wathegar | <p>Magnitude of change: medium</p> <p>Proposed developments will be visually separate from the pattern of onshore wind farms on the western, inland side of this stretch of the A99, with limited in combination visibility, but the addition of offshore wind farm influence into a new part of the views to the east of the A99 on open sea skyline results in a notable contribution to the cumulative situation.</p> | Not significant |
| | | Application | Beatrice Dunbeath Plover Hill Upper Smerral Wathegar 2 | <p>In succession visibility with Dunbeath and Upper Smerral from much of A9 between Lybster and Latheron, where Dunbeath and Upper Smerral are visible in the inland portion of views and not visible in combination with proposed developments.</p> <p>Occasional sequential visibility with Plover Hill and Wathegar 2, which are mainly visible in the inland portion of views to the north east from stretch of A9 between Thrumster and Wick.</p> <p>Combined visibility mainly in combination with Beatrice from majority of the A9 between Latheron and Thrumster at distances over 25 km from proposed developments.</p> <p>Proposed developments located largely behind Beatrice, resulting in an increase in the density of turbines visible in the array.</p> <p>The MacColl site will form a visible extension to Beatrice on the skyline, increasing the horizontal extents of the overall wind farm.</p> <p>Limited stretch of in succession visibility with Upper Smerral from section of A9 past Dunbeath and Latheronwheel, where it is visible in the inland portion of views and not visible in combination with proposed developments.</p> | Not significant |

| Route Corridor | Sensitivity to Change | Cumulative Scenario | Wind Farms Visible | Cumulative Magnitude of Change | Significance of Effect |
|--|-----------------------|----------------------------|--|--|------------------------|
| A99 (Latheron to Wick) (continued) | Medium (continued) | Application (continued) | Beatrice Dunbeath Plover Hill Upper Smerral Wathegar 2 | <p>Magnitude of change in context of onshore wind farms: medium</p> <p>Proposed developments will be visually separate from the pattern of onshore wind farms on the western, inland side of this stretch of the A99, with limited in combination visibility, but the addition of offshore wind farm influence into a new part of the views to the east of the A99 on open sea skyline results in a notable contribution to the cumulative situation.</p> | Not significant |
| | | | | <p>Magnitude of change in context of onshore wind farms and Beatrice: medium</p> <p>Location behind Beatrice limits the influence and prominence of proposed developments in the application stage view, but increase in developed horizon results in a notable contribution to the cumulative situation.</p> | |
| A99 (Wick to John O' Groats) | Medium | Operational | Achairn Camster Causeymire Flex Hill | <p>Fleeting sections of visibility of 1 to 216 turbine blade tips interspersed with stretches with no visibility, including stretch with no visibility between John O' Groats and Warth Hill, past Freswick Bay and Sinclair's Bay.</p> | Not significant |
| | | | | <p>Higher visibility as the road passes Nybster and Keiss, but at distance between 32 to 35 km from the three proposed wind farm sites.</p> | |
| | | | | <p>In succession visibility with Achairn, Camster and Flex Hill which appear as one larger wind farm in the view inland. Limited visibility of Causeymire blade tips over horizon at long distance to south west.</p> | |
| | | | | <p>Proposed developments are visually separated from this group in views from the A99, located in views south east and will add a distant wind farm influence to offshore skyline.</p> | |
| | | | | <p>Proposed developments are often not seen in full from southern part of the A99 between Keiss and Wick, with much screened behind skyline, and often occupying a relatively narrow part of wide panorama and located at long distance.</p> <p>Magnitude of change: low</p> | |

| Route Corridor | Sensitivity to Change | Cumulative Scenario | Wind Farms Visible | Cumulative Magnitude of Change | Significance of Effect | |
|--|-----------------------|---------------------|--|--|------------------------|-----------------|
| A99 (Wick to John O' Groats) (continued) | Medium (continued) | Consented | Burn of Whilk Stroupster Wathegar | In succession views of Stroupster from northern part of A99 between Skirza and Nybster, and with Wathegar, which will combine with Achairn, Camster and Flex Hill to appear as one larger wind farm in the views inland from intermittent stretches of the A99. | Not significant | |
| | | | | In succession views of several turbines at Burn of Whilk, which will appear as a separate wind farm on rising ground on the skyline to the east. | | |
| | | | | Proposed developments are visually separated from onshore wind farm groups in views from the A99, located in views south east and will add a distant wind farm influence to offshore skyline. | | |
| | | | | Proposed developments are often not seen in full from southern part of the A99 between Keiss and Wick, with much screened behind skyline, and often occupying a relatively narrow part of wide panorama and located at long distance. Magnitude of change: low | | |
| | | Application | Beatrice Halsary Plover Hill Spittal Hill Wathegar 2 | In succession views of Wathegar 2, which will combine with Achairn, Camster, Flex Hill and Wathegar to appear as one larger wind farm in the view inland. | | Not significant |
| | | | | In succession views of Halsary and Spittal Hill located at long distances to the south west. | | |
| | | | | Proposed developments will be visible in combination with Beatrice such that the two wind farms will appear as one larger wind farm in the views from the A99. | | |
| | | | | Proposed developments will be located almost entirely behind Beatrice in views from this stretch of the A99, resulting in an increase in the density of turbines visible in the array without increasing the horizontal extent of development. | | |
| | | | | Proposed developments are often not seen in full from southern part of the A99 between Keiss and Wick, with much screened behind skyline, and often occupying a relatively narrow part of wide panorama and located at long distance. | | |
| | | | | | | |

| Route Corridor | Sensitivity to Change | Cumulative Scenario | Wind Farms Visible | Cumulative Magnitude of Change | Significance of Effect |
|---|-----------------------|----------------------------|---|---|------------------------|
| A99 (Wick to John O' Groats) (continued) | Medium (continued) | Application (continued) | Beatrice Halsary Plover Hill Spittal Hill Wathegar 2 (continued) | Magnitude of change in context of onshore wind farms: medium-low Proposed developments will be visually separate from the pattern of onshore wind farms to the south west of the A99, with limited in combination visibility, and are often not seen in full from the southern part of the A99 between Keiss and Wick, with much screened behind skyline. | Not significant |
| | | | | Magnitude of change in context of onshore wind farms and Beatrice: medium-low Location behind Beatrice limits increase in developed skyline, and as such the influence and prominence of proposed developments in the application stage views. | |

15.4.5 Cumulative Seascape / Landscape Effects – with Operational, Consented and Application Wind Farm

- 15.4.5.1 The assessment of cumulative effects on seascape and landscape receptors is carried out from the same receptors described in Chapter 5.4 (Seascape, Landscape and Visual Receptors). The methodology for the assessment of cumulative effects on seascape and landscape receptors is described in Technical Appendix 5.4 A
- 15.4.5.2 The assessment of cumulative effects on seascape and landscape receptors assesses the additional effects arising from the three proposed wind farm sites in relation to the other wind farms assumed to be part of the landscape in three scenarios: operation, consented and application. The sensitivity of each receptor is repeated from the impact assessment in Chapter 8.4 (Seascape, Landscape and Visual Receptors) and the cumulative magnitude of change is described further for each seascape and landscape receptor in each scenario. As described in Technical Appendix 5.4 A, the cumulative magnitude of change on seascape and landscape receptors is an expression of the degree to which the seascape and landscape character will be changed by the addition of the three proposed wind farm sites to wind farms that are already operational, consented or at application stage.
- 15.4.5.3 An assessment of cumulative effects on landscape types (LCTs) is provided in Table 15.4-6 below, coastal character areas (CCAs) in Table 15.4-7 below, Gardens and Designed Landscapes (GDLs) in Table 15.4-8 below and Special Landscape Areas (SLAs) in Table 15.4-9 below.

Table 15.4-6 Assessment of Cumulative Effects on Landscape Types (LCTs)

| Landscape Type Defined or Influenced by the Sea | Sensitivity | Scenario | Cumulative Magnitude of Change | Significance of Effect |
|--|--|-------------|--|--|
| Caithness and Sutherland (SNH Review No. 103) | | | | |
| 6. Coastal Island | Sensitivity: medium-high Visibility of the multiple wind farms may change the way in which island character is perceived and the sense of remoteness, but may also relate to the sense of exposure and drama. | Operational | Magnitude of change: none There are no operational wind farms located within, or near, this landscape type and there is no combined visibility with other operational wind farms. No cumulative change to key characteristics of the landscape character. | Operation Not significant, negative, long term, reversible. Construction and decommissioning Not significant, negative, short term, reversible. |
| | | Consented | Magnitude of change: negligible There is a limited area of combined visibility of the three proposed wind farms with Stroupster wind farm (8 km) from the island of Muckle Ferry and Pentland Skerries. Negligible cumulative change to key characteristics of the landscape character. | |
| | | Application | Magnitude of change in context of onshore wind farms: negligible There are no application stage wind farms located within, or near, this landscape type and limited combined visibility with distant onshore wind farm applications in Caithness. Negligible cumulative change to key characteristics of the landscape character. Magnitude of change in context of onshore wind farms and Beatrice: negligible Combined visibility of the three proposed wind farm sites (42 km) with distant Beatrice Offshore (40 km) from the island of Muckle Ferry and Pentland Skerries. Negligible cumulative change to key characteristics of the landscape character. | |
| 8. Coastal Shelf | Sensitivity: medium-high Visibility of multiple wind farms may change the way in which land / sea edge is perceived and the direct relationship of the sea with the coastal shelf, but may also relate to the sense of exposure and linear land use pattern. | Operational | Magnitude of change: low There will be limited areas of combined visibility from this landscape type of the three proposed wind farms (44 km) with the operational Beatrice Demonstrator turbines (33 km). Low cumulative change to key characteristics of the landscape character. | Operation Not significant, negative, long term, reversible. Construction and decommissioning Not significant, negative, short term, reversible. |
| | | Consented | Magnitude of change: low No consented wind farms will be visible from this landscape type. Low cumulative change to key characteristics of the landscape character. | |

| Landscape Type Defined or Influenced by the Sea | Sensitivity | Scenario | Cumulative Magnitude of Change | Significance of Effect |
|---|---|-------------|---|---|
| 8. Coastal Shelf (continued) | <p>Sensitivity: medium-high</p> <p>Visibility of multiple wind farms may change the way in which land / sea edge is perceived and the direct relationship of the sea with the coastal shelf, but may also relate to the sense of exposure and linear land use pattern.</p> | Application | <p>Magnitude of change in context of onshore wind farms: low</p> <p>No onshore application stage wind farms will be visible from this landscape type. Low cumulative change to key characteristics of the landscape character.</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: medium-low</p> <p>Combined visibility of the three proposed wind farm sites (44 km), located largely behind distant Beatrice Offshore (38 km). Marginal increase in the influence of wind farm development on key characteristics of the landscape type.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| 11. Harbour | <p>Sensitivity: medium</p> <p>Visibility of multiple wind farms may change visual focus of harbour, but may also relate to the sea based activity and variety of experiential characteristics.</p> | Operational | <p>Magnitude of change: low-negligible</p> <p>Limited areas of combined visibility of onshore wind farms located inland, such as Achairn and Camster, but the three proposed wind farm sites are visually separate, adding a new visual focus, but having negligible cumulative change on the key experiential characteristics of the harbour landscape type.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| | | Consented | <p>Magnitude of change: low</p> <p>Limited areas of combined visibility of onshore wind farms located inland, such as Burn of Whilk, but the three proposed wind farm sites are visually separate, adding a new visual focus, but having a low cumulative change on the key characteristics of the landscape type.</p> | <p>Not significant, negative, short term, reversible.</p> |
| | | Application | <p>Magnitude of change in context of onshore wind farms: low</p> <p>Limited areas of combined visibility of onshore wind farms located inland, such as Wathegar 2, but the three proposed wind farm sites are visually separate, adding a new visual focus, but will have a low cumulative change on the key characteristics of the landscape type.</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: medium-low</p> <p>Combined visibility of the three proposed wind farm sites (26 km) from Harbour landscape type with Beatrice, such that the two wind farms will appear as one larger wind farm, but due to its location largely behind Beatrice, and long distance offshore, will have a low cumulative change on the key characteristics of the landscape type.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |

| Landscape Type Defined or Influenced by the Sea | Sensitivity | Scenario | Cumulative Magnitude of Change | Significance of Effect |
|---|---|-------------|---|---|
| 12. High Cliffs and Sheltered Bays | <p>Sensitivity: high</p> <p>Seascape / coastal characteristics have a defining influence on character. Visibility of the three proposed wind farm sites may change the way in which land / sea edge is perceived and the sense of remoteness of this most north westerly corner of British mainland, but may also relate to the sense of exposure and drama.</p> | Operational | <p>Magnitude of change:</p> <p>Duncansby Head: negligible</p> <p>There will be limited areas of combined visibility from this landscape type of the three proposed wind farms (42 km) with the operational Beatrice Demonstrator turbines (60 km). Negligible cumulative change to key characteristics of the landscape type.</p> <p>Berriedale to Helmsdale: low</p> <p>There will be limited areas of combined visibility from this landscape type of the three proposed wind farms (44 km) with the operational Beatrice Demonstrator turbines (33 km). Low cumulative change to key characteristics of the landscape type.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| | <p>Sensitivity: high</p> <p>Seascape / coastal characteristics have a defining influence on character. Visibility of the three proposed wind farm sites may change the way in which land / sea edge is perceived and the sense of remoteness of this most north westerly corner of British mainland, but may also relate to the sense of exposure and drama.</p> | Consented | <p>Magnitude of change:</p> <p>Duncansby Head: low</p> <p>There is a limited amount of combined visibility of the three proposed wind farms with Stroupster wind farm. Low cumulative change to key characteristics of the landscape character.</p> <p>Berriedale to Helmsdale: low</p> <p>No consented wind farms will be visible from this part of the landscape type. Low cumulative change to key characteristics of the landscape character.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |

