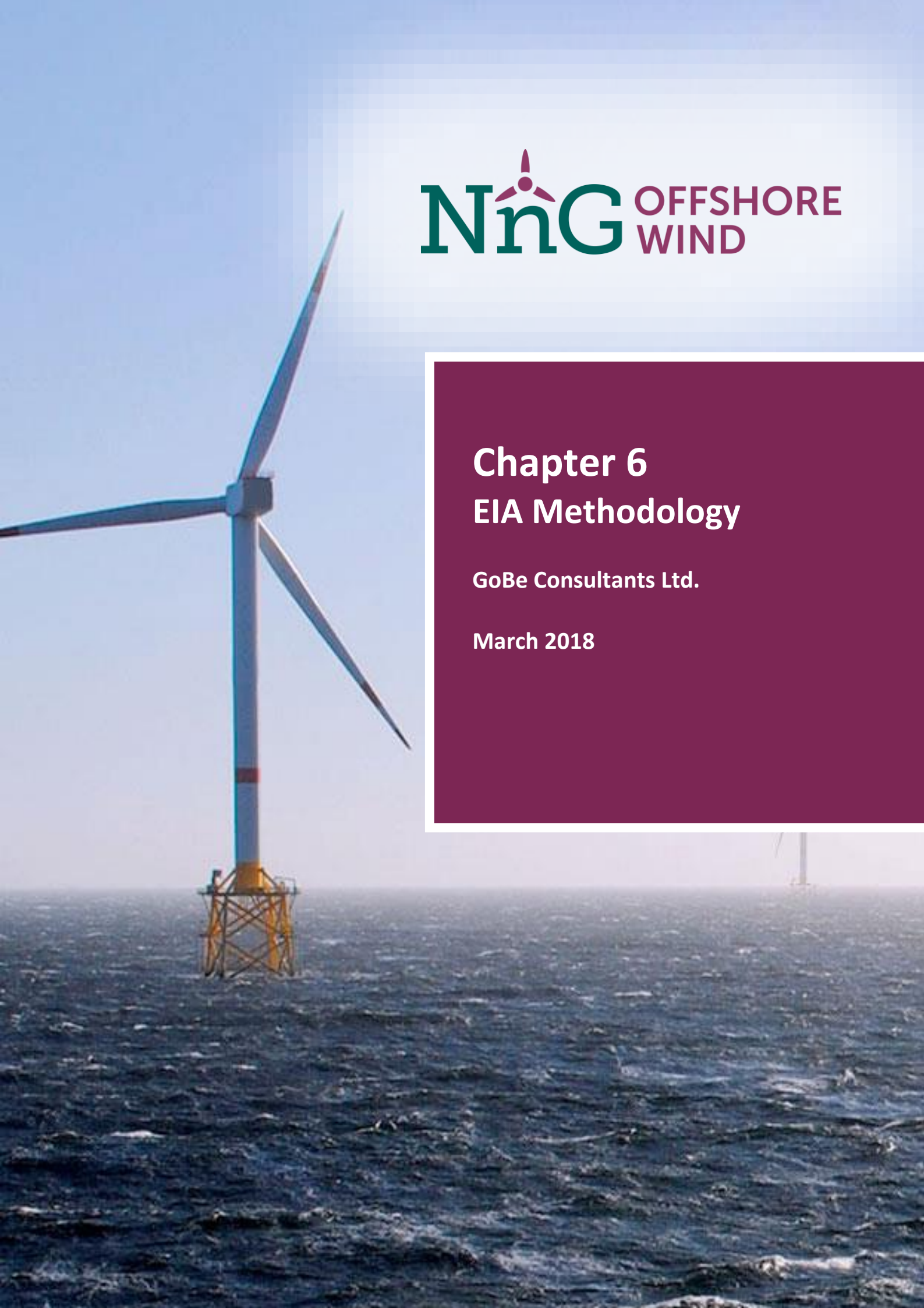

NnG OFFSHORE WIND

# Chapter 6
## EIA Methodology

**GoBe Consultants Ltd.**

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# 6 Environmental Impact Assessment Methodology

## 6.1 Introduction

1. Under European legislation, transposed into UK and Scottish law (see Chapter 3: The Need for the Project, Site Selection and Alternatives for further information), it is a requirement to undertake an Environmental Impact Assessment (EIA) for certain projects, to identify likely significant effects that may arise as a result of the Project and, where necessary, to propose measures to prevent, reduce or offset these effects.
2. This EIA Report supports an application for consent for the Project (under Section 36 of the Electricity Act 1989) and Marine Licences (one for the Offshore Wind Farm and a second for the Offshore Transmission Works) under the provisions of Part 4 of the Marine (Scotland) Act 2010). As outlined in Chapter 1: Introduction (Section 1.4.1), a previous, separate EIA (NnGOWL, 2012) was undertaken to underpin the Original Application for an offshore wind farm, which was submitted in 2012 to Marine Scotland. After submission of an Addendum to the EIA in 2013, consent was granted for this application in 2014 (the Originally Consented Project).
3. A separate EIA was submitted to assess the potential environmental impacts of the associated OnTW (covering the area from the MLWS to the onshore substation) in support of a planning application, under the Town and Country Planning (Scotland) Act 1997, which was made to East Lothian Council (ELC) in 2012. NnGOWL was granted planning permission for the OnTW in June 2013 (12/00922/PM) with the permission subsequently amended by a Section 42 application which was granted in November 2015 (15/00634/PM). The permission was implemented in August 2016.
4. This EIA Report considers inter-related effects of the offshore components of the Project together with any relevant impacts arising from the OnTW, as consented.

## 6.2 The Need for EIA

5. The EIA requirements relevant to an application for Section 36 consent are enacted by the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 and in relation to marine licensing by The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017. These Regulations came into force on 16th May 2017 and set out the statutory process and requirements for EIA in accordance with the new EIA Directive.
6. A request for a Scoping Opinion was submitted to MS-LOT on the 15th of May 2017 (i.e. prior to the regulations noted above coming into force) and therefore the transitional arrangements set out within the regulations apply to the Project (meaning that certain aspects of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 and the Marine Works (Environmental Impact Assessment) Regulations 2007 (the 2000 EIA Regulations and the 2007 EIA Regulations respectively) continue to apply (i.e. in relation to the scope of an Environmental Statement (now referred to as an EIA Report)).
7. The requirement to undertake an EIA for a given type of development is set out in the EIA Directive and corresponding Scottish Regulations. For some types of development (i.e. those listed in Annex I of the EIA Directive and Schedule 1 of the EIA Regulations) EIA is mandatory but for others (i.e. those listed in Annex II of the EIA Directive and Schedule 2 of the EIA Regulations) EIA may be required, subject to screening by the competent authority. An offshore wind farm falls within Annex II of the EIA Directive

(as "an installation for the harnessing of wind power for energy production (wind farms)"). NnGOWL has opted not to request a screening opinion and due to the scale and location of the Project has voluntarily undertaken and EIA.

8. In addition to the primary EIA legislation listed above, other legislation may be relevant to the EIA process in so far as it determines the sensitivity of a given receptor (principally in relation to nature conservation designation) as well as requiring, in certain cases, separate assessment in relation to the implications of the Project on features designated under the respective legislation. This includes, but may not be limited to, the following:

- The Conservation (Natural Habitats, &c.) Regulations 1994;
- The Conservation of Habitats and Species Regulations 2017;
- The Conservation of Offshore Marine Habitats and Species Regulations 2017;
- Wildlife and Countryside Act 1981; and
- Nature Conservation (Scotland) Act 2004.

9. These and other, related legislative instruments and frameworks are discussed in more detail in Chapter 2: Policy and Legislation, as well as in individual topic chapters where appropriate.

## 6.3 EIA Guidance and Best Practice

10. A variety of guidance and best practice documents have been developed to assist with the production of a 'fit for purpose' EIA, both in relation to the generic EIA process, and specifically in relation to the EIA of offshore wind farm developments in UK waters. The EIA process reported in this EIA Report has been completed in recognition of the various guidance, including but not limited to, the following:

- Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU) (EC, 2017);
- Guidance for Marine Licence Applicants - Version 2 (Marine Scotland, 2015);
- A Handbook on Environmental Assessment. Guidance for competent authorities, consultees and others involved in the Environmental Assessment Process in Scotland (Scottish Natural Heritage, 2013 – 4th Edition);
- Environmental impact assessment for offshore renewable energy projects (British Standards Institute (BSI), 2015);
- Guidelines for Environmental Impact Assessment (Institute of Environmental Management and Assessment (IEMA), 2004);
- Guidelines for Ecological Impact in Britain and Ireland. Marine and Coastal. (IEEM, 2010);
- Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy projects (Centre for Environment, Fisheries and Aquaculture Science (Cefas), 2012);
- A Review of Assessment Methodologies for Offshore Wind Farms (COWRIE METH-08-08) (Maclean et al., 2009);
- Cumulative Impact Assessment Guidelines – Guiding Principles for Cumulative Impacts Assessment in Offshore Wind Farms (Renewable UK, 2013); and
- A Strategic Framework for Scoping Cumulative Effects (Marine Management Organisation (MMO), 2014).

11. Additionally, specific guidance is available for certain individual topics (for example, landscape, seascape and visual impact assessment, ornithology, aviation etc.) and these have been referenced where applicable within the relevant topic chapters (Chapters 7 to 15).

## 6.4 The EIA Process

12. An EIA is intended to identify, describe and assess, the direct and indirect likely significant effects of a proposed project on the receiving environment (and specifically on the receptors listed under the relevant regulations – but broadly summarised as effects on the physical, biological and human environments).

13. The process includes preparation of an EIA Report by the project proponent and consultation on the EIA Report by the Scottish Ministers. The findings of the EIA Report and responses to the consultation are then considered during the determination process by the Scottish Ministers prior to a decision being made on the applications for consent.

14. The key steps undertaken in the EIA process can be summarised as follows (SNH, 2013):

- Gathering of relevant baseline environmental information: describes the existing environmental and social conditions of the development site as a basis for the impact assessment process;
- Description of the development: setting out the proposed project in relation to the construction, operation and decommissioning phases;
- The impact assessment process: identifying and assessing the potentially significant effects that could arise from the Project – direct and indirect, alone and cumulatively, including any inter-related effects;
- Mitigation and residual effects: for potentially significant effects, identifying mitigation to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment reduce or compensate for that effect, and the subsequent assessment of the residual level of significance;
- Monitoring: identifying, in relation to potentially significant effects, requirements for any monitoring studies.
- Publication of the EIA Report;
- Consultation with key bodies; and
- Consideration of consultation and decision-making.

15. The EIA process is informed through ongoing consultation and engagement with relevant stakeholders throughout the EIA process (see Chapter 5: Scoping and Consultation).