| Landscape Type Defined or Influenced by the Sea | Sensitivity | Scenario | Cumulative Magnitude of Change | Significance of Effect |
|---|---|-------------|---|---|
| 12. High Cliffs and Sheltered Bays (continued) | | Application | <p>Magnitude of change in context of onshore wind farms:</p> <p>Duncansby Head: low</p> <p>No visibility of application stage onshore wind farms from landscape type.</p> <p>Berriedale to Helmsdale: low</p> <p>No onshore application stage wind farms will be visible from this part of the landscape type. Low cumulative change to key characteristics of the landscape character.</p> <p>Magnitude of change in context of onshore wind farms and Beatrice:</p> <p>Duncansby Head: low</p> <p>Combined visibility of the three proposed wind farm sites (44 km) from landscape type with Beatrice, located largely behind Beatrice, such that the two wind farms will appear as one larger wind farm, but due to its location largely behind Beatrice, and long distance offshore, will have a low cumulative change on the key characteristics of the landscape type.</p> <p>Berriedale to Helmsdale: medium-low</p> <p>Combined visibility of the three proposed wind farm sites (44 km), located largely behind distant Beatrice Offshore (38 km). Marginal increase in the influence of wind farm development on key characteristics of the landscape type.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| 16. Long Beaches Dunes and Links | <p>Sensitivity: medium-high</p> <p>Visibility of multiple wind farms may change simple visual composition of low lying bay, but may also relate to the sense of exposure and existing offshore fabrication influences.</p> | Operational | <p>Magnitude of change: low</p> <p>Limited visibility of the three proposed wind farm sites from small area in northern part of landscape type near Keiss, because Noss Head largely screens views such that most of the landscape type has no visibility of the three proposed wind farm sites in combination with other operational wind farms. Low cumulative change to key characteristics of the landscape character.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |

| Landscape Type Defined or Influenced by the Sea | Sensitivity | Scenario | Cumulative Magnitude of Change | Significance of Effect |
|---|--|-------------|--|---|
| 16. Long Beaches Dunes and Links (continued) | | Consented | <p>Magnitude of change: low</p> <p>Limited visibility of the three proposed wind farm sites in combination with other consented wind farms. Low cumulative change to key characteristics of the landscape character.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| | | Application | <p>Magnitude of change in context of onshore wind farms: low</p> <p>Limited visibility of the three proposed wind farm sites in combination with other consented wind farms. Low cumulative change to key characteristics of the landscape character.</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: medium-low</p> <p>Limited areas of combined visibility of the three proposed wind farm sites from landscape type with Beatrice, such that the two wind farms will appear as one larger wind farm, but due to its location largely behind Beatrice, and long distance offshore, will have a low cumulative change on the key characteristics of the landscape type.</p> | |
| 18. Mixed Agriculture and Settlement | <p>Sensitivity: medium</p> <p>Seascape / coastal characteristics have external influence on character. Visibility of the three proposed wind farm sites may increase visual complexity and change the distant horizon of the sea, but may also relate to the sense of exposure, linear elements and horizontal emphasis of the landscape.</p> | Operational | <p>Magnitude of change: low-negligible</p> <p>Camster, Flex Hill and Achair frequently visible from this landscape type, but proposed developments are visually separated from this group, at long distance (40 km) and often not seen in full from this landscape type, with much screened behind intervening landforms, such that only turbine blade tips are visible above skyline. Low-negligible cumulative change on the key characteristics of the landscape type.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| | | Consented | <p>Magnitude of change: low</p> <p>Camster, Flex Hill and Achair will combine with Wathegar, and will be frequently visible from this landscape type, but proposed developments are visually separated from this group, at long distance (40 km) and often not seen in full from this landscape type, with much screened behind intervening landforms, such that only turbine blade tips are visible above skyline.</p> | |

| Landscape Type Defined or Influenced by the Sea | Sensitivity | Scenario | Cumulative Magnitude of Change | Significance of Effect |
|---|--|-------------|---|---|
| 18. Mixed Agriculture and Settlement (continued) | <p>Sensitivity: medium</p> <p>Seascape / coastal characteristics have external influence on character. Visibility of the three proposed wind farm sites may increase visual complexity and change the distant horizon of the sea, but may also relate to the sense of exposure, linear elements and horizontal emphasis of the landscape.</p> | Application | <p>Magnitude of change in context of onshore wind farms: low</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: low</p> <p>Wathegar 2 will combine with Achairn, Camster, Flex Hill and Wathegar to join this group and appear frequently visible from this landscape type. Halsary, Plover Hill and Spittal Hill will also be visible as separate wind farm features on the inland skyline, but proposed developments are visually separated from this group, at long distance (40 km) and often not seen in full from this landscape type, with much screened behind intervening landforms, such that only turbine blade tips are visible above skyline.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| 19. Moorland Slopes and Hills | <p>Sensitivity: medium-low</p> <p>Visibility of multiple wind farms may change perception of scale and add visual foci, but may also relate to the sense of exposure and broad scale of the landscape.</p> | Operational | <p>Magnitude of change: low</p> <p>Limited, scattered areas on elevated / coastal parts of landforms with visibility allow distant views of the three proposed wind farm sites (30 km) with operational onshore wind farms such as Buolfruch and Beatrice demonstrator offshore. Low cumulative change to key characteristics of the landscape character.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| | | Consented | <p>Magnitude of change: low</p> <p>Limited, scattered areas on elevated / coastal parts of landforms with visibility allow distant views of the three proposed wind farm sites (30 km) with consented onshore wind farms such as Burn of Whilk. Low cumulative change to key characteristics of the landscape character.</p> | <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |

| Landscape Type Defined or Influenced by the Sea | Sensitivity | Scenario | Cumulative Magnitude of Change | Significance of Effect |
|---|---|-------------|--|---|
| 19. Moorland Slopes and Hills (continued) | <p>Sensitivity: medium-low</p> <p>Visibility of multiple wind farms may change perception of scale and add visual foci, but may also relate to the sense of exposure and broad scale of the landscape.</p> | Application | <p>Magnitude of change in context of onshore wind farms: low</p> <p>Limited, scattered areas on elevated / coastal parts of landforms with visibility allow distant views of the three proposed wind farm sites (30 km) with consented onshore wind farms such as Dunbeath. Low cumulative change to key characteristics of the landscape character.</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: medium-low</p> <p>Limited, scattered areas on elevated / coastal parts of landforms with visibility allow distant views of the three proposed wind farm sites (30 km) behind Beatrice Offshore. Medium-low cumulative change to key characteristics of the landscape character.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| | | Operational | <p>Magnitude of change: medium-low</p> <p>Areas around Wick have distant views of the three proposed wind farm sites (22 km) with operational onshore wind farms such as Achairn, Flex Hill and Camster. Limited visibility of Beatrice Demonstrator. Medium-low cumulative change to key characteristics of the landscape character.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> |
| 20. Open Intensive Farmland | <p>Sensitivity: medium-low</p> <p>Visibility of multiple wind farms may change the way in which simple composition of elements is perceived, but may also relate to the sense of exposure and ordered landscape pattern.</p> | Consented | <p>Magnitude of change: medium-low</p> <p>Areas around Wick have distant views of the three proposed wind farm sites (22 km) with consented onshore wind farms such as Wathegar and Burn of Whilk. Limited visibility of Beatrice Demonstrator. Medium-low cumulative change to key characteristics of the landscape character.</p> | <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| | | | | |

| Landscape Type Defined or Influenced by the Sea | Sensitivity | Scenario | Cumulative Magnitude of Change | Significance of Effect |
|---|---|-------------|---|---|
| 20. Open Intensive Farmland (continued) | <p>Sensitivity: medium-low</p> <p>Visibility of multiple wind farms may change the way in which simple composition of elements is perceived, but may also relate to the sense of exposure and ordered landscape pattern.</p> | Application | <p>Magnitude of change in context of onshore wind farms: medium-low</p> <p>Areas around Wick have distant views of the three proposed wind farm sites (22 km) with application stage onshore wind farms such as Wathegar 2, Spittal Hill and Halsary. Limited visibility of Beatrice Demonstrator. Medium-low cumulative change to key characteristics of the landscape character.</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: medium-low</p> <p>Areas around Wick have distant views of the three proposed wind farm sites (22 km) behind Beatrice Offshore. Medium-low cumulative change to key characteristics of the landscape character.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| 23. Small Farms and Crofts | <p>Sensitivity: medium</p> <p>Visibility of multiple wind farms may increase visual complexity and influence the perception of land division and human scale at the coastal edge, but also relates to the characteristic activity of people and visibility may be limited by the landform.</p> | Operational | <p>Magnitude of change: low</p> <p>Widespread combined visibility from landscape type of the three proposed wind farm sites (22 km) with operational Beatrice demonstrator turbines and limited combined visibility with onshore wind farms inland. Low cumulative change to key characteristics of the landscape character.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| | | Consented | <p>Magnitude of change: medium-low</p> <p>Increased combined visibility from landscape type of the three proposed wind farm sites (22 km) with consented onshore wind farms inland, such as Burn of Whilk. Medium-low cumulative change to key characteristics of the landscape character.</p> | <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |

| Landscape Type Defined or Influenced by the Sea | Sensitivity | Scenario | Cumulative Magnitude of Change | Significance of Effect |
|---|---|-------------|---|---|
| 23. Small Farms and Crofts (continued) | <p>Sensitivity: medium</p> <p>Visibility of multiple wind farms may increase visual complexity and influence the perception of land division and human scale at the coastal edge, but also relates to the characteristic activity of people and visibility may be limited by the landform.</p> | Application | <p>Magnitude of change in context of onshore wind farms: medium-low</p> <p>Increased combined visibility from landscape type of the three proposed wind farm sites (22 km) with application stage onshore wind farms inland, such as Dunbeath and Upper Smerral. Medium-low cumulative change to key characteristics of the landscape character.</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: medium-low</p> <p>Widespread areas of combined visibility of the three proposed wind farm sites from landscape type with Beatrice, such that the two wind farms will appear as one larger wind farm, but due to its location largely behind Beatrice, and long distance offshore, will have a medium-low cumulative change on the key characteristics of the landscape type.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |

Table 15.4-7 Assessment of Cumulative Effects on Coastal Character Areas (CCAs)

| Coastal Character Area | Sensitivity | Scenario | Cumulative Magnitude of Change | Significance of Effect |
|--------------------------|--|-------------|---|---|
| 7. Duncansby Head | <p>Sensitivity: high</p> <p>Visibility of multiple wind farms may change the way in which land / sea edge is perceived, the impression of scale, visual foci, and the sense of remoteness of this most north westerly corner of British mainland, but may also relate to the sense of exposure and drama.</p> | Operational | <p>Magnitude of change:</p> <p>Duncansby Head: negligible</p> <p>There will be limited areas of combined visibility from this CCA of the three proposed wind farms (42 km) with the operational Beatrice Demonstrator turbines (60 km). Negligible cumulative change to key characteristics of the CCA.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| | | Consented | <p>Magnitude of change:</p> <p>Duncansby Head: low</p> <p>There is a limited amount of combined visibility of the three proposed wind farms with Stroupster wind farm. Low cumulative change to key characteristics of the CCA.</p> | |

| Coastal Character Area | Sensitivity | Scenario | Cumulative Magnitude of Change | Significance of Effect |
|--|--|-------------|--|---|
| 7. Duncansby Head (continued) | <p>Sensitivity: high</p> <p>Visibility of multiple wind farms may change the way in which land / sea edge is perceived, the impression of scale, visual foci, and the sense of remoteness of this most north westerly corner of British mainland, but may also relate to the sense of exposure and drama.</p> | Application | <p>Magnitude of change in context of onshore wind farms:</p> <p>Duncansby Head: low</p> <p>Limited visibility of application stage onshore wind farms from CCA.</p> <p>Magnitude of change in context of onshore wind farms and Beatrice:</p> <p>Duncansby Head: low</p> <p>Combined visibility of the three proposed wind farm sites (44 km) from CCA with Beatrice, located largely behind Beatrice, such that the two wind farms will appear as one larger wind farm, but due to its location largely behind Beatrice, and long distance offshore, will have a low cumulative change on the key characteristics of the CCA.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| 8. Freswick Bay and Nybster Coast | <p>Sensitivity: medium</p> <p>Visibility of multiple wind farms may influence simple visual composition of low lying bay and influence the perception of land division and human scale at the coastal edge, but may also relate to the sense of exposure and characteristic activity of people which has shaped this landscape.</p> | Operational | <p>Magnitude of change: negligible</p> <p>There will be limited areas of combined visibility from this CCA of the three proposed wind farms (34 km) with the operational Beatrice Demonstrator turbines (47 km). Negligible cumulative change to key characteristics of the CCA.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| | | Consented | <p>Magnitude of change: low</p> <p>There is a limited amount of combined visibility of the three proposed wind farms with Stroupster wind farm inland. Low cumulative change to key characteristics of the CCA.</p> | |
| | | Application | <p>Magnitude of change in context of onshore wind farms: low</p> <p>Limited visibility of application stage onshore wind farms from CCA.</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: low</p> <p>Combined visibility of the three proposed wind farm sites (34 km) from CCA with Beatrice, located largely behind Beatrice, such that the two wind farms will appear as one larger wind farm, but due to its location largely behind Beatrice, and long distance offshore, will have a low cumulative change on the key characteristics of the CCA.</p> | |

| Coastal Character Area | Sensitivity | Scenario | Cumulative Magnitude of Change | Significance of Effect |
|------------------------|--|-------------|---|---|
| 9. Sinclair's Bay | <p>Sensitivity: medium-high</p> <p>Visibility of multiple wind farms may change simple visual composition of low lying bay, but may also relate to the sense of exposure and existing offshore fabrication influences.</p> | Operational | <p>Magnitude of change: low</p> <p>Limited visibility of the three proposed wind farm sites from small area in northern part of CCA near Keiss, because Noss Head largely screens views such that most of the CCA has no visibility of the three proposed wind farm sites in combination with other operational wind farms. Low cumulative change to key characteristics of the CCA.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| | | Consented | <p>Magnitude of change: low</p> <p>Limited visibility of the three proposed wind farm sites in combination with other consented wind farms. Low cumulative change to key characteristics of the CCA.</p> | |
| | | Application | <p>Magnitude of change in context of onshore wind farms: low</p> <p>Limited visibility of the three proposed wind farm sites in combination with other consented wind farms. Low cumulative change to key characteristics of the CCA.</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: medium-low</p> <p>Limited areas of combined visibility of the three proposed wind farm sites from landscape type with Beatrice, such that the two wind farms will appear as one larger wind farm, but due to its location largely behind Beatrice, and long distance offshore, will have a low cumulative change on the key characteristics of the CCA.</p> | |
| 10. Noss Head | <p>Sensitivity: medium-low</p> <p>Visibility of multiple wind farms may change the way in which land / sea edge is perceived, the perception of scale and visual foci of existing headland and point features, but may also relate to the sense of exposure and horizontal emphasis of the landscape.</p> | Operational | <p>Magnitude of change: medium-low</p> <p>Distant views of the three proposed wind farm sites (25 km) with operational onshore wind farms such as Achairn, Flex Hill and Camster. Limited visibility of Beatrice Demonstrator. Medium-low cumulative change to key characteristics of the landscape character.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |

| Coastal Character Area | Sensitivity | Scenario | Cumulative Magnitude of Change | Significance of Effect |
|---------------------------|--|-------------|---|---|
| 10. Noss Head (continued) | <p>Sensitivity: medium-low</p> <p>Visibility of multiple wind farms may change the way in which land / sea edge is perceived, the perception of scale and visual foci of existing headland and point features, but may also relate to the sense of exposure and horizontal emphasis of the landscape.</p> | Consented | <p>Magnitude of change: medium-low</p> <p>Distant views of the three proposed wind farm sites (25 km) with consented onshore wind farms such as Wathegar and Burn of Whilk. Limited visibility of Beatrice Demonstrator. Medium-low cumulative change to key characteristics of the landscape character.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible</p> |
| | | Application | <p>Magnitude of change in context of onshore wind farms: medium-low</p> <p>Distant views of the three proposed wind farm sites (25 km) with application stage onshore wind farms such as Wathegar 2, Spittal Hill and Halsary. Limited visibility of Beatrice Demonstrator. Medium-low cumulative change to key characteristics of the landscape character.</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: medium-low</p> <p>Distant views of the three proposed wind farm sites (25 km) behind Beatrice Offshore. Medium-low cumulative change to key characteristics of the landscape character.</p> | |
| 11. Wick Bay | <p>Sensitivity: medium</p> <p>Visibility of multiple wind farms may change visual focus of bay and occupy contained sea skyline, but may also relate to the sea based activity and variety of experiential characteristics.</p> | Operational | <p>Magnitude of change: low-negligible</p> <p>Limited areas of combined visibility of onshore wind farms located inland, such as Achairn and Camster, but the three proposed wind farm sites are visually separate, adding a new visual focus, but having negligible cumulative change on the key experiential characteristics of the CCA.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| | | Consented | <p>Magnitude of change: low</p> <p>Limited areas of combined visibility of onshore wind farms located inland, such as Burn of Whilk, but the three proposed wind farm sites are visually separate, adding a new visual focus, but having a low cumulative change on the key characteristics of the CCA.</p> | |

| Coastal Character Area | Sensitivity | Scenario | Cumulative Magnitude of Change | Significance of Effect |
|--------------------------|---|-------------|--|---|
| 11. Wick Bay (continued) | <p>Sensitivity: medium</p> <p>Visibility of multiple wind farms may change visual focus of bay and occupy contained sea skyline, but may also relate to the sea based activity and variety of experiential characteristics.</p> | Application | <p>Magnitude of change in context of onshore wind farms: low</p> <p>Limited areas of combined visibility of onshore wind farms located inland, such as Wathegar 2, but the three proposed wind farm sites are visually separate, adding a new visual focus, but will have a low cumulative change on the key characteristics of the CCA.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| | | | <p>Magnitude of change in context of onshore wind farms and Beatrice: medium-low</p> <p>Combined visibility of the three proposed wind farm sites (26 km) from the CCA with Beatrice, such that the two wind farms will appear as one larger wind farm, but due to its location largely behind Beatrice, and long distance offshore, will have a low cumulative change on the key characteristics of the CCA.</p> | |
| 12. Sarclet Head | <p>Sensitivity: medium</p> <p>Visibility of multiple wind farms may increase visual complexity and influence the perception of land division and human scale at the coastal edge, but may also relate to the sense of exposure and characteristic activity of people which has shaped the landscape.</p> | Operational | <p>Magnitude of change: low</p> <p>Widespread combined visibility from the CCA of the three proposed wind farm sites (22 km) with operational Beatrice demonstrator turbines and limited combined visibility with onshore wind farms inland. Low cumulative change to key characteristics of the CCA.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| | | Consented | <p>Magnitude of change: medium-low</p> <p>Increased combined visibility from CCA of the three proposed wind farm sites (22 km) with consented onshore wind farms inland, such as Burn of Whilk. Medium-low cumulative change to key characteristics of the CCA.</p> | |

| Coastal Character Area | Sensitivity | Scenario | Cumulative Magnitude of Change | Significance of Effect |
|---------------------------------|---|-------------|--|---|
| 12. Sarclet Head (continued) | <p>Sensitivity: medium</p> <p>Visibility of multiple wind farms may increase visual complexity and influence the perception of land division and human scale at the coastal edge, but may also relate to the sense of exposure and characteristic activity of people which has shaped the landscape.</p> | Application | <p>Magnitude of change in context of onshore wind farms: medium-low</p> <p>Increased combined visibility from CCA of the three proposed wind farm sites (22 km) with application stage onshore wind farms inland, such as Dunbeath and Upper Smerral. Medium-low cumulative change to key characteristics of the CCA.</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: medium-low</p> <p>Widespread areas of combined visibility of the three proposed wind farm sites from CCA with Beatrice, such that the two wind farms will appear as one larger wind farm, but due to its location largely behind Beatrice, and long distance offshore, will have a medium-low cumulative change on the key characteristics of the CCA.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| | | Operational | <p>Magnitude of change: low</p> <p>Widespread combined visibility from the CCA of the three proposed wind farm sites (23 km) with operational Beatrice demonstrator turbines and limited combined visibility with onshore wind farms inland. Low cumulative change to key characteristics of the CCA.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| 13. Lybster Bay | <p>Sensitivity: medium</p> <p>Visibility of multiple wind farms may change visual focus of bay and the way in which land / sea edge is perceived, the impression of scale and visual foci, but may also relate to the sense of exposure and sea based activity.</p> | Consented | <p>Magnitude of change: medium-low</p> <p>Increased combined visibility from CCA of the three proposed wind farm sites (23 km) with consented onshore wind farms inland, such as Burn of Whilk. Medium-low cumulative change to key characteristics of the CCA.</p> | |

| Coastal Character Area | Sensitivity | Scenario | Cumulative Magnitude of Change | Significance of Effect |
|-----------------------------|--|-------------|--|---|
| 13. Lybster Bay (continued) | <p>Sensitivity: medium</p> <p>Visibility of multiple wind farms may change visual focus of bay and the way in which land / sea edge is perceived, the impression of scale and visual foci, but may also relate to the sense of exposure and sea based activity.</p> | Application | <p>Magnitude of change in context of onshore wind farms: medium-low</p> <p>Increased combined visibility from CCA of the three proposed wind farm sites (23 km) with application stage onshore wind farms inland, such as Dunbeath and Upper Smerral. Medium-low cumulative change to key characteristics of the CCA.</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: medium-low</p> <p>Widespread areas of combined visibility of the three proposed wind farm sites from CCA with Beatrice, such that the two wind farms will appear as one larger wind farm, but due to its location largely behind Beatrice, and long distance offshore, will have a medium-low cumulative change on the key characteristics of the CCA.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| | | Operational | <p>Magnitude of change: low</p> <p>Widespread combined visibility from the CCA of the three proposed wind farm sites (28 km) with operational Beatrice demonstrator turbines and limited combined visibility with onshore wind farms inland. Low cumulative change to key characteristics of the CCA.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| 14. Dunbeath Bay | <p>Sensitivity: medium</p> <p>Visibility of multiple wind farms may change visual focus of bay and the way in which land / sea edge is perceived, the impression of scale and visual foci, but may also relate to the sense of exposure and sea based activity.</p> | Consented | <p>Magnitude of change: medium-low</p> <p>Increased combined visibility from CCA of the three proposed wind farm sites (28 km) with consented onshore wind farms inland, such as Burn of Whilk. Medium-low cumulative change to key characteristics of the CCA.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |

| Coastal Character Area | Sensitivity | Scenario | Cumulative Magnitude of Change | Significance of Effect |
|---|---|-------------|---|---|
| 14. Dunbeath Bay (continued) | <p>Sensitivity: medium</p> <p>Visibility of multiple wind farms may change visual focus of bay and the way in which land / sea edge is perceived, the impression of scale and visual foci, but may also relate to the sense of exposure and sea based activity.</p> | Application | <p>Magnitude of change in context of onshore wind farms: medium-low</p> <p>Increased combined visibility from CCA of the three proposed wind farm sites (28 km) with application stage onshore wind farms inland, such as Dunbeath and Upper Smerral. Medium-low cumulative change to key characteristics of the CCA.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| | | | <p>Magnitude of change in context of onshore wind farms and Beatrice: medium-low</p> <p>Widespread areas of combined visibility of the three proposed wind farm sites from CCA with Beatrice, such that the two wind farms will appear as one larger wind farm, but due to its location largely behind Beatrice, and long distance offshore, will have a medium-low cumulative change on the key characteristics of the CCA.</p> | |
| 15. Helmsdale to Berriedale Coastal Shelf | <p>Sensitivity: medium-high</p> <p>Visibility of multiple wind farms may change the way in which land / sea edge is perceived and the direct relationship of the sea with the coastal shelf, but may also relate to the sense of exposure, linear land use pattern and energy transmission features.</p> | Operational | <p>Magnitude of change: low</p> <p>There will be limited areas of combined visibility from this CCA of the three proposed wind farms (44 km) with the operational Beatrice Demonstrator turbines (33 km). Low cumulative change to key characteristics of the CCA.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| | | Consented | <p>Magnitude of change: low</p> <p>No consented wind farms will be visible from this part of the CCA. Low cumulative change to key characteristics of the CCA.</p> | |
| | | Application | <p>Magnitude of change in context of onshore wind farms: low</p> <p>No onshore application stage wind farms will be visible from this part of the CCA. Low cumulative change to key characteristics of the CCA.</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: medium-low</p> <p>Combined visibility of the three proposed wind farm sites (44 km), located largely behind distant Beatrice Offshore (38 km). Marginal increase in the influence of wind farm development on key characteristics of the CCA.</p> | |

| Coastal Character Area | Sensitivity | Scenario | Cumulative Magnitude of Change | Significance of Effect |
|---|---|-------------|---|---|
| <p>16. Brora to Helmsdale Deposition Coast</p> | <p>Sensitivity: medium</p> <p>Visibility of multiple wind farms may change the way in which land / sea edge is perceived and the direct relationship of the sea with the coastal shelf, but may also relate to the sense of exposure and linear land use pattern and energy transmission features.</p> | Operational | <p>Magnitude of change: low</p> <p>There will be limited areas of combined visibility from this CCA of the three proposed wind farms (44 km) with the operational Beatrice Demonstrator turbines (33 km). Low cumulative change to key characteristics of the CCA.</p> | <p>Operation</p> <p>Not significant, negative, long term, reversible.</p> <p>Construction and decommissioning</p> <p>Not significant, negative, short term, reversible.</p> |
| | | Consented | <p>Magnitude of change: low</p> <p>No consented wind farms will be visible from this CCA. Low cumulative change to key characteristics of the CCA.</p> | |
| | | Application | <p>Magnitude of change in context of onshore wind farms: low</p> <p>No onshore application stage wind farms will be visible from this CCA. Low cumulative change to key characteristics of the CCA.</p> <p>Magnitude of change in context of onshore wind farms and Beatrice: medium-low</p> <p>Combined visibility of the three proposed wind farm sites (44 km), located largely behind distant Beatrice Offshore (38 km). Marginal increase in the influence of wind farm development on key characteristics of the CCA.</p> | |

Landscape Designations

Gardens and Designed Landscapes (GDLs)

15.4.5.4 The cumulative effect of the three proposed wind farm sites is assessed further on the GDLs in the study area in Table 15.4-8 below.

Table 15.4-8 Assessment of Cumulative Effects on Gardens and Designed Landscapes

| Region | GDL | Sensitivity to Change | Scenario | Cumulative Magnitude of Change | Significance of Effect |
|------------|-----------------|-----------------------|-------------|--|--|
| Caithness | Castle of Mey | High | Operational | None The three proposed wind farm sites are not visible | Operation Not significant, negative, long term, reversible. Construction and decommissioning Not significant, negative, short term, reversible. |
| | | | Consented | None The three proposed wind farm sites are not visible | Operation Not significant, negative, long term, reversible. Construction and decommissioning Not significant, negative, short term, reversible. |
| | | | Application | None The three proposed wind farm sites are not visible | Not significant, negative, short term, reversible. |
| | Dunbeath Castle | High | Operational | Low | Operation Not significant, negative, long term, reversible. Construction and decommissioning Not significant, negative, short term, reversible. |
| | | | Consented | Low | |
| | | | Application | Low | |
| | Langwell Lodge | High | Operational | Low | Operation Not significant, negative, long term, reversible. Construction and decommissioning Not significant, negative, short term, reversible. |
| | | | Consented | Low | |
| | | | Application | Low | |
| Morayshire | Cullen House | High | Operational | Low to negligible | Operation Not significant, negative, long term, reversible. |
| | | | Consented | Low to negligible | |
| | | | Application | Low to negligible | Construction and decommissioning Not significant, negative, short term, reversible. |
| | Gordon Castle | High | Operational | Low to negligible | Operation |
| | | | Consented | Low to negligible | Not significant, negative, |

| Region | GDL | Sensitivity to Change | Scenario | Cumulative Magnitude of Change | Significance of Effect |
|-------------------------------|-------------|-----------------------|-------------|--|--|
| Morayshire (continued) | | | Application | Low to negligible | long term, reversible. Construction and decommissioning Not significant, negative, short term, reversible. |
| Aberdeenshire | Gordonstoun | High | Operational | None The three proposed wind farm sites are not visible | Operation Not significant, negative, long term, reversible. Construction and decommissioning Not significant, negative, short term, reversible. |
| | | | Consented | None The three proposed wind farm sites are not visible | |
| | | | Application | None The three proposed wind farm sites are not visible | |
| | Innes House | High | Operational | None The three proposed wind farm sites are not visible | Operation Not significant, negative, long term, reversible. Construction and decommissioning Not significant, negative, short term, reversible. |
| | | | Consented | None The three proposed wind farm sites are not visible | |
| | | | Application | None The three proposed wind farm sites are not visible | |
| | Duff House | High | Operational | None The three proposed wind farm sites are not visible | Operation Not significant, negative, long term, reversible. Construction and decommissioning Not significant, negative, short term, reversible. |
| | | | Consented | None The three proposed wind farm sites are not visible | |
| | | | Application | None The three proposed wind farm sites are not visible | |

Special Landscape Areas

15.4.5.5 The cumulative effect of the three proposed wind farm sites is assessed further on the proposed SLAs in the study area in Table 15.4-9 below.