## 6.5 The Impact Assessment Methodology

16. The assessment of potential effects arising from the Project is intended to evaluate those changes to baseline conditions that could occur above the level of background environmental variation (positive or negative), and the level of significance at which they may occur (this being a product of the magnitude of the change and the sensitivity of a receptor to that change). Effects that are considered significant may be considered material to the decision-making process and may require mitigation to reduce the significance of the effect to an acceptable level.

### 6.5.1 Key Principles of the Assessment

17. The assessment of each topic is presented as a separate chapter within the EIA Report (Chapters 7 to 15).

18. Each topic chapter includes the following sections (as appropriate to each topic):

- Guidance, Policy and Legislation: provides a summary of the relevant legislation, national policy and guidance that have been taken into account in assessing each individual topic;
- Data Sources: provides a summary of the data sources used to inform the baseline description;

- Relevant Consultation: provides a summary of the topic-specific consultation responses received to date and outcomes of the Scoping process (both formal EIA Scoping and subsequent discussions with consultees);
- Impact Assessment Methodology: provides detail confirming the extent of the study area and topic specific detail on the approach to the impact assessment;
- Baseline Description: provides a description of the existing environment;
- Impact Assessment: presents the key design envelope parameters for assessment (the most likely (or realistic) worst-case scenario (See Section 6.5.3) and identifies the potential impacts to be addressed. This section goes on to present the magnitude of the potential impacts that may arise during the construction, operation and decommissioning of the Project, taking account of any embedded mitigation measures, and presents the subsequent significance of the effects. An assessment of any cumulative impacts arising from interaction with other projects, plans or activities is also presented;
- Mitigation and Residual Impacts: identifies any relevant additional mitigation measures (i.e. those beyond the embedded mitigation) necessary to avoid, prevent or reduce and, if possible, offset likely significant adverse effects and presents the residual effects; and
- Monitoring Requirements: sets out any proposals for the monitoring of potentially significant effects.

### 6.5.2 Evidence Based Approach

19. The evidence based approach to EIA involves utilising existing data and information from sufficiently similar or analogous studies to inform baseline understanding and/or impact assessments for a new project. In this way, the evidence based approach does not always require new data to be collected, or new modelling studies to be undertaken, in order to characterise the potential impact with sufficient confidence for the purposes of EIA.

20. The Project boundary is identical to the boundary for the Originally Consented Project. Therefore, the majority of the data and information collected for the purposes of conducting the Original EIA, as set out in the Original ES (NnGOWL, 2012), remain a valuable source of evidence to inform the assessment of likely significant environmental effects associated with the Project and, where relevant to the scope of this EIA Report, have been used to inform the EIA process. Where the original data was considered inadequate, or required updating as indicated by the Scottish Ministers in the Scoping Opinion, further baseline data has been used as the basis of the assessment. The available information has been used to:

    - Characterise the baseline environment to inform the EIA;
    - Scope out impacts where there is clear evidence to do so (see Chapter 5: Scoping and Consultation); and
    - Where impacts have been scoped into this EIA Report, to draw upon the existing evidence base and previous impact assessment work as a basis for conducting the EIA as set out in this EIA Report.

21. The use of existing data is encouraged as part of the offshore wind industry's response to government drivers to reduce the cost of offshore wind energy.

### 6.5.3 The Design Envelope Approach

22. The nature of offshore wind farm projects, where consent is applied for several years before construction can commence, has the potential to leave the developer unable to use the up-to-date technology or installation methods that were not available at the time of assessment. In addition, since the EIA process and EIA Report are completed before the full, detailed technical engineering assessment of the site has been undertaken, uncertainty inevitably remains with regard to the optimal

engineering solutions such as, for example, installation techniques, foundation types and specification of turbines.

23. To minimise unnecessary constraints on the design and construction methods which can be ultimately utilised, often with environmental benefits, it has become common practice to define a 'Design Envelope'.

24. The adoption of a Design Envelope approach allows a meaningful EIA to be completed based on design parameters that are not finalised at the time of writing, but are indicated within a range of potential values. As long as the final technical and engineering parameters for the Project fall within the limits of this envelope, such that the final scheme gives rise to environmental effects that are no greater than those predicted within the EIA, then these parameters are considered to fall within the scope of the consent granted.

25. For each of the impacts assessed within the topic chapters (Chapters 7 to 15), the most likely (or realistic) worst-case scenario is identified from the range of potential options for each parameter as set out in Chapter 4: Project Description. The most likely worst-case scenario selected, described and assessed in each topic chapter is therefore the most realistic scenario which would give rise to the greatest potential impact. If, after undertaking the impact assessment, it is shown that no significant effect is anticipated, it can be assumed that any design parameter values equal to or less than those assessed in this most likely worst-case scenario will have environmental effects of the same level or less than those described by the EIA. Often, the application of a Design Envelope results in a precautionary approach being applied to the assessments due to the various unknowns at different stages (e.g. precautionary noise contours applied along with precautionary approach using generalised fish spawning grounds resulting in a precautionary level of effect being determined).

26. By employing the design envelope approach, NnGOWL seeks to undertake a robust EIA while retaining a reasonable level of flexibility in the final design of the Project, within certain maximum extents and ranges, all of which are fully assessed in this EIA Report. This approach ensures that the Scottish Ministers can be confident that the maximum environmental impacts that could arise from the Project are described and that any scheme subsequently brought forward will give rise to environmental effects that are no greater than (and probably less than) those set out in this EIA Report.

### 6.5.4 Measures Envisaged to Avoid, Prevent, Reduce and Where Possible Offset Significant Adverse Effects (Mitigation)

27. The EIA Regulations require that where significant effects are identified, then a description of the measures envisaged to avoid, prevent or reduce and, if possible, offset likely significant adverse effects, should be included in the EIA Report.

28. The iterative approach to EIA employed in this EIA Report has involved a feedback loop during the impact assessment process. A specific impact has initially been assessed for its significance of effect, and if this is deemed significant and adverse in EIA terms, measures are considered, where possible, that could act to reduce the level of effect. The assessment is then repeated until:

- The effect has been reduced to a level that is not significant in EIA terms; or
- No further changes may be made in order to reduce the significance of the effect. In such cases, an overall effect that is still significant in EIA terms may be presented.

#### 6.5.4.1 Embedded Mitigation

29. Through the iterative EIA process and in light of the findings of the Original EIA and subsequent consent determination process, NnGOWL has identified a variety of measures that have been 'embedded' into the Project design and have been termed 'embedded mitigation'. This embedded mitigation is included within the Project design and therefore is considered as being in place when undertaking the EIA process and assigning the significance to a given effect through the assessment

process. A list of relevant embedded mitigation measures is included in each of the topic chapters (Chapters 7 to 15).

30. In addition, embedded mitigation measures that were included for topics that were scoped out of the EIA Report, as listed in the Scoping Report (NnGOWL, 2017), are set out in Chapter 5; Scoping and Consultation.

#### 6.5.4.2 Anticipated Consent Condition Commitments

31. Various conditions were applied to the Originally Consented Project. NnGOWL recognises that MS-LOT may wish to apply similar conditions to new consents and expects these to reflect the main requirements of the conditions applied to the Originally Consented Project.

32. NnGOWL anticipates a condition requiring the Project to be constructed and operated in accordance with the Project EIA Report and the requirement for the following plans to be submitted for approval, which act to limit the final design of the Project to that detailed within the design envelope:

- Construction Programme (CoP) to confirm the timing and programming of construction;
- Design Specification and Layout Plan (DSLP) detailing the final specification and layout of the wind turbine array and cable routes;
- Construction Method Statement (CMS) to confirm the installation methods and management of construction taking into account any required mitigation measures;
- Piling Strategy (PS) setting out the key pile parameters, installation method and mitigation to be applied during construction;
- Cable Plan (CaP) setting out the installation methods taking into consideration all environmental and navigational issues; and,
- Operation and Maintenance Programme (OMP) setting out the requirements and programme of ongoing operation and maintenance activities.

33. Where relevant, there are discussed further within the relevant topic chapters (Chapters 7-15).

#### 6.5.4.3 Additional Mitigation

34. In some instances, the EIA process may identify effects that are considered significant and for which additional mitigation measures are required. Where this is the case, additional mitigation measures are set out under the relevant assessments in each of the topic chapters (Chapters 7 to 15) and the residual significance with the additional mitigation in place is described.

### 6.5.5 Approach to Impact Assessment

35. The Project has the potential to create a range of 'impacts' and 'effects' with regard to the physical, biological and human environment. For this assessment, the term 'impact' is used to define a change that is caused by an action. For example, piling of turbine foundations (action) during construction, which results in increased levels of subsea noise (impact). Impacts can be classified as direct, indirect, secondary, cumulative and inter-related. They can be either positive or negative, although the relationship between them is not always straightforward. Definitions for each of these terms are provided in Table 6.1.

36. The term 'effect' is used in this assessment to express the consequence of an impact. For example, the piling of turbine foundations (action) results in increased levels of subsea noise (impact), with the potential to disturb, for example, marine mammals (effect).

37. The 'significance of effect' is determined by considering the magnitude of the impact alongside the importance, or sensitivity, of the receptor or resource, in accordance with defined significance criteria, which are set out in the following sections below.

Table 6.1: Definition of direct, indirect, secondary, cumulative, inter-related, positive and negative impacts (derived from IEEM, 2006)

| Term | Definition |
|---|---|
| **Direct impact** | Occurs as a result of activities undertaken in direct connection with the project. |
| **Indirect impact** | Occurs as a consequence of a direct impact (sometimes as part of a chain of events) and may be experienced at a point in space or time that is removed from the direct impact. |
| **Secondary impact** | Socioeconomic and cultural changes which may be experienced at a point in space or time that is removed from both direct and indirect impacts. |
| **Cumulative impact** | Impacts that result from incremental changes caused by other reasonably foreseeable actions alongside the project in question. This includes the impact of all other developments that were not present at the time of data collection (surveys etc.). |
| **Inter-related effects** | The impacts resulting from the inter-relationship of different topic-specific impacts upon the same receptor (e.g. where the impacts from noise and impacts from air quality affect a single receptor such as fauna). |
| **Positive or negative impacts** | Positive impacts merit just as much consideration as negative ones, for example as international, national and local policies increasingly press for projects to deliver positive biodiversity outcomes. Positive impacts can be considered for all the definitions above. |

38. The impact assessment process considers the following:

- The magnitude of the impact;
- The sensitivity of the receptor to the impact;
- The probability that the impact will result in a given effect;
- The significance of the resulting likely environmental effect; and
- The level of certainty inherent within the assessment.

#### 6.5.5.1 Determining Magnitude of Impacts

39. Predicting the physical impacts of wind farm construction, operation[1] and decommissioning activities on the environment is a critical step in the assessment process. It involves determining the magnitude of the potential physical changes and comparing it to baseline conditions. In this way, inferences can be made on future potential changes to the sensitive receptors.