Table 15.4-9 Assessment of Effects on Special Landscape Areas

| Proposed SLA | Distance from Site | Sensitivity to Change | Scenario | Cumulative Magnitude of Change | Significance of Effect |
|--------------------------------------|--------------------|-----------------------|-------------|---|--|
| Flow Country and Berriedale Coast | 35 km (Stevenson) | High | Operational | Medium to low | Operation Not significant, negative, long term, reversible. |
| | | | Consented | Medium to low | |
| | | | Application | Medium to low | Construction and decommissioning Not significant, negative, short term, reversible. |
| Duncansby Head | 38 km (Telford) | High | Operational | Low | Operation Not significant, negative, long term, reversible. |
| | | | Consented | Low | |
| | | | Application | Low | Construction and decommissioning Not significant, negative, short term, reversible. |
| Dunnet Head | 47 km (Telford) | High | Operational | None (the three proposed wind farm sites are not visible) | Operation Not significant, negative, long term, reversible. Construction and decommissioning Not significant, negative, short term, reversible. |
| | | | Consented | None (the three proposed wind farm sites are not visible) | |
| | | | Application | None (the three proposed wind farm sites are not visible) | |
| Loch Fleet, Loch Brora and Glen Loth | 46 km (MacColl) | High | Operational | Medium to low | Not significant |
| | | | Consented | Medium to low | |
| | | | Application | Medium to low | |

15.4.6 Cumulative Seascape, Landscape and Visual Effects – WDA

15.4.6.1 Cumulative LVIA Guidance (SNH, 2009) does not generally recommend assessment of wind energy developments at pre-scoping stage, but there is a potential development scenario where the WDA will be developed if the maximum capacity of the Telford, Stevenson and MacColl wind farms is not achieved. If MORL do not develop the maximum capacity of turbines in the Telford, Stevenson and MacColl wind farms, up to 500 MW may be developed in the WDA. A cumulative assessment has been undertaken to assess the likely cumulative effects of the Telford, Stevenson and MacColl wind farms with the WDA. In undertaking this assessment, the realistic worst case scenario is assessed for the WDA. A summary of the realistic worst case parameters of wind farm design for the potential MORL WDA in terms of seascape, landscape and visual receptors is provided in Table 15.4-3 above. The assessment takes account of the

realistic worst case effects, which includes up to 100 turbines in the WDA for the 5 MW rated turbine scenario, located in the western part of the WDA, furthest and most separate from the Telford, Stevenson and MacColl wind farms. Wireline views of this scenario for the WDA were produced to inform the assessment. When referring to the WDA, the assessment refers to the realistic worst case parameters and assumes a maximum spread of 1.5 GW over the combined EDA and WDA sites.

15.4.6.2 The cumulative seascape, landscape and visual effects of the Telford, Stevenson and MacColl wind farms with the WDA are summarised as follows:

- The cumulative visual effect of the Telford, Stevenson and MacColl wind farms in addition to the WDA is generally to increase the horizontal extent of turbines on the developed horizon at the southern end of the wind farm;
- The WDA will, in views from Caithness and Moray, increase the horizontal extent of development and occupy more of the skyline, such that the OGS appears as a wider horizontal feature in views;
- The WDA will result in an increased effect on receptors from the southern part of the Caithness section of the study area, approximately between Lybster and Brora, due to the OGS being located closer to this stretch of coast (22 km at its closest) than the Telford, Stevenson and MacColl wind farms, and due to the increase in developed horizon;
- Receptors in Caithness where the cumulative effects of the Telford, Stevenson and MacColl wind farm sites with the WDA have increased and are assessed as significant due to the increased horizontal extent of development and / or due to the WDA forming a separate wind farm feature on the skyline are:
 - Viewpoints: 5 Sarclet; 6 Hill O'Many Stanes; 7 Lybster; 8 Latheron; 9 Dunbeath; 10 Berriedale (A9); 11 Morven; 12 Navidale; 14 Minor Road, south side of Stemster Hill; and 15 Navidale;
 - Coastal Character Areas: Wick Bay (11); Sarclet Head (12); Lybster Bay (13); Dunbeath Bay (14); Helmsdale to Brora Coastal Shelf (15); and Brora to Helmsdale Deposition Coast (16); and
 - Landscape Types: Coastal Shelf (8); Harbour (Lybster, Dunbeath and Helmsdale) (11); High Cliffs and Sheltered Bays (Berriedale to Helmsdale) (12); Moorland Slopes and Hills (19); and Small Farms and Crofts (23).
- Receptors where the cumulative effect of the proposed Telford, Stevenson and MacColl wind farm sites with the WDA are of less magnitude / significance than in the primary assessment, where the WDA is not visible and there would be less turbines in the EDA visible, are:
 - Viewpoints: 2 Keiss Pier; 3 Sortat; 4 Wick Bay; and 13 Catchory;
 - Coastal Character Areas: Sinclairs Bay (9);
 - Landscape Types: Harbour (Wick) (11); and Long Beaches Dunes and Links (16); and
 - Landscape Designations: Dunnet Head SLA.
- Receptors in Caithness where the cumulative effects of the proposed Telford, Stevenson and MacColl wind farm sites with the WDA are – at worst – of an equal magnitude / significance as in the primary assessment, where the WDA is located behind, and less prominent than the EDA, and does not

significantly extend the developed horizon are:

- Viewpoint 1: Duncansby Head;
- Coastal Character Areas: Duncansby Head (7); Freswick Bay and Nybster Coast (8); and Noss Head (10);
- Landscape Types: Coastal Island (6); High Cliffs and Sheltered Bays (Duncansby Head) (12); Mixed Agriculture and Settlement (18); and Open Intensive Farmland (20); and
- Landscape Designations: Duncansby Head SLA; Flow Country and Berridale Coast SLA; Loch Fleet, Loch Brora and Glen Loth SLA; Castle of Mey GDL; Dunbeath Castle GDL; and Langwell Lodge GDL.
- The WDA could be located at closer proximity to the Moray and Aberdeenshire coastline, approximately 31 km at its closest point, and forms a westward extension in views from this part of the study area;
- The cumulative effect of the proposed Telford, Stevenson and MacColl wind farm sites with the WDA will have a resulting increased effect on receptors in Moray and Aberdeenshire due to its increased prominence and wider horizontal extent on the skyline. This increased effect is evident from the following receptors, but the effect is assessed as not significant:
 - Viewpoints: 16 Lossiemouth Harbour; 17 Buckie, Cliff Terrace; 18 Portnockie – Bow Fiddle Rock; 19 Cullen, Viaduct & Cycle Path; 20 Bin Hill; 21 Findlater Castle; and 22 Portsoy;
 - Coastal Character Areas: Lossiemouth to Burghead Coast (17); Spey Bay (18); Portgordon to Portknockie Coast (19); Cullen Bay (20); Sandend Bay (21); Boyne Bay (22) and Boyndie Bay (23);
 - Landscape Types: Coastal (2); Coastal Farmland (4); Coastal Lowland (7); River Valleys (22); The Coast (26); and Uplands (28); and
 - Landscape Designations: Cullen House GDL; Gordon Castle GDL; Gordonstoun GDL; and Innes House GDL.

15.4.6.3 In summary, the cumulative effect of the Telford, Stevenson and MacColl wind farms in addition to the WDA is generally to increase the horizontal extent of turbines on the developed horizon, either forming a connecting extension to the EDA or a separate wind farm feature on the skyline, viewed at the southern end of the wind farm from Caithness, and the western side of the wind farm from Moray and Aberdeenshire. The cumulative effect of the Telford, Stevenson and MacColl wind farms in addition to the WDA is assessed as significant from receptors over a limited part of the southern Caithness coastline in the study area, but of an equal or lower magnitude / significance from the northern parts of Caithness (north of Wick), and from Moray and Aberdeenshire.

15.4.7 References

As per previous guidance.

15.5 Archaeology and Visual Receptors

15.5.1 Summary

15.5.1.1 This chapter presents the results of assessment of the likely significant cumulative impacts upon cultural heritage arising from the proposed Telford, Stevenson and MacColl offshore wind farms and transmission infrastructure in conjunction with other existing or reasonably foreseeable developments and activities. MORL's approach to the assessment of cumulative impacts is described in Chapter 1.3 (Environmental Impact Assessment).

15.5.1.2 A summary of the likely significant cumulative effects is provided in Table 15.5-1 below. Given the findings of the cumulative assessment it is considered that there is limited potential for cumulative physical and setting effects to occur in relation to the identified cultural heritage assets.

Table 15.5-1 Cumulative Impact Summary

| Receptor | MORL Whole Project | WDA | Beatrice Offshore Wind Farm | Burn of Whilk Wind Farm | Sensitivities for Telford, Stevenson and MacColl | Mitigation Measures |
|--|----------------------------------|-----------------|-----------------------------|-------------------------|--|--|
| Construction & Decommissioning | | | | | | |
| Known Wrecks, Obstructions and Geophysical Targets of Medium and High Potential | Not significant | Not significant | Not significant | N / A | No significant effects specific to Telford, Stevenson or MacColl (or combinations of them) | None additional to the mitigation detailed in Chapters 8.8 and 11.5. |
| | No significant cumulative effect | | | | | |
| Submerged Archaeology and Palaeo-Landscapes | Not significant | Not significant | Not significant | N / A | As above | None additional to the mitigation detailed in Chapters 8.8 and 11.5. |
| | No significant cumulative effect | | | | | |
| Operation | | | | | | |
| Dunbeath Castle (HB 7936) | Negligible | Negligible | Negligible | N / A | Negligible | None |
| | No significant cumulative effect | | | | | |
| Whaligoe Steps (HB 14070) | Negligible | Negligible | Negligible | N / A | Negligible | None |
| | No significant cumulative effect | | | | | |
| Lybster Conservation Area | Not significant | Not significant | Not significant | N / A | Not significant | None |
| | No significant cumulative effect | | | | | |
| Lybster Harbour Complex | Not significant | Not significant | Not significant | N / A | Not significant | None |
| | No significant cumulative effect | | | | | |
| Yarrows Palimpsest Landscape | Not significant | Not significant | Not significant | Not significant | Not significant | None |
| | No significant cumulative effect | | | | | |

15.5.2 Assessment of Cumulative Effects

- 15.5.2.1 The following paragraphs present the results of assessment of the potential cumulative effects upon cultural heritage assets arising from the proposed Telford, Stevenson and MacColl wind farms in conjunction with other existing or reasonably foreseeable marine and coastal developments and activities. The effects of the MORL offshore transmission infrastructure (OfTI) were excluded from this assessment in consultation with Historic Scotland (as advisors to the Scottish Government) as the effects of the export cable and associated infrastructure on changes in sediment transport were considered to be localised and not significant.
- 15.5.2.2 MORLs approach to the assessment of cumulative effects is described in Chapter 1.3 (Environmental Impact Assessment).
- 15.5.2.3 Cultural heritage is defined here as all Designated Wrecks, Scheduled Monuments, Listed Buildings, Conservation Areas, Inventory Designed Gardens and Designed Landscapes, Inventory Battlefields as well non-designated cultural heritage sites highlighted by the local authority as at risk from potential effects, submerged archaeology and palaeoenvironments, including maritime losses such as wrecks, aircraft and their associated debris.
- 15.5.2.4 The proposed developments considered alongside the Project within the cumulative impact assessment are listed below:
- Marine Renewable Projects:
 - Beatrice Offshore Wind Farm Limited (BOWL); and
 - MORL Western Development Area (WDA).
 - Onshore Projects:
 - Burn of Whilk Wind Farm.

15.5.3 Methodology

- 15.5.3.1 The assessment methodology has followed that outlined in the Moray Firth Offshore Wind Developers Group Discussion Document (ERM, 2011; see Technical Appendix 1.3 D).
- 15.5.3.2 There are currently a number of specific guidance documents available to inform the approach and these will be considered during the cumulative effect assessment on archaeology and cultural heritage assets. The guidance that will be considered will include the following:
- Oxford Archaeology with George Lambrick Archaeology and Heritage (2008) Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy. COWRIE Ltd;
 - Historic Scotland (2009) Assessment of Impact on the Setting of the Historic Environment Resource – Some general considerations; and
 - Historic Scotland (2011) Managing Change in the Historic Environment – Setting.
- 15.5.3.3 Direct and secondary physical cumulative effects on cultural heritage assets such as wrecks and aircraft and associated debris are considered unlikely as there

would be little chance of more than one Project having an impact on the same cultural heritage receptor due to the localised nature of such remains. Similarly, the low potential for the presence of submerged features and deposits of palaeoenvironmental and archaeological interest across a large spatial extent within the proposed three wind farms, WDA and BOWL wind farm and offshore transmission works reduce the likelihood of direct physical cumulative effects. As such, only indirect physical cumulative effects will be considered in this assessment.

15.5.3.4 The study area for considering cumulative indirect physical effects on cultural heritage and archaeology has been set at 1 km from the MORL and BOWL boundary which includes the Telford, Stevenson and MacColl Wind Farms and WDA. Of the developments within the 1 km study area, it was found that the majority of these developments have no potential to significantly affect currents and waves, and therefore patterns of sediment transport. In addition, following the scoping response from Historic Scotland the MORL OfTI has been excluded, in consultation with Historic Scotland, from this assessment as the effects of the export cable and associated infrastructure on changes in sediment transport were considered to be localised and not significant.

15.5.3.5 With regard to setting effects on cultural heritage and archaeological receptors, a study area of 35 km from the proposed wind farm sites was agreed with consultees, along with the receptors to be considered in the cumulative assessment (see setting effects below). Following consultation the potential cumulative effects resulting from the operation of the three proposed wind farms, the WDA and the consented Burn of Whilk onshore wind farm were deemed appropriate for the consideration of cumulative effects. This was agreed with Historic Scotland and Highland Council Historic Environment Team. As the BOWL offshore transmission infrastructure was scoped out of the seascape, landscape and visual assessment due to the lack of effects once constructed, there is no cumulative indirect effect on the setting of cultural heritage assets between the wind farms and the OfTI and hence this is not assessed here.

15.5.3.6 The TI has no interaction with the mobilisation of sediment within the 1 km study area and hence is not considered for cumulative assessment. With regard to effects on setting the TI is located outwith the 35 km study area agreed as applicable to the wind farms and hence are not considered here.

Worst Case Scenario - BOWL

15.5.3.7 A summary of the worst case parameters of wind farm design for the BOWL offshore wind farm in terms of Archaeology and Visual Receptors is provided below in Table 15.5-2. The worst case parameters for the Telford, Stevenson and MacColl wind farms and the TI are as provided in Chapters 8.5 and 11.5 (Archaeology and Visual Receptors).

Table 15.5-2 Summary of BOWL Worst Case Parameters

| Worst case Parameters | Scenario Assessed |
|--|--|
| Construction & Decommissioning | |
| Direct Physical Effects on the Seabed as a Result of Wind Turbine Foundation Construction | <ul style="list-style-type: none"> 277 x 3.6 MW turbines using GBS foundations are considered to be the worst case scenario, as this option effects upon the largest area of seabed (3,790,745 m²) |

| Worst case Parameters | Scenario Assessed |
|---|---|
| Direct Physical Effects on the Seabed as a Result of Offshore Platform Foundation Construction | <ul style="list-style-type: none"> Two single AC substations and one AC / DC converter station with gravity based foundation are considered to present the worst case as this option has the largest seabed footprint (77,190 m²) |
| Laying of Inter Array Cables | <ul style="list-style-type: none"> Burying all cabling is assessed as the worst case construction method |
| | <ul style="list-style-type: none"> 277 x 3.6 MW turbines are considered to present the worst case, as the greatest length of cable would be required (325 km) |
| Laying and Burial of Export Cable | <ul style="list-style-type: none"> Length of export cable = 65 km (up to three trenches) |
| Operation | |
| Effects on the Setting of Onshore Cultural Heritage Assets | <ul style="list-style-type: none"> 142 x 7 MW turbines of 198.4 m to tip are considered to be the worst case scenario as they have the most extensive ZTV and will be the most prominent |

Worst Case Scenario - Western Development Area

15.5.3.8 The WDA comprises part of the MORL Zone, within which the three proposed wind farm sites (Telford, Stevenson and MacColl) are located. The maximum capacity to be installed in the entire Zone is 1.5 GW and MORL has applied for a maximum of 1.5 GW within three proposed wind farm sites.

15.5.3.9 The WDA may be developed if less than 1.5 GW of capacity is delivered by the Project in the EDA. In total the consented capacity of the Project and the WDA will not exceed 1.5 GW.

15.5.3.10 The connection between the WDA and the Project necessitates a slightly different approach to assessment, as the effects arising from the 'worst case' for the Project cannot simply be added to the 'worst case' scenario for the WDA. Instead, assessment of the likely significant cumulative effects of the Project and the WDA follows a similar format to the 'sensitivity assessments' of the individual wind farm proposals in Section 3 (i.e. where the effects of combinations of projects are considered). See Table 15.5-3 below for a summary of the WDA worst case parameters.

Table 15.5-3 Summary of MORL WDA Worst Case Parameters

| Realistic Worst Case Parameters | Scenario Assessed |
|---|---|
| Construction & Decommissioning | |
| Direct Physical Effects on the Seabed as a Result of Wind Turbine Foundation Construction | <ul style="list-style-type: none"> Installation of 100 x 5 MW turbines Gravity based foundations are considered to be the worst case scenario, as this option effects on the largest area of seabed |
| Direct Physical Effects on the Seabed as a Result of Offshore Platform Foundation Construction | <ul style="list-style-type: none"> Two single AC substations with a gravity based foundation are considered to present the worst case as this option has the largest seabed footprint |

| Realistic Worst Case Parameters | Scenario Assessed |
|--|--|
| Laying of Inter Array Cables | <ul style="list-style-type: none"> Burying all cabling is assessed as the worst case construction method |
| Operation | |
| Effects on the Setting of Onshore Cultural Heritage Assets | <ul style="list-style-type: none"> 72 no. 7 MW turbines are considered to be the worst case scenario as they have the most extensive ZTV and will be the most prominent |

15.5.4 Impact Assessment

15.5.4.1 The potential effects that will be considered in this cumulative impact assessment are:

- Indirect physical effects; and
- Setting effects.

Indirect Physical Effects

15.5.4.2 The following indirect physical cumulative effects have been considered in relation to cultural heritage assets:

- There are no designated or protected wrecks within the three proposed wind farms; and
- The geoarchaeological assessment of the seabed substrates has indicated negligible potential for the survival of relict landscape surfaces, features or deposits within Telford, Stevenson and MacColl wind farms.

15.5.4.3 There are three confirmed known wreck locations (HW 1001 to 1004) classified as 'live' by the UKHO within the Wind Farms and associated 1 km buffer; four further known wrecks or obstructions (HW 1005, 1006, 1014 and 1015) lie within the site of the three proposed wind farms and associated 1 km buffer that are classified as 'dead' (i.e. the identity was established initially but subsequent survey has failed to locate the wreck remains).

15.5.4.4 There are no known wrecks or obstructions located within the BOWL site. One wreck (HA 1) was identified within the associated 1 km buffer (Outer Study Area) of the BOWL site – this wreck is the same as HW 1001 highlighted in Chapter 5.5 (Archaeology and Visual Receptors). Twelve medium potential features of anthropogenic origin were identified during the geophysical survey; nine in the Inner Study Area (HA 2, 22, 41, 53, 111, 130, 137, 139 and 140) and three in the Outer Study Area (HA 122, 136 and 138).

15.5.4.5 There is one wreck (UKHO no. 897 'Sunbeam' (possibly)) which is located within the WDA, but outwith the study areas.

15.5.4.6 The possibility of alterations to the tidal regimes leading to long term effects on patterns of sediment transport within the application area are assessed and reported in Chapter 13.2 (Sedimentary and Coastal Processes). The effects of the three proposed wind farms (and WDA) on sediment transport regimes will persist for the lifetime of the development where sediment transport is less than the potential for natural variability, and therefore the potential effect on the cultural heritage assets identified above is considered to be **not significant**. The predicted

effect of changes to the tidal regime as a result of the three proposed wind farms suggest that the effects on currents will persist over the lifetime of the development but are of a very small magnitude, have only a local effect, and do not impact beyond natural variability. The likely significant effect on cultural heritage assets is therefore considered to be **not significant**.

15.5.4.7 The effect of the BOWL wind farm and offshore transmission works on sediment transport regimes, based on information from surveys undertaken by ABPMer, suggest the magnitude of the effect on water levels and currents is predicted to be low when compared to the natural range of variability and are not considered to be measurable in practice. Some short to medium term localised increases in sediment thickness are predicted, but it is not expected to be a significant change in the textural properties of the sediment available for transport. This supports the further conclusion that actual sediment transport rates through the BOWL and MORL sites will not be affected by the proposed three proposed wind farms, WDA, and BOWL wind farm and offshore transmission works and therefore the indirect physical effects upon all known and unknown cultural heritage assets will be negligible and therefore **not significant**.

15.5.4.8 The likely significant effects have all been described as of low magnitude, and not significant. It is therefore considered that there will be no significant cumulative effect on cultural heritage assets due to changes to waves, tidal currents or sedimentary regimes as a result of the presence of both the MORL wind farms, WDA, and Beatrice Offshore Wind Farm and offshore transmission works.

Setting Effects

15.5.4.9 Following consultation, cumulative effects have been considered in relation to the following assets which were identified as potentially having cumulatively effects through Cumulative Zone of Theoretical Visibility (CZTV) mapping (Figures 15.4-2 to 15.4-22, Volume 7):

- Dunbeath Castle;
- Whaligoe Steps;
- Lybster Conservation Area;
- Lybster harbour complex; and
- Yarrows palimpsest landscape.

15.5.4.10 Table 15.5-4 below summarises the predicted effects of the proposed Stevenson, MacColl and Telford Offshore Wind Farms upon the setting of onshore assets. The impacts have been assessed as being either of negligible significance or not significant

Table 15.5-4 Summary of Effects upon the Setting of Selected Onshore Cultural Heritage Assets

| 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. |

| Receptor | Predicted Significance | Summary |
|--|------------------------|--|
| 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. |

15.5.4.11 Given that there will be no intervisibility from the Lybster Conservation Area and harbour complex with the proposed Stevenson, MacColl and Telford Wind Farms and that no effect is predicted, it is concluded that there is no potential for cumulative effects upon the setting of these assets. Therefore, they are not considered further. Cumulative effects for the remaining assets are considered below.

Dunbeath Castle

15.5.4.12 The proposed BOWL site will be seen in combination with the proposed Stevenson, MacColl and Telford Wind Farms from the castle and its immediate vicinity. The proposed turbines of the latter will lie behind those of the former at a distance of at least 35 km. This will have the effects as described below.

15.5.4.13 There will be a greater degree of clustering of turbines giving rise to a more cluttered appearance and turbines will be seen to occupy a greater part of the horizon.

15.5.4.14 Clustering could lead to a cumulative effect upon setting if the aesthetics of the affected view were linked to its cultural significance. In this instance the affected view is not linked to the aesthetic appreciation of the castle and its cultural significance. Given the distance of the wind farm's turbines from the castle, the clustering effect will only be perceptible in conditions of excellent visibility and even then it will not be pronounced. There will therefore be **no cumulative effect** from the clustering of turbines.

15.5.4.15 The Stevenson, MacColl and Telford Wind Farms will largely lie behind BOWL when viewed from the castle. However, the MacColl Wind Farm will extend the portion of the horizon occupied by turbines. Again the views affected are not important to the appreciation of the castle's setting and it is concluded that the increase in the part of the horizon covered will have **no cumulative effect** upon the setting of the castle.

Whaligoe Steps

- 15.5.4.16 The proposed BOWL site will be seen in combination with the proposed Stevenson, MacColl and Telford Offshore Wind Farms from top of the Whaligoe Steps and from the observation platform. The proposed turbines of the latter will lie behind those of the former at a distance of 23 km. This will result in a greater degree of clustering of turbines giving rise to a more cluttered appearance.
- 15.5.4.17 Clustering could lead to a cumulative effect upon setting if the aesthetics of the affected view were linked to its cultural significance. The foreground of the views from the affected locations is very dramatic, comprising precipitous dark cliffs seen against the background of the North Sea and this contributes to the sense of place rather than the aesthetics of the experience of the asset. Given the distance of the Stevenson, MacColl and Telford Wind Farms from the Steps, the clustering effect will only be perceptible in conditions of good visibility and even then it will not be pronounced. There will be no cumulative effect upon the sense of place of the asset and hence **no cumulative effect** upon the setting of the steps.

Yarrows Palimpsest Landscape

- 15.5.4.18 The proposed BOWL site will be seen in combination with the proposed Stevenson, MacColl and Telford Wind Farms from top of the Whaligoe Steps and from the observation platform. The proposed turbines of the latter will lie behind those of the former at a distance of at 23 km. This will result in a greater degree of clustering of turbines giving rise to a more cluttered appearance.
- 15.5.4.19 The consented Burn of Whilk wind farm will be seen at a distance of 1 km from the Yarrows landscape. The offshore wind farms will be seen in succession with it, i.e. the viewer will be able to see all the wind farms from a single spot but will have to turn to do so. The addition of Telford Stevenson, MacColl and BOWL Wind Farms will have at most a negligible cumulative effect, resulting in more turbines being visible but no greater loss of cultural significance than the Burn of Whilk wind farm alone. Accordingly, this effect is assessed as being not significant.

WDA Effect on Setting

- 15.5.4.20 As mentioned above, the WDA may be developed for a maximum of 500 MW of capacity if less than 1.5 GW of capacity is delivered by the Project in the EDA. As the three proposed wind farms were assessed for a total of 1.5 GW the effects of the three proposed wind farm sites cannot be added to the effects of the WDA.
- 15.5.4.21 No detailed information is available for the WDA. However, it is recognised that the horizontal spread of turbines will increase with the WDA and therefore will affect the assessment of setting effects. Chapter 15.4 (Seascape, Landscape and Visual Receptors) assesses the potential effects of the worst case scenario for Seascape, Landscape and Visual impact assessment for the WDA as follows:
- The cumulative effect of the Telford, Stevenson and MacColl wind farms in addition to the WDA is generally to increase the horizontal extent of turbines on the developed horizon, either forming a connecting extension to the EDA or a separate wind farm feature on the skyline, viewed at the southern end of the wind farm from Caithness, and the western side of the wind farm from Moray and Aberdeenshire. The cumulative effect of the Telford, Stevenson and MacColl wind farms in addition to the WDA is assessed as significant from receptors over a limited part of the southern Caithness coastline in the study area, but of an equal or lower magnitude / significance from the northern parts of Caithness (north of Wick), and from Moray and Aberdeenshire.

15.6 Socio-Economics, Recreation and Tourism

15.6.1 Summary of Effects and Mitigation

15.6.1.1 This chapter presents the results of assessment of the likely significant cumulative effects upon Socio-Economics, Recreation and Tourism arising from the Project in conjunction with other existing or reasonably foreseeable developments and activities. MORLs approach to the assessment of cumulative impacts is described in Chapter 1.3 (Environmental Impact Assessment).

Summary of Effects

15.6.1.2 A summary of the expected cumulative impacts is provided in Table 15.6-1 below.

15.6.1.3 In relation to the employment and GVA cumulative effects, timing and the supply chain are important, given not just considering cumulative effects with BOWL but also North Sea oil and gas activities, and other major proposed renewable energy projects. The cumulative effects of the expenditure (with BOWL) is assessed as having a major positive effect on social and economic conditions within the Study Area (defined as Highlands, Moray, Aberdeenshire and Aberdeen City Local Authority areas) and creating opportunities for employment across Scotland.

15.6.1.4 For tourism, while the cumulative effect of the Project and BOWL will be greater than the Project would be on its own, there is likely to be a diminishing marginal loss of value. The negative effect "per turbine" is lower for the combined wind farms (with BOWL) than for the three proposed wind farms (without BOWL). So, arguably the attribution of any negative effects to these wind farms would be reduced. In practice, the cumulative effect has a greater visual impact, and this could be reflected in a minor reduction in tourism activity. The cumulative effect would be of minor significance.

15.6.1.5 This chapter contains relevant information on the OnTI to allow Scottish Ministers and Marine Scotland to make decisions on the applications for Section 36 consents and Marine Licences for the three proposed wind farm sites and the OfTI. Discussions are ongoing with landowners to determine the exact location and layout of the substation(s) on their land within the preferred onshore substation area. This will be finalised following production of a masterplan by the owner / operator of the Peterhead Power Station compound which forms part of the preferred area. Once the precise location and layout for the onshore substation(s) and export cable location has been confirmed, an application for planning permission for the OnTI will be submitted to Aberdeenshire Council and will be supported by this ES and such further information as is required to support the planning application.

Summary of Residual Effects and Mitigation

15.6.1.6 No mitigation specific to cumulative effects on Socio-Economics, Recreation and Tourism has been proposed. The negative cumulative effects are all assessed as not significant.