40. The magnitude of impacts is quantified, where possible, and based on the characteristics set out in Table 6.2.

Table 6.2: Definition of the spatial extent, duration, frequency and reversibility when defining the magnitude of an impact (from IEEM, 2006)

| Term | Definition (after IEEM, 2006) |
|---|---|
| **Spatial extent of the impact** | Geographical area over which the impact may occur. |
| **Probability** | The chance of occurrence of an impact can be described as unlikely, possible, probably or definite. |
| **Duration of the impact** | The time over which an impact occurs. An impact may be described as short, medium or long-term and permanent or temporary. |
| **Frequency of the impact** | The number of times an impact occurs across the lifetime of a project. |

[1] For the avoidance of doubt, the term 'operation' is used throughout this EIA Report and includes any maintenance activities undertaken during the operational phase.

| Term | Definition (after IEEM, 2006) |
|---|---|
| **Reversibility of the impact** | An irreversible (permanent) impact may occur when recovery is not possible within a reasonable timescale, or there is no reasonable chance of action being taken to reverse it. By contrast, a reversible (temporary) impact is one where recovery is possible naturally, in a relatively short time period, or where mitigation measures can be effective at reversing the impact. It is possible for the same activity to cause both irreversible and reversible impacts. |

41. Consideration of these various characteristics allow the assessment of magnitude to take into account aspects such as whether a change as a result of the Project is localised or widespread, one-off or continuous, the scale of the change and whether or not it is reversible (i.e. temporary or permanent). It also takes account of the probability of an impact having an effect on a given receptor.

42. Based on the above criteria, the magnitude of impact is assessed as being within one of four impact severity groups, and can be either beneficial or adverse:

- Negligible;
- Low;
- Medium; or
- High.

43. Example definitions for each of these categories is set out in Table 6.3 below, derived from the Design Manual for Roads and Bridges (DMRB) (Highways Agency et al., 2008). However, in this EIA Report, topic specific definitions for each of these categories are provided in each of the topic chapters (Chapters 7 to 15), the topic-specific definitions drawing upon relevant guidance and other material, including specialist knowledge, relevant to each specific topic.

Table 6.3: Definition of terms relating to the magnitude of impacts (adapted from Highways Agency et al., 2008)

| Magnitude of impact | Description (adverse) | Description (beneficial) |
|---|---|---|
| **High** | Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements. | Large scale or major improvement or resource quality; extensive restoration or enhancement; major improvement of attribute quality. |
| **Medium** | Loss of resource, but not adversely affecting integrity of resource; partial loss of/damage to key characteristics, features or elements. | Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality. |
| **Low** | Some measurable change in attributes, quality or vulnerability, minor loss of, or alteration to, one (maybe more) key characteristics, features or elements. | Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring. |
| **Negligible** | Very minor loss or detrimental alteration to one or more characteristics, features or elements. | Very minor benefit to, or positive addition of one or more characteristics, features or elements. |
| **No change** | No loss or alteration or characteristics, features or elements; no observable impact in either direction. | |

#### 6.5.5.2 Determining Receptor Sensitivity (or Vulnerability)

44. Sensitivity, or vulnerability, is used to describe the susceptibility of a given receptor to a change in baseline conditions brought about by an impact and the response of that receptor to the change. The sensitivity of a receptor is determined by consideration of a number of factors, which can include:

- Adaptability – the degree to which a receptor can avoid or adapt to an impact. Higher adaptability results in lower sensitivity;
- Tolerance – the ability of a receptor to accommodate temporary or permanent change. Higher tolerance results in lower sensitivity;
- Recoverability – the ability of a receptor to recover following exposure to an impact. Higher recoverability results in lower sensitivity; and
- Value – a measure of the importance of the receptor in terms of ecological, social/community and/or economic value. Higher value results in higher sensitivity.

45. The exact determination of sensitivity for any given receptor will vary according to the receptor in question, and as such will be defined on a receptor by receptor basis. Expert judgement may be applied to determine overall receptor sensitivity, taking into account relevant guidance, knowledge, legislation and protected status. Within the EIA Report, vulnerability is therefore attributed on a topic by topic basis within each of the Chapters 7 to 15.

46. The sensitivity of a receptor is defined within each topic on the following scale:

- Negligible;
- Low;
- Medium; or
- High.

47. Example definitions for each of these categories is set out in Table 6.4 below, derived from the DMRB (Highways Agency et al., 2008). However, in this EIA Report, topic specific definitions for each of these categories are provided in each of the topic chapters (Chapters 7 to 15), the topic-specific definitions draw upon relevant guidance and other material, including specialist knowledge, relevant to each specific topic.

Table 6.4: Definition of terms relating to the environmental value (sensitivity of the receptor) (adapted from Highways Agency et al., 2008)

| Value (sensitivity of the receptor) | Description |
|---|---|
| **High** | Very High or high importance and rarity, international or national scale and limited potential for substitution. |
| **Medium** | Medium importance and rarity, regional scale, limited potential for substitution. |
| **Low** | Low importance and rarity, local scale. |
| **Negligible** | Very low importance and rarity, local scale. |

#### 6.5.5.3 Evaluating the Significance of Effects

48. The significance of an effect, either adverse or beneficial, is determined using a combination of the magnitude of the impact and the sensitivity of the receptor and with due regard to any degree of uncertainty encountered in the assessment and the probability of an effect occurring. A matrix approach will normally be applied (see Table 6.5) unless otherwise described in the topic specific EIA methodology.

Table 6.5: Significance of potential effects

| | | Magnitude | | | |
|---|---|---|---|---|---|
| | | High | Medium | Low | Negligible |
| Sensitivity | High | Major | Major | Moderate | Minor |
| | Medium | Major | Moderate | Minor | Negligible |
| | Low | Moderate | Minor | Minor | Negligible |
| | Negligible | Minor | Negligible | Negligible | Negligible |

49. For the purposes of this EIA Report, and unless otherwise stated in the topic specific chapters (7 to 15), effects rated as being of either Moderate or Major significance are considered to be potentially significant in EIA terms and therefore may require further consideration and/or mitigation.

50. The definitions of significance are set out in each of the topic chapters, but, as an example, definitions for each of these categories is set out in Table 6.6 below, derived from the DMRB (Highways Agency et al., 2008).

Table 6.6: Definition of significance levels (adapted from Highways Agency et al., 2008)

| Significance Term | Definition |
|---|---|
| **Negligible** | No effects or those that are beneath levels of perception. |
| **Minor** | These beneficial or adverse effects are generally, but not exclusively, raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project. |
| **Moderate** | These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse or beneficial effect on a particular resource or receptor. |
| **Major** | These beneficial or adverse effects are considered very important considerations and are likely to be material in the decision-making process. |

#### 6.5.5.4 Evaluating Uncertainty

51. When predicting the significance of an effect and understanding the significance judgment, it is important to establish any significant uncertainty encountered in the assessment process. This may arise from the data used within the assessment, the identification of activities and impacts, the confidence in determining impact magnitude and receptor sensitivity and ultimately in assigning significance levels of predicted resulting effects. Therefore, uncertainty is indicated within each topic chapter in relation to the assessment process.

## 6.6 Assessment of Cumulative Impacts

52. The EIA Directive requires the consideration of the potential impacts of a project not only in isolation but also how it might act cumulatively with other plans or projects to create a cumulative impact greater than or different to that of each individual project.

53. The term cumulative assessment is used in this EIA Report to describe the assessment of incremental changes caused by other reasonably foreseeable actions alongside the Project. The term 'in-combination' is reserved for use in the context of the separate Habitats Regulations Assessment (HRA) requirements and therefore, to avoid confusion, is not used in this EIA Report.

54. The following sections set out the approach to Cumulative Impact Assessment (CIA) in this EIA Report, and as set out in detail in each of the topic specific chapters (Chapters 7 to 15). It sets out the following:

- Cumulative impact assessment legislation and guidance;

- The role of the Forth and Tay Offshore Wind Developers Group (FTOWDG); and
- The approach to cumulative impact assessment.

### 6.6.1 Cumulative Impact Assessment Legislation and Guidance

55. The current EIA Regulations require that a description of the likely significant cumulative effects of a project should be considered. This requirement is also set out within the SNH EIA Handbook (SNH, 2013) (with further topic-specific guidance, for example in relation to cumulative landscape and seascape visual impact assessment, also available). Other relevant guidance includes:

    - IEEM (2010) Guidelines for Ecological Impact Assessment in Britain and Ireland. Marine and Coastal. Final Version 5. August 2010;
    - European Commission (1999). Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions;
    - SNH (2005) *Cumulative Effects of Wind Farms. Version 2 Revised 13.04.05;*
    - SNH (2012). Assessing the Cumulative Impact of Onshore Wind Energy Developments;
    - Renewable UK (2013). Cumulative Impact Assessment Guidelines. Guiding Principles for Cumulative Impacts Assessment in Offshore Wind Farms. June 2013;
    - BSI (2015). PD 6900:2015. Environmental impact assessment for offshore renewable energy projects – Guide; and
    - King, S., Maclean, I.M.D., Norman, T., and Prior, A. (2009). Developing Guidance on Ornithological Cumulative Impact Assessment for Offshore Wind Farm Developers. COWRIE.

56. The approach to CIA undertaken for the Project takes into account some of the principles outlined in the Renewable UK guidelines (Renewable UK, 2013) in addition to the requirements set out in the legislation and statutory guidance documents together with the commentary provided on cumulative impact assessment in BSI guidance (BSI, 2015).

### 6.6.2 The Forth and Tay Offshore Wind Developers Group

57. The developers of the major offshore wind farm projects in the outer Forth and Tay (NnG, Inch Cape and Seagreen) cooperated prior to submitting their respective applications for the original consents through the FTOWDG, formed specifically to assist collaboration and cooperative working to inform cumulative assessments.

58. FTOWDG developed a guidance document setting out the proposed approach for assessing the cumulative impacts and to guide some aspects of the individual project EIAs. The document *Scottish Territorial Waters Offshore Wind Farms – East Coast. Discussion Document – Cumulative Effects Assessment w*as produced in 2009 and a second version was produced in 2010. These documents defined areas where the developers could work collaboratively in developing an approach to considering cumulative (and in-combination) impacts. The approach was followed in undertaking the cumulative assessments for the Original ES.

59. Where appropriate, the approaches developed through FTOWDG, and applied in the Original ES, have equally been applied to the cumulative assessment for this EIA Report.

### 6.6.3 Approach to the Cumulative Impact Assessment

60. The following section sets out the approach taken to the CIA for the EIA Report including details relating to the:

    - Approach to assessing the other Forth and Tay offshore wind farm projects;
    - Screening of the CIA (including identification of other offshore and onshore plans or projects that may have CIA); and

- The approach to conducting the CIA.

#### 6.6.3.1 The Firth of Forth and Tay Offshore Wind Farms

61. There are currently several major offshore wind farm proposals in the Firths of Forth and Tay: Inch Cape, Seagreen and NnG as shown in Figure 4-4, Volume 2.