15.6.1.7 The summary of effects is shown in Table 15.6-1 below.

Table 15.6-1 Cumulative Impact Summary

| Effect / Receptor | MORL Total Project | BOWL (generating station and associated transmission infrastructure) | Sensitivities for Telford, Stevenson and MacColl, and OFTO | Mitigation Method (if required) |
|---|--|--|--|---------------------------------|
| Construction / Decommissioning | | | | |
| Employment and GVA | Major (+) | Major (+) | No difference | None required |
| Overall CIA for Employment and GVA | <p>Alongside other major construction projects, there may be constraints on capacity. The scale of these constraints depends on levels of investment and skills over the next few years. In this sense the cumulative effect depends on the timing of other projects and competing demand. This could either lead to more procurement from outside Scotland and a reduction in the number of jobs and amount of GVA supported by an individual project or, under a more positive scenario, and with beneficial timing, could make Scotland and the Study Area a more attractive base for investment and for the development of the sector.</p> <p>The interplay of the potential capacity issues and the development of the supply chain will be important in determining the cumulative effects. In practice, these effects will work differently within different parts of the supply chain. Whether the cumulative effect is positive or negative depends on the supply chain's response.</p> | | | |
| Leisure Tourism | Minor (-) | Minor (-) | Minor differences between the three proposed wind farms on tourism receptors which draw upon the results of seascape, landscape and visual assessment (leisure tourism). | None required |
| Business Tourism | Minor (+) | Minor (+) | No difference | None required |
| Overall CIA for Tourism | <p>During construction and decommissioning, the sensitivity of tourists to the extended cumulative visual effects would be higher than for the three proposed wind farms alone. The sensitivity would remain low, but the magnitude of the effect would increase marginally as a result of a greater level of activity. The number of tourists exposed would remain the same as would the duration of the effect. Given the temporary nature of the work the magnitude would remain low. The significance would remain as minor, negative and under the EIA would continue to be considered as not significant.</p> | | | |
| Recreation | Minor (-) | Minor (-) | Minor differences between the three proposed wind farms on recreation receptors which draw upon the results of seascape, landscape and visual assessment (walking). | None required |
| Overall CIA for Recreation | <p>The cumulative effects on other sea-based recreation such as surfing and sea-kayaking are not considered to be different from the assessment of the Project on their own. However, for recreational walking the cumulative effect with onshore wind farms would be greater, having a minor negative effect.</p> | | | |
| Operation | | | | |
| Overall CIA for Employment and GVA | Major (+) | Major (+) | No difference | None required |

| Effect / Receptor | MORL Total Project | BOWL (generating station and associated transmission infrastructure) | Sensitivities for Telford, Stevenson and MacColl, and OFTO | Mitigation Method (if required) |
|---|---|--|--|---------------------------------|
| Overall CIA for Employment and GVA | <p>The annual expenditure and requirement for employment during the operation phases for both the Project and BOWL is smaller than for construction, but lasts for longer, 25 years. There are therefore less likely to be capacity constraints, as the market has more time to adjust.</p> <p>There may also be some opportunities for economies of scale to be achieved, which could reduce expenditure and the employment required. Even so, the cumulative effect of these developments would be much greater than either on their own and would continue to be of major positive significance.</p> | | | |
| Leisure Tourism | Minor (-) | Minor (-) | Minor differences between the three proposed wind farms on tourism receptors which draw upon the results of seascape, landscape and visual assessment (leisure tourism). | None required |
| Business Tourism | Minor (+) | Minor (+) | No difference | None required |
| Overall CIA for Tourism | <p>The sensitivity of tourists to the extended cumulative visual effect of the three proposed wind farms and BOWL would be higher than for the MORL wind farms alone. While the sensitivity would remain low, the magnitude of the effect would increase marginally as a result of changes to the visual effect. The number of tourists exposed would remain the same as would the duration of the effect. On this basis the magnitude would increase from low to medium. The significance would remain as minor, negative and under the EIA would continue to be considered as not significant.</p> | | | |
| Recreation | Minor (-) | Minor (-) | Minor differences between the three proposed wind farms on recreation receptors which draw upon the results of seascape, landscape and visual assessment (walking). | None required |
| Overall CIA for Recreation | <p>The cumulative effects on other sea-based recreation such as surfing and sea-kayaking are not considered to be different from the assessment of the Project on their own. However, for recreational walking the cumulative effect with onshore wind farms would be greater, having a minor negative effect.</p> | | | |

15.6.2 Assessment of Cumulative Impacts

15.6.2.1 The cumulative effects are difficult to define in relation to socio-economic variables, as they are not necessarily defined by geography. The cumulative impact assessment for socio-economic effects has been considered in the following manner:

- In relation to the employment and GVA effects anticipated from the Project in conjunction with other developments and activities, the cumulative effect depends on the extent to which the supply chain has the capacity to meet demand from a number of projects taking place simultaneously. In other words the cumulative effect brings into consideration the possibility that some of the employment benefits anticipated by the MORL wind farms may not be realised because Scottish-based resources are being used for competing projects. In this sense, the cumulative effect may not be limited to wind farms, but would include other major projects over the same time frame,

including oil and gas investment and decommissioning; and

- In relation to tourism and recreation, cumulative effects are interpreted as the combined effects of the Project with other existing and proposed developments. In practice, this is related to the cumulative visual effect and the conclusions of Chapter 15.4 (Seascape, Landscape and Visual Receptors).

15.6.2.2 The only development considered within the cumulative impact assessment for tourism and recreation is BOWL.

15.6.3 Methodology

15.6.3.1 The assessment methodology has followed that outlined in the Moray Firth Offshore Wind Developers Group Discussion Document (ERM, 2011; see Technical Appendix 1.3 D). Because the Socio-Economic assessment is primarily led by the pattern of expenditure that will be made by the Project, the cumulative effects can only be a relatively broad consideration of the possible positive and negative effects.

Worst Case Scenario

15.6.3.2 It is not possible to assess detailed worst case scenarios for the cumulative assessment, however, at a high level, the worst case scenario for employment and GVA would be where supply chain constraints and timing mean that developers spend a smaller proportion of their expenditure in Scotland, than was planned (and was assumed under the Base case). Having large, similar projects over the same time frame increases demand for the same inputs and, if the supply chain is not able to respond (or increases prices), the cumulative effect would be less than the effect anticipated by the developments independently.

15.6.3.3 The worst case for the tourism and recreation activities is related to the cumulative visual effects and the conclusions of Chapter 15.4 (Seascape, Landscape and Visual Receptors). This includes onshore wind farms as well as in combination with BOWL. The worst case for tourism and recreation will be the same as the worst case for the visual assessment.

Western Development Area

15.6.3.4 The Western Development Area (WDA) comprises part of the MORL Zone, within which the three proposed wind farm sites (Telford, Stevenson and MacColl) are located. The maximum capacity to be installed in the entire Zone is 1.5 GW and MORL has applied for a maximum of 1.5 GW within three proposed wind farm sites.

15.6.3.5 The WDA may be developed for a maximum of 500 MW of capacity if less than 1.5 GW of capacity is delivered by the Project in the EDA. In total the consented capacity of the Project and the WDA will not exceed 1.5 GW.

15.6.3.6 The connection between the WDA and the three proposed wind farm sites necessitates a slightly different approach to assessment, as the effects arising from the "worst case" for the Project cannot simply be added to the "worst case" scenario for the WDA. Instead, assessment of the likely significant cumulative effects of the Project and the WDA will therefore follow a similar format to that undertaken for the sensitivity assessments of the individual wind farm proposals in Section 3.

15.6.3.7 All marine renewable projects considered in the CIA are shown in Figure 1.3-1, Volume 6 a.

15.6.4 Impact Assessment

- 15.6.4.1 The types of impacts considered in this cumulative impact assessment are:
- The amount of employment and GVA that would be supported as a result of expenditure on the construction, operation and decommissioning of the developments;
 - The effect on the levels of leisure and business tourism in the Study Area; and
 - The effect on the levels of other recreational activities (surfing, sea-kayaking and walking).

Employment and GVA

- 15.6.4.2 The estimates of the economic activity associated with the investment in the proposed wind farms and TI are based on the capacity of the supply to chain to meet the demand for goods and services. When considered, cumulatively, alongside other major construction projects, there may be further constraints on capacity, if potential contractors were working with other developments. The scale of these constraints depends on levels of investment and skills over the next few years.
- 15.6.4.3 In this sense the cumulative effect depends on the timing of other projects and competing demand. This could lead to more procurement from outside Scotland and a reduction in the number of jobs and amount of GVA supported. The cumulative effect would then be less than the sum of the individual projects.
- 15.6.4.4 Under a more positive scenario, and with beneficial timing, the cumulative effect of a number of developments could make Scotland and the study area a more attractive base for investment and for the development of the sector.
- 15.6.4.5 The interplay of the potential capacity issues and the development of the supply chain will be important in determining the cumulative effects. In practice, these effects will work differently within different parts of the supply chain.
- 15.6.4.6 A potential further cumulative effect could occur if the wind farms and TI were to share any elements of the operations and maintenance support with the BOWL development. This could provide economies of scale, but would in effect reduce the expenditure and therefore employment and GVA in the local economy.
- 15.6.4.7 In relation to this assessment, the sensitivity of the economy to the employment and GVA that the Project and other developments would support will remain high. Even with some supply chain constraints the scale of activity and hence magnitude would still be expected to be high. As such, the cumulative effects on GVA and employment are considered to **major positive** and **significant** as was concluded in the assessment of the wind farms and TI in Chapters 8.6 and 11.6 respectively (Socio-Economics, Recreation and Tourism).

Tourism and Recreation

- 15.6.4.8 There is no evidence on which to base a judgement about the cumulative visual effects of offshore wind farms and their effect on tourism, so any assessment is highly uncertain. Chapter 15.4 (The Seascape, Landscape and Visual Receptors) provides an indication of where the effects are strongest and the marginal

difference that cumulative effects make. The cumulative effect with the BOWL site will increase the overall extent of the visual effect, although the Telford, Stevenson and MacColl turbines and proposed OSPs themselves will be behind the BOWL site when viewed from the east Caithness shore. This will create an increased density when viewing the four sites together.

- 15.6.4.9 It is important to note that one of the conclusions of the Scottish Government research (Riddington *et al.*, 2008) was that there was a diminishing marginal loss of value associated with increasing the size of wind farms. Once there has been an intrusion into the scenery, the effect on the value of the landscape of expanding the size of the wind farm is smaller.
- 15.6.4.10 The sensitivity of tourists to the extended cumulative visual effect of the three proposed wind farms and BOWL would be higher than for the Project alone. While the sensitivity would remain low, the magnitude of the effect would increase marginally as a result of changes to the visual effect. The number of tourists exposed would remain the same as would the duration of the effect. On this basis the magnitude would increase from low to medium. The significance would remain as minor, negative and under the EIA regulations would continue to be considered as not significant.
- 15.6.4.11 The cumulative effects on other sea-based recreation such as surfing and sea-kayaking are not considered to be different from the assessment of the Project. However, for recreational walking the cumulative effect with onshore wind farms would be greater, although this would remain a **minor, negative effect**.

Other Cumulative Effects

- 15.6.4.12 The cumulative effect with the other developments will mean that there is a more significant increase in employment opportunities within the local area. This in turn will have a greater effect on levels of income, potentially house prices and population, than one project on its own. The combined effect of these projects proceeding would increase the chances of attracting further related investment and employment in support services. These effects cannot be assessed in detail given the limited project information available, the uncertainty of which projects will be developed and the difficulty in assessing cumulative effects related to indirect effects associated with the development of the supply chain.

15.6.5 Assessment of WDA

- 15.6.5.1 As mentioned above the WDA may be developed for a maximum of 500 MW of capacity if less than 1.5 GW of capacity is delivered by the Project in the EDA. As the three proposed wind farms were assessed for a total of 1.5 GW the effects of the three proposed wind farm sites cannot be added to the effects of the WDA.
- 15.6.5.2 The employment and GVA effects for the WDA would therefore represent approximately 33 % of the reported for offshore generating station in Chapter 8.6 (Socio-Economics, Recreation and Tourism).
- 15.6.5.3 No detailed information is available for the WDA. However, it is recognised that the horizontal spread of turbines will increase with the WDA coast and therefore will affect the Seascape, Landscape and Visual Receptors assessment and the tourism and recreation activities that relate to this discipline. Chapter 15.4 (Seascape, Landscape and Visual Receptors) assesses the potential effects of the worst case scenario for Seascape, Landscape and Visual impact assessment for

the WDA as follows:

- The cumulative effect of the Telford, Stevenson and MacColl wind farms in addition to the WDA is generally to increase the horizontal extent of turbines on the developed horizon, either forming a connecting extension to the EDA or a separate wind farm feature on the skyline, viewed at the southern end of the wind farm from Caithness, and the western side of the wind farm from Moray and Aberdeenshire. The cumulative effect of the Telford, Stevenson and MacColl wind farms in addition to the WDA is assessed as significant from receptors over a limited part of the southern Caithness coastline in the study area, but of an equal or lower magnitude / significance from the northern parts of Caithness (north of Wick), and from Moray and Aberdeenshire.

15.6.6 References

ERM (2011). Moray Firth Offshore Wind Developers Group Cumulative Impacts Assessment Discussion Document April 2011

Riddington, G., Harrison, T., McArthur, D., Gibson, H., & Millar, K. (2008). The economic impacts of wind farms on Scottish tourism. Glasgow Caledonian University.

This page has been intentionally left blank.

15.7 Traffic and Transport

15.7.1 Assessment of Cumulative Impacts

Introduction

- 15.7.1.1 This chapter contains relevant information on the Onshore Transmission Infrastructure (OnTI) to allow Scottish Ministers and Marine Scotland to make decisions on the applications for Section 36 consents and Marine Licences for the three proposed wind farm sites and the OfTI. Discussions are ongoing with landowners to determine the exact location and layout of the substation(s) on their land within the preferred onshore substation area. This will be finalised following production of a masterplan by the owner / operator of the Peterhead Power Station compound which forms part of the preferred area. Once the precise location and layout for the onshore substation(s) and export cable location has been confirmed, an application for planning permission for the OnTI will be submitted to Aberdeenshire Council and will be supported by this ES and such further information as is required to support the planning application.
- 15.7.1.2 The following paragraphs present the results of the assessment of the likely significant cumulative effects due to traffic and transport arising from the OnTI coinciding with other existing or reasonably foreseeable developments and activities. MORLs approach to the assessment of cumulative impacts is described in Chapter 1.3 (Environmental Impact Assessment).
- 15.7.1.3 The assessment has been limited to the same geographical boundaries as the primary assessment (Chapter 11.7: Traffic and Transport), i.e. the roads surrounding Peterhead and Fraserburgh and as shown on Figure 5.7-1, Volume 6 b. The assessment only accounts for construction activities that may occur in parallel to MORL. All other activities (such as operational traffic or decommissioning activities in the future) are considered part of the baseline.
- 15.7.1.4 The other developments that have been identified for consideration following consultation with Aberdeenshire Council are listed in 15.7.2 (Potential Concurrent Developments) of this chapter.
- 15.7.1.5 The receptors considered in this assessment have been limited to the A roads due to the exact delivery routes being unknown. A summary of the effects identified in the cumulative impact assessment are listed in Table 15.7-1 below.