62. The original consents issued by Scottish Ministers in 2014 in relation to the Inch Cape and Seagreen Alpha and Bravo Offshore Wind Farms, along with NnG, were subject to lengthy Judicial Review proceedings. In parallel with the Judicial Review proceedings, NnG, Inch Cape and Seagreen all submitted requests for scoping opinions, accompanied by Scoping Reports, seeking an opinion on the matters to be addressed in an EIA Report to accompany new consent applications. It is the current understanding that these new applications are likely to be submitted to Scottish Ministers in the coming months.

63. Based on information set out in the respective Scoping Reports, NnGOWL understands that these applications will be for revised project design envelopes (when compared to the originally consented projects) (a summary of the project details for Inch Cape and Seagreen is presented in Chapter 4: Project Description).

64. The potential for cumulative impacts with these projects is considered in this EIA Report and it is it is understood that each developer only intends to progress either the original consented project or the revised project design.

65. In order to address this in the CIA, NnGOWL has for most topics presented the worst case scenario i.e. the new applications or the existing consents. In some topics, two CIA scenarios are presented, based on the Project with:

    - Inch Cape and Seagreen as consented in 2014; and
    - Inch Cape and Seagreen revised designs for their forthcoming applications.

66. NnGOWL, by presenting the full range of cumulative scenarios with the other offshore wind farms in the Firths of Forth and Tay, has set out the full information on the theoretically possible worst-case cumulative impacts that could arise for each of the topics considered (the specific CIA scenarios being set out in each topic chapter).

67. However, it is equally important to understand what represents the theoretical worst-case and what is in fact the more realistic scenario. In most (but not necessarily all) cases, the worst case will be represented by the originally consented parameters (the original projects having a design envelope allowing for a substantially greater number of turbines. However the other Forth and Tay projects will be seeking the lowest cost design solution in order to be competitive in seeking a CfD from the UK Government. This can be achieved most effectively by the use of the most up-to-date offshore wind technology, which is represented by the revised designs set out in the currently proposed projects rather than the worst-case designs defined by the original consents. It is therefore considered extremely unlikely that a scenario where the projects are built to the extent of their 2014 consents will occur. Nevertheless, as those consents do currently stand, they are considered and assessed in this EIA Report.

68. To aid the interpretation of the CIA scenarios with regard to the Forth and Tay projects, each topic assessment, where necessary, provides additional commentary on the cumulative impacts in this regard, highlighting the likelihood of the maximum theoretical worst-case occurring compared to the more realistic worst-case.

#### 6.6.3.2 Screening of Other Plans and Projects

69. In addition to the Firth of Forth and Tay offshore wind projects, other major developments (both onshore and offshore) in the area should be taken into account, including those which are:

- Under construction;
- Consented application(s), but not yet under construction;
- Submitted application(s) not yet determined;
- Projects identified in a relevant development plan (and emerging development plans - with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals will be limited; and
- Identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.

70. A 'long list' of other plans and projects with which the Project may interact to produce a cumulative impact during any of the construction, operation or decommissioning phases was presented in the Scoping Report (NnGOWL, 2017) and has been amended, where relevant, in light of the Scoping Opinion (MS-LOT, 2017).

71. For each project included on the long list, the following information has been compiled (where it is publicly available): project name, information source, confidence in project data, scale / capacity, status of the development, known planned construction programme, and distance to the Project.

72. These plans and projects have been considered for inclusion within the CIA presented in each topic chapter based on the potential for cumulative impacts to occur with the Project when considering the potential interaction, the physical overlap and the temporal overlap (as well as the level of detail available for any given plan or project).

73. In relation to the potential interaction, for a cumulative effect to occur it must be established that a cumulative impact has the potential to directly or indirectly affect the receptor(s) in question i.e. there must be an impact-receptor-pathway. Each project, plan and activity on the 'long list' has been considered on a topic by topic basis in order to evaluate the potential for a relevant receptor-impact pathway in screening that plan or project into a particular topic specific cumulative assessment.

74. In many cases, for a cumulative impact to arise there must be a physical overlap in the extents of the impact from each particular project in relation to the effect on any given receptor. Where such a physical overlap cannot occur, a particular plan or project can be screened out of the topic specific cumulative assessment (note that exceptions to this can occur for certain mobile species such as marine mammals that may move between areas impacted by separate projects).

75. Temporal overlap relates to the overlap in time of a given impact arising on a particular receptor. For example, impacts arising from construction (such as piling noise) will only result in direct cumulative effects with projects producing underwater noise at the same time, but might produce indirect cumulative effects where sequential piling from different projects affects the same receptor over an extended period. By contrast, collision risk for birds occur over a longer operational period and the likely temporal overlap with other potential plans or projects must be screened and assessed accordingly.

#### 6.6.3.3 The Cumulative Impact Assessment Methodology

76. In relation to each topic chapter, screening of projects on the long list is undertaken to identify those plans or projects that are considered relevant to the topic specific CIA; these topic specific lists are presented in each of the topic chapters. The list in each topic chapter also includes a summary of each of the screened in projects, plans and activities.

77. In general, the CIA methodology follows the outline of the stand-alone assessment methodology. This approach is employed in order to maintain consistency throughout the chapter and to allow relevant comparisons to be made. This approach, however, differs between topic chapters according to several factors, such as the nature of the topic, the cumulative projects, plans and activities included for that

topic, the data available for each project, plan and activity, and the specific practicalities around undertaking CIA for each particular topic.