Table 15.7-1 Summary of Effects Identified

| Receptor (Impact) | Individual Effect | Cumulative Effect | Mitigation Method |
|---|-------------------------|-------------------------|-------------------|
| A90 (T) near Cruden Bay – Increase in Construction Traffic | Negligible significance | Negligible significance | None required |
| A950 West of Peterhead – Increase in Construction Traffic | Negligible significance | Negligible significance | None required |
| A952 North of Mintlaw – Increase in Construction Traffic | Negligible significance | Negligible significance | None required |

15.7.2 Potential Concurrent Developments

15.7.2.1 The offshore developments and activities considered within the cumulative impact assessment are listed in Table 15.7-2 below.

Table 15.7-2 Offshore Developments and Activities Considered

| Cumulative Considerations – Offshore Developments |
|--|
| <ul style="list-style-type: none"> • Beatrice Offshore Wind Farm; • Moray Offshore Renewables Ltd Western Development Area; • Marine energy development in Pentland Firth and Orkney; • Aberdeen Offshore Wind Farm; • Viking SHETL cable and onshore infrastructure; • East Coast Link; and • North Connect. |

15.7.2.2 The onshore developments listed in Table 15.7-3 below are also considered to potentially coincide with the construction phase traffic associated with the MORL onshore transmission infrastructure (OnTI).

Table 15.7-3 Onshore Developments Considered to Potentially Coincide with Construction Phase Traffic

| Cumulative Considerations – Onshore Developments |
|--|
| <ul style="list-style-type: none"> • St Fergus Moss Wind Farm; • White Cow Wood Wind Cluster; • Peterhead Harbour Wind Farm; • Greenside Wind Cluster; • West Knock Wind Cluster; • Aldie Wind Farm; and • Peterhead Power Station CCS. |

15.7.3 Assessment Methodology

15.7.3.1 The methodology employed for assessing the cumulative effects associated with the traffic from the OnTI and other foreseeable developments was as follows:

- Identify potential developments that might occur in parallel to the MORL development;
- Determine the proposed construction phase of the developments. For the offshore developments, expected completion dates have been provided therefore the potential for construction phase clashes can be identified. For the onshore developments, reviewing the ESs revealed little information on planned construction dates. Therefore, it has been assumed that construction would commence within four years of the application date for any given proposal. This includes for the typical development window of a year to process the application and the standard three year life of a planning consent. Therefore, any proposed onshore developments which have been submitted to planning in 2010 and the years previous have been

excluded from of this assessment, as they are assumed to have expired by the proposed construction date of 2015;

- Remove any developments that do not coincide with the OnTI construction programme or would represent minimal traffic effects. Minor developments such as single turbine or anemometer mast installations have not been considered within this assessment as the traffic numbers associated with these developments would be relatively minor;
- Determine the potential vehicle movements and construction periods for the concurrent developments; and
- Develop a realistic / conservative scenario to determine the magnitude of the potential cumulative traffic increase.

15.7.4 Assessment of Developments

15.7.4.1 The following paragraphs describe the potential for cumulative effects to arise from the proposed developments listed above.

Beatrice Offshore Wind Farm

15.7.4.2 The landfall for Beatrice Offshore Wind Farm cabling will be located at Portgordon. The construction activities associated with the onshore activities will be geographically separate from the OnTI and therefore, is not considered further for the cumulative impact assessment of the traffic.

Moray Offshore Renewables Ltd Western Development Area

15.7.4.3 The proposed OnTI will also cover the WDA so there will be no cumulative effect.

Marine Energy Development in Pentland Firth and Orkney

15.7.4.4 Onshore activities associated with Marine Energy Developments in the Pentland Firth and Orkney will be outwith the study area for the traffic effects due to OnTI.

Aberdeen Offshore Wind Farm

15.7.4.5 Any onshore activities associated with Aberdeen Offshore Wind Farm will be outwith the study area for the traffic effects due to OnTI.

Viking SHETL Cable and Onshore Infrastructure

15.7.4.6 It is understood that the landfall for the Viking SHETL cable will be located at Portgordon. Therefore, as with the above projects, the traffic effects of this project will not impact on the MORL OnTI study area.

East Coast Link – Peterhead Substation(s)

15.7.4.7 A planning application is yet to be submitted for this proposed development. However, it is understood that construction is due to be completed by 2016. A substation is to be constructed near the existing Peterhead Power Station and it has been assumed that its size will be similar to the one associated with the OnTI development. Due to the provisional completion date of 2016, it has been assumed that construction will take place in 2015 at the same time as the MORL onshore substation(s).

North Connect

15.7.4.8 No planning application has been submitted on this proposed development to date. No construction date has been set for this development and it has not been considered for cumulative effects.

Onshore Wind Farm Developments

15.7.4.9 All onshore wind farm developments listed in Table 15.7-3 above are considered in the cumulative impact assessment. This is the residual list of projects that is to be considered for cumulative effects, having removed all developments that do not coincide or have minimal traffic effects.

Peterhead Power Station CCS

15.7.4.10 To date, no EIA has been completed or planning application submitted for this development. There is uncertainty associated with the future of this project. For these reasons, it has not been considered within the cumulative impact assessment of the traffic.

15.7.5 Impact Assessment

15.7.5.1 The proposed developments that are to be considered in this cumulative impact assessment are detailed in Table 15.7-4 below.

Table 15.7-4 Proposed Onshore Development Vehicle Movements

| Site | Planning Status | Primary Transport Route | Total Vehicle Movements | Construction Period | Average Daily Vehicle Movements |
|---|-----------------|--------------------------|-------------------------|---------------------|---------------------------------|
| St Fergus Moss Wind Farm | Granted | A952 | 1,764 | 6 Months | 13 |
| White Cow Wood Wind Farm | Pending | A952 | 410 | 3 Months | 6 |
| Peterhead Harbour Wind Farm | Pending | A90 | 320 | 3 Months | 5 |
| Greenside Wind Farm | Granted | A90 | 1,362 | 5 Months | 12 |
| West Knock Wind Farm | Granted | A90, A950 | 134 | 3 Months | 2 |
| Aldie Wind Farm | Pending | A90 (South of Peterhead) | 130 | 2 Months | 3 |
| East Coast Link – Peterhead Substation(s) | – | A90 (South of Peterhead) | 14,138 | 6 Months | See Table 15.7-5 |

15.7.5.2 Figures for total vehicle movements, construction periods and average daily vehicle movements for the wind farm developments were taken from the environmental statements for each development. Where there was uncertainty relating to data in the ES, it has been assumed that vehicle movements listed in the environmental statements refer to the HGV numbers only.

15.7.5.3 For the proposed East Coast Link substation at Peterhead it has been assumed that the buildings will be of a similar size to that proposed for the onshore substation associated with the OnTI development. Therefore, the same predicted traffic numbers have been used.

15.7.6 Generated Cumulative Construction Traffic Distribution

15.7.6.1 The proposed developments listed in Table 15.7-4 above may overlap with the Project and have different construction periods. Due to a lack of information on the proposed timeline for these developments and to create a more conservative model; proposed developments with less than a six month construction period have been overlapped with the peak construction period of the OnTI. For example: White Cow Wood (which has a three month construction period) has been overlapped with months 3, 4 and 5 of the MORL development (i.e. the months with the peak predicted traffic levels).

15.7.6.2 The proposed East Coast Link substation has been assumed to start and finish at the same time as the OnTI, ensuring the most conservative outcome by overlapping the peak construction periods.

15.7.6.3 The generated traffic distribution is listed in Table 15.7-5 below.

Table 15.7-5 Generated Cumulative Construction Traffic Distribution

| Item | Month | | | | | |
|--|-------|------|------|-------|------|------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Average Daily HGV Movements – Cable Route | | | | | | |
| St Fergus Moss Wind Farm | 13 | 13 | 13 | 13 | 13 | 13 |
| White Cow Wood Wind Cluster | | | 6 | 6 | 6 | |
| Peterhead Harbour Wind Farm | | | 5 | 5 | 5 | |
| Greenside Wind Cluster | 12 | 12 | 12 | 12 | 12 | |
| West Knock Wind Cluster | | | 2 | 2 | 2 | |
| Aldie Wind Farm | | | | 3 | 3 | |
| East Coast Link – Peterhead Substation(s) | 18.1 | 25.3 | 65.0 | 132.5 | 76.8 | 65.6 |
| Total Average Daily HGV Movements on A90 | 30.1 | 37.3 | 84.0 | 154.5 | 98.8 | 65.6 |
| Total Average Daily HGV Movements on A950 | | | 2.0 | 2.0 | 2.0 | |
| Total Average Daily HGV Movements on A952 | 13.0 | 13.0 | 19.0 | 19.0 | 19.0 | 13.0 |

15.7.7 Effect of Cumulative Construction Traffic

15.7.7.1 The predicted maximum increase in traffic due to both the OnTI and the potentially concurrent other developments is summarised in Table 15.7-6 below.

Table 15.7-6 Maximum Percentage Increase in Five Day Average HGV Flows

| Location | % Increase in HGV Flow MORL Only | % Increase in HGV Flow with Cumulative Effects |
|----------------------------------|----------------------------------|--|
| Site 2 – A90 (T) near Cruden Bay | 12.5 % | 27.0 % |
| Site 6 – A950 West of Peterhead | 15.9 % | 16.3 % |
| Site 7 – A952 North of Mintlaw | 15.9 % | 19.7 % |

A90

- 15.7.7.2 According to the proposed wind farm environmental statements, the A90 will carry a large proportion of all the construction traffic. As per Table 15.7-4 above, Peterhead Harbour, Greenside, West Knock and Aldie Wind Farms and the East Coast Link Peterhead Substation developments will utilise the A90. For the proposed route, the cumulative effect on daily traffic flows equates to a maximum total increase in HGVs of 27.0 %.
- 15.7.7.3 Table 11.7-3 in Chapter 11.7 (Traffic and Transport) classifies the magnitude of this percentage increase in HGV numbers to be negligible. As stated in paragraph 11.7.12.9 of Chapter 11.7, the sensitivity of this road to change in traffic levels is also minor. It is therefore considered that the cumulative construction traffic would result in an environmental effect of **negligible** significance.
- 15.7.7.4 This model represents a conservative, worst-case approach by assuming that all nine proposed developments are to be constructed concurrently and for the peak periods of their construction phases to overlap. The probability of this outcome is considered to be very low.

A950 & A952

- 15.7.7.5 As per Table 15.7-6 above, the cumulative effect on daily traffic flows equates to a maximum total increase in HGVs of 16.3 % on the A950 and 19.7 % for the A952. Both the A950 and the A952 operate well within the capacity for a road of their class and the increase in flows is unlikely to have any appreciable operational effect on the road. As stated in paragraph 11.7.12.14 of Chapter 11.7 (Traffic and Transport), the sensitivity of the roads to change in traffic levels is minor. It is therefore considered that general construction traffic would result in an environmental effect of **negligible** significance for the A950 and A952.

15.7.8 Summary

- 15.7.8.1 The cumulative traffic on the A90, A950 and A952 were considered to have negligible effects due to the predicted increase in traffic levels and the probability of these effects occurring is considered to be very low. However, should such concurrency occur, with the use of Traffic Management Plans, and their coordination across the developments, any potential effects could be mitigated.

15.7.9 References

Aldie Wind Farm, Environmental Statement, TNEI (October 2011)

Greenside Wind Cluster, Environmental Statement, Green Cat Renewables (October 2011)

Peterhead Harbour Wind Farm, Environmental Statement, Green Cat Renewables (October 2010)

St Fergus Moss Renewables Project, Environmental Impact Assessment, The Greenspan Agency (June 2010)

West Knock Wind Cluster, Environmental Report, Green Cat Renewables (July 2009)

White Cow Wood Wind Cluster, Environmental Statement, Green Cat Renewables (October 2010)

This page has been intentionally left blank.

15.8 Other Human Activities

15.8.1 Summary

15.8.1.1 In conjunction with other developments and activities within the region, the Project may have effects on oil operators of minor to moderate adverse significance. The assessment is precautionary as a result of uncertainty regarding the intentions of oil operators to explore the potential of licensed oil and gas blocks that overlap with proposed offshore wind farm projects in the Moray Firth (i.e. the assessment assumes a potential conflict of interest between the offshore wind developers and oil and gas operators active in the Moray Firth).

15.8.1.2 Cumulative effects on other human activities are expected not to be significant on the basis that any proposed and consented projects with which the MORL Project may interact, will be required to adhere to the same suite of standard industry practice that MORL will apply (e.g. use of cable-crossing agreements, implementation of UXO mitigation measures as detailed in Chapters 8.7 and 11.8: Other Human Activities). A summary of the likely significant cumulative effects is provided in Table 15.8-1 below.

Table 15.8-1 Cumulative Effects Summary

| Effect / Receptor | MORL Whole Project | Beatrice Demonstrator Project | Beatrice Offshore Wind Farm | SHEFA-2 Subsea Cable | Beatrice and Jacky Oil Infrastructure | Sensitivities for Telford, Stevenson and MacColl | Additional Mitigation Measures (if required) |
|--|----------------------------------|-------------------------------|-----------------------------|----------------------|---------------------------------------|--|--|
| Construction / Decommissioning | | | | | | | |
| Effects on Other Offshore Wind Farms | Not significant | Not significant | Not significant | Not significant | Not significant | No effects specific to Telford, Stevenson or MacColl (or combinations of them) | N / A |
| | No significant cumulative effect | | | | | | |
| Effects on Military Practice and Exercise Areas | Not significant | Not significant | Not significant | Not significant | Not significant | No effects specific to Telford, Stevenson or MacColl (or combinations of them) | N / A |
| | No significant cumulative effect | | | | | | |

| Effect / Receptor | MORL Whole Project | Beatrice Demonstrator Project | Beatrice Offshore Wind Farm | SHEFA-2 Subsea Cable | Beatrice and Jacky Oil Infrastructure | Sensitivities for Telford, Stevenson and MacColl | Additional Mitigation Measures (if required) |
|--|----------------------------------|-------------------------------|-----------------------------|----------------------|---------------------------------------|--|---|
| Effects on Planned Oil Operations and Structures | Minor adverse | Not significant | Minor adverse | Not significant | Not significant | No effects specific to Telford, Stevenson or MacColl (or combinations of them) | Assumes ongoing consultation amongst Moray Firth operators |
| | No significant cumulative effect | | | | | | |
| Damage to Subsea Cables | Not significant | Not significant | Not significant | Not significant | Not significant | No effects specific to Telford, Stevenson or MacColl (or combinations of them) | Assumes implementation of industry standard practice by all proposed projects |
| | No significant cumulative effect | | | | | | |
| Health and Safety Risk due to Unexploded Ordnance | Not significant | Not significant | Not significant | Not significant | Not significant | No effects specific to Telford, Stevenson or MacColl (or combinations of them) | Assumes implementation of industry standard practice by all proposed projects |
| | No significant cumulative effect | | | | | | |
| Operation | | | | | | | |
| Effects on Other Offshore Wind Farms | Not significant | Not significant | Not significant | Not significant | Not significant | No effects specific to Telford, Stevenson or MacColl (or combinations of them) | N / A |
| | No significant cumulative effect | | | | | | |

| Effect / Receptor | MORL Whole Project | Beatrice Demonstrator Project | Beatrice Offshore Wind Farm | SHEFA-2 Subsea Cable | Beatrice and Jacky Oil Infrastructure | Sensitivities for Telford, Stevenson and MacColl | Additional Mitigation Measures (if required) |
|---|--|-------------------------------|-----------------------------|----------------------|---------------------------------------|--|--|
| Effects on Military Practice and Exercise Areas | Not significant | Not significant | Not significant | Not significant | Not significant | No effects specific to Telford, Stevenson or MacColl (or combinations of them) | N / A |
| | No significant cumulative effect | | | | | | |
| Effects on Planned Oil Operations and Structures | Moderate adverse | Not significant | Moderate adverse | Not significant | Not significant | No effects specific to Telford, Stevenson or MacColl (or combinations of them) | Assumes ongoing consultation amongst Moray Firth operators |
| | Potential for moderate adverse cumulative effect | | | | | | |
| Damage to Subsea Cables | Not significant | Not significant | Not significant | Not significant | Not significant | No effects specific to Telford, Stevenson or MacColl (or combinations of them) | Assumes implementation of industry standard practice by all proposed projects (note: also assumes that in most cases, buried cable / other buried structures will remain in-situ when projects are decommissioned) |
| | No significant cumulative effect | | | | | | |
| Health and Safety Risk due to Unexploded Ordnance | Not significant | Not significant | Not significant | Not significant | Not significant | No effects specific to Telford, Stevenson or MacColl (or combinations of them) | Assumes implementation of industry standard practice by all proposed projects (note: also assumes that in most cases, buried cable / other buried structures will remain in-situ when projects are decommissioned) |
| | No significant cumulative effect | | | | | | |

15.8.2 Assessment of Cumulative Impacts

- 15.8.2.1 MORL's approach to the assessment of cumulative effects is described in Chapter 1.3 (Environmental Impact Assessment).
- 15.8.2.2 The spatial context within which the cumulative assessment is set is based upon the range over which the proposed MORL Project may overlap and / or interact with other human activities in the Moray Firth.
- 15.8.2.3 The developments and activities considered in detail within the cumulative impact assessment are listed below:
- Proposed Beatrice Offshore Wind Farm (BOWL) and related transmission infrastructure;
 - Existing Beatrice Demonstrator Project wind turbines;
 - Existing SHEFA telecommunications subsea cable; and
 - Existing Beatrice and Jacky oil platforms and associated well, pipeline and cable infrastructure.
- 15.8.2.4 In addition, the following developments and activities have been identified which may have cumulative effects over the lifetime of the Project but there is currently insufficient information available on which to base a detailed assessment of effects:
- Licensed oil and gas blocks (intent of operators to develop within blocks is unknown); and
 - Proposed SHETL hub and related transmission infrastructure (no detail on Project scope / timeline available).

15.8.3 Methodology

- 15.8.3.1 The assessment methodology has followed that outlined in the Moray Firth Offshore Wind Developers Group Discussion Document (ERM, 2011; see Technical Appendix 1.3 D).

Worst Case Scenario (for Developments and Activities Subject to Detailed Assessment)

- 15.8.3.2 To inform assessment, project parameters have been provided by BOWL and are confirmed in its published Environmental Statement. A summary of the worst case parameters of wind farm design for the BOWL project in terms of maximum footprint and maximum construction window are provided in Table 15.8-2 below.
- 15.8.3.3 The worst case parameters for the Telford, Stevenson and MacColl wind farms and the offshore transmission infrastructure are as provided in Chapter 8.7 and Chapter 11.8 (Other Human Activities) respectively.
- 15.8.3.4 Worst case scenarios have not been supplied for the Beatrice Demonstrator Project, the SHEFA telecommunications cable or the existing oil infrastructure in the Moray Firth. These developments are all operational and have known parameters (as outlined in Chapter 1.3, Environmental Impact Assessment).

Table 15.8-2 Summary of BOWL Worst Case Parameters

| Worst Case Parameters | Scenario Assessed |
|--|--|
| <p>Installation of 277 turbines if lowest rated (3.6 MW) turbines selected, plus two AC OSPs and one AC / DC substation.</p> <p>Gravity base and scour protection with combined permanent zone of influence of 11,690 m² per foundation.</p> <p>Length of export cable = 65 km.</p> <p>Length of inter-array cables = 325 km and trench width = 3 m.</p> <p>Maximum construction window of up to five years.</p> <p>Maximum operational lifetime of 25 years.</p> | <p>Total footprint of 3.52 km².</p> <p>Construction activities ongoing for a five year period.</p> <p>Wind farm structures in place for 25 years.</p> |

Worst Case Scenario - Western Development Area

- 15.8.3.5 The Western Development Area (WDA) comprises part of the MORL Zone, within which the three proposed wind farm sites (Telford, Stevenson and MacColl) are located. The maximum capacity to be installed in the entire Zone is 1.5 GW and MORL has applied for a maximum of 1.5 GW within three currently proposed wind farm sites.
- 15.8.3.6 The WDA may be developed up to a maximum of 500 MW capacity if less than 1.5 GW of capacity is delivered by the Project in the EDA. In total the consented capacity of the Project and the WDA will not exceed 1.5 GW.
- 15.8.3.7 The linkage between the WDA and the three proposed wind farm sites necessitates a slightly different approach to assessment of cumulative effects, as the effects arising from the 'worst case' for the Project cannot simply be added to the 'worst case' scenario for the WDA. Instead, assessment of the likely significant cumulative effects of the Project and the WDA follows a similar format to the 'sensitivity assessments' of the individual wind farm proposals in Section 3 (i.e. where the effects of combinations of projects are considered). The WDA worst case parameters are presented in Table 15.8-3 below.

Table 15.8-3 Summary of MORL WDA Worst Case Parameters

| Realistic Worst Case Parameters | Scenario Assessed |
|---|--|
| <p>Installation of 100 turbines and one AC OSPs with gravity base foundations and associated scour material.</p> <p>Cable protection associated with up to 4 J tubes per turbine assuming protection required up to 50 m distance from turbine and at 10 m width = 2,000 m² per turbine.</p> <p>Length of inter-array cables = approximately 130 km and trench width = 3 m.</p> <p>Length of export cable = approximately 60 km (from WDA to converter stations to the east of the EDA).</p> <p>Maximum construction window of up to two years.</p> <p>Maximum operational lifetime of 25 years.</p> | <p>Total footprint of 1.20 km².</p> <p>Construction activities ongoing for a five year period.</p> <p>Wind farm structures in place for 25 years.</p> |

Other Developments

15.8.3.8 In relation to other remaining projects and activities (i.e. the proposed SHETL cable and hub, and the possible exploration of licensed oil and gas blocks), parameters remain unconfirmed and the cumulative assessment has therefore taken a more qualitative approach in defining potential effects based on available information.

15.8.3.9 All projects considered in the assessment of cumulative effects are shown in Figure 5.8-1, Volume 6 b, and licensed oil and gas blocks are shown in Figure 5.8-2, Volume 6 b.

15.8.4 Detailed Impact Assessment

15.8.4.1 The types of effects considered in this cumulative impact assessment are:

- Effects on other offshore wind farms;
- Effects on military practice and exercise areas;
- Effects on oil operations and structures;
- Damage to subsea cables; and
- Health and safety risk due to unexploded ordnance.

15.8.4.2 The receptors identified for consideration in this cumulative impact assessment are:

- Offshore wind farm developers and operators;
- Military users;
- Oil and gas operators;
- Subsea cable operators; and
- Human health and safety (offshore workers).

Construction / Decommissioning

Effects on Other Offshore Wind Farms

15.8.4.3 The offshore projects proposed within the Moray Firth are seen to be complimentary rather than conflicting, and all are proposed in order to meet renewable energy targets in Scotland and the wider UK. Relationships and communication between all offshore developers are considered to be good. Continued sharing of plans with regard to construction schedules and methodologies (including the implementation of safety zones during construction) will ensure all construction works are undertaken safely and as a result **no significant cumulative effect** is predicted.

Effects on Military Practice and Exercise Areas

15.8.4.4 There is potential for the construction of the MORL and BOWL projects, and the SHETL Hub, to run concurrently. Construction activity has the potential to disrupt and interfere with military practice and exercise area (PEXA) activities. Whilst MORL, BOWL and SHETL projects overlap in particular locations with PEXA (two of the proposed MORL wind farm sites with D809, the BOWL export cable with D807, and the SHETL hub and export cable with both D809 and D807), the Ministry of

Defence (MoD) considers proposals on a case-by-case basis, and to date has not raised any formal objection to either the MORL or BOWL projects as a result of disruption to PEXA. MORL is unaware of the outcome of any consultation with the MoD undertaken by SHETL. Consultation responses to date indicate that there will be **no significant cumulative effect** on PEXA in the Moray Firth. The WDA does not overlap with any PEXA.

Effects on Oil Operations and Structures

15.8.4.5 Oil and gas licence blocks overlapping with a number of other projects / activities have been awarded to several operators (Table 15.8-4 below).

Table 15.8-4 Overlap of Projects and Activities with Oil and Gas Licence Blocks

| Operator (Licence Blocks) | Overlapping Projects and Activities |
|--|---|
| Caithness Petroleum Ltd (12 / 22b & 12 / 23b) | MORL Project SHEFA-2 subsea cable SHETL Hub |
| Suncor (12 / 28b & 12 / 27) | MORL Project MORL WDA SHETL Hub |
| Sendero (12 / 21) | MORL Project MORL WDA BOWL |

15.8.4.6 Operators have yet to explore the potential of the licence blocks and their exploration plans are currently unknown. Discussion is ongoing with one licence holder, Caithness Petroleum Ltd, and MORL is seeking to initiate communications with Suncor and Sendero (licences awarded late in MORL EIA process) in order to understand their exploration plans. It is possible that the licence holders may wish to undertake seismic surveys within their licence blocks; if this is the case, survey activity would be excluded from construction locations (and the associated safety zones) within the wind farm and hub sites, where construction may be concurrent. With a low sensitivity (assuming there is a degree of flexibility in terms of when seismic survey is undertaken and a variety of survey techniques that may be employed) and negligible magnitude (exclusion would be temporary), the potential effect is deemed to be of **minor adverse significance**.

Damage to Subsea Cables

15.8.4.7 Both the proposed MORL export cable and the proposed SHETL cable (from the offshore SHETL hub to the southern Moray Firth coastline) will need to cross an existing SHEFA-2 telecommunications cable. As part of the cable installation process, the following activities could impact upon the SHEFA cable:

- Cable installation and protection activity (via trenching, jetting, ploughing, etc.);
- Vessel anchoring; and
- Debris clearance operations.

- 15.8.4.8 Damage to subsea cables is expensive to repair and can cause disruption to international telecommunications. As a result, the sensitivity of the receptor is considered to be high. The magnitude of the effect will be medium given that the SHEFA cable will have to be crossed. The unmitigated cumulative effect is therefore considered to be of **moderate adverse significance**.

Health and Safety Risk due to Unexploded Ordnance

- 15.8.4.9 There is potential for UXO associated with historic and current military activity to be encountered on the seabed in the area of all proposed offshore projects in the Moray Firth. During construction, activities which will have contact with the seabed, either directly (e.g. jack-up vessel) or via the placement of material (e.g. foundations or scour protection), run the risk of disturbing UXO with potentially damaging and dangerous effects to both employees and equipment. However, there is an obligation on those responsible for intrusive works to ensure that a comprehensive threat assessment is undertaken and risk mitigation measures are implemented with regard to all hazards on site. It is assumed that MORL, BOWL and SHETL will adhere to this obligation and as such any cumulative effect **will not be significant**.

Operation

Effects on Other Offshore Wind Farms

- 15.8.4.10 Activity associated with the operation of the MORL and BOWL proposed wind farm sites and the SHETL hub will be significantly reduced relative to the construction / decommissioning phases. Monitoring and maintenance vessels will require access, with any exceptional maintenance activity likely to have a temporary 500 m exclusion zone imposed around the relevant structure. It is theoretically possible for there to be an overlap between temporary exclusion zones associated with the proposed wind farm sites and the hub. The potential for two or more maintenance events occurring concurrently is considered extremely unlikely and in light of established and ongoing coordination of works by MORL, BOWL and SHETL, **no significant cumulative effect** is predicted.

Effects on Military Practice and Exercise Areas

- 15.8.4.11 As per the text above relating to 'construction / decommissioning' effects, consultation responses to date indicate that there will be **no significant cumulative effect** on PEXA in the Moray Firth.

Effects on Oil Operations and Structures

- 15.8.4.12 As detailed above, the intentions of oil and gas block licence holders are currently unknown. Should licence holders seek to commence block exploration once the wind farms and hub are operational, it is expected that activities such as seismic survey will be spatially restricted by the presence of turbines and platforms and any associated safety zones. With a medium sensitivity and magnitude, the likely effect is deemed to be of **moderate adverse significance**.

Damage to Subsea Cables

- 15.8.4.13 During the operational phase, there is the potential for disturbance to subsea cables from maintenance activities, such as foundation and cable repair work

which could entail the use of jack-up vessels and the deployment of anchors. It is expected that any such activity will be subject to the same principals and agreements as established under construction.

- 15.8.4.14 The likelihood for damage to existing cables during such maintenance work is therefore remote and consequently the magnitude of effect is considered to be low. Damage to submarine cables is expensive to repair and can cause disruption to telecommunications and therefore, the value and sensitivity will be high. As a result the likely cumulative effect will be of a **minor adverse significance**.

Health and Safety Risk due to Unexploded Ordnance

- 15.8.4.15 Any seabed UXO will have previously been identified and the risk mitigated prior to Project construction. Cumulative effects will not be significant during operation.

15.8.5 Western Development Area and Other Projects and Activities

- 15.8.5.1 Wherever possible, the effects of the MORL WDA, SHETL Hub and potential development activities in oil and gas licence blocks have been taken into account in the assessment presented above. On the basis of there being limited information available about the development of the SHETL Hub or about the plans of oil and gas operators holding licence blocks in the Moray Firth, assessment has been necessarily precautionary (i.e. overlap between activities and developments is assumed, and it is also assumed that oil and gas operators intend to undertake development activities such as seismic surveys within their licence areas).

This page has been intentionally left blank.