78. Importantly, as part of the CIA process, the temporal status of the other projects, plans and activities has been considered in order to identify those that may have construction and/or operational periods that overlap the respective periods of NnG (again based on the publicly available information on the proposed timing of the other plans or projects). Such a consideration is particularly important for certain receptors (for example marine mammals), where the overlap of impacts during construction, such as noise from the piling activities of several large offshore developments, tends to be considered important. The details provided on the timing of other plans and projects represent the current understanding of programmes of development, though it is recognised that these programmes may be subject to change.

## 6.7 Inter-related effects

### 6.7.1 Approach to the assessment of inter-related effects

79. The EIA Regulations require consideration of the inter-relationships between topics that may lead to environmental effects. The Project EIA has therefore considered the inter-related effects resulting from the Project. Inter-related effects have been assessed through the consideration of the scope of all effects on a given receptor to interact, whether that be spatially or temporally, to result in an inter-related effect on that receptor. Such effects may be short-term, temporary or transient effects or incorporate longer term effects over the lifetime of the Project.

80. The approach adopted includes consideration of inter-dependencies for each topic, where one topic draws upon the findings of another assessment. To illustrate, the assessment of effects on commercial fisheries draws upon information from the shipping and navigation assessment in terms of navigation risk to fishing vessels and from the fish and shellfish ecology chapter in relation to ecological effects on target species. In this way, many of the inter-related effects are intrinsic to the assessments undertaken. Where relevant, this aspect is covered within each chapter, with specific attention drawn to other topic assessments upon which it relies. If there are additional effects from separately considered impacts acting together, these are considered qualitatively using professional judgement.

81. The approach to the inter-related assessment process can be summarised by the following key steps:

- Identification of relevant receptors from the individual impact assessments;
- Identification of potential inter-related effects on these receptor groups through a review of relevant assessment sections; and
- Presentation of an inter-related effects assessment identifying all potential effects on a given receptor during the construction, operation and decommissioning phases.

### 6.7.2 Assessment of the Onshore Components of the Project

82. As noted in Section 6.1, the onshore aspects of the Project (the OnTW) received planning permission from ELC in 2013 with an amended planning permission granted in 2015. The planning permission was implemented in 2016. The application for the planning permission for the OnTW was accompanied by a separate EIA. Consequently, the OnTW works are not considered as part of the EIA process presented in this EIA Report, which focuses on the offshore works as the subject of the application for S36 Consent and Marine Licences.

83. However, the requirement to consider the potential inter-related effects arising from the offshore works and the OnTW works is noted (and was scoped into the assessment in the Project Scoping Report). This reflects the requirements of the UK MPS (2011) which sets out the inter-relationship between marine and terrestrial planning regimes and requires that when the Scottish Ministers make

decisions that affect, or might affect, the marine area they must do so in accordance with the Statement.

84. This EIA has therefore considered the potential for inter-related effects to occur on onshore receptors as a result of effects arising from the offshore proposals and the OnTW on the same receptor. Specifically, this has been considered in respect of the following receptors:

- The visual impacts arising from the offshore works (i.e. the turbines and OSPs) on onshore receptors alongside the visual impacts of the OnTW works on those same receptors; and
- The visual impacts on the setting of cultural heritage assets at the coast arising from the offshore works (i.e. the turbines and OSPs) alongside the visual impacts of the OnTW works on those same receptors.

85. The spatial overlap of the separate consenting regime (the intertidal area between mean high-water springs and mean low water springs) is also addressed by a presentation of the effects on the intertidal area resulting from the offshore works (i.e. cable landfall) where relevant to the topics scoped into the EIA.

## 6.8 Transboundary Effects

86. The Scoping Report (NnGOWL, 2017) proposed that, given the location of the Project and the likely key receptors, potential transboundary effects would not be considered likely to occur and as such, no specific transboundary assessment would be presented. Therefore, no further specific transboundary assessments are presented in this EIA Report.

## 6.9 References

- BSI (2015) *Environmental impact assessment for offshore renewable energy projects – Guide.* Report Number PD 6900:2015
- Cefas (2012*) Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy projects (Final). Cefas.* Report reference: ME5403 – Module 15. Issue date: 2 May 2012
- EC (2017) *Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report* (Directive 2011/92/EU as amended by 2014/52/EU).
- EC (1999) *Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions*. Available from https://tethys.pnnl.gov/sites/default/files/publications/European-Commission-1999.pdf
- Highways Agency Scottish Government, Welsh Assembly Government and the Department for Regional Development Northern Ireland (2008) *Design Manual for Roads and Bridges (DMRB) Volume 11: Environmental Assessment*
- IEEM, (2010) *Guidelines for Ecological Impact in Britain and Ireland. Marine and Coastal.* (Council of the Institute of Ecology and Environmental Management).
- IEEM (2006) *Guidelines for ecological impact assessment in the United Kingdom* (Institute of Ecology and Environmental Management: Winchester, Hampshire).
- IEMA (2004) *Guidelines for Environmental Impact Assessment* (Institute of Environmental Management and Assessment St Nicholas House, 70 Newport, Lincoln).
- King, S., Maclean, I.M.D., Norman, T., and Prior, A. (2009). *Developing Guidance on Ornithological Cumulative Impact Assessment for Offshore Wind Farm Developers.* (COWRIE)
- Maclean I.M.D., Wright L.J., Showler D.A. and Rehfisch M.M. (2009) *A Review of Assessment Methodologies for Offshore Wind farms (COWRIE METH-08-08)* (Report commissioned by COWRIE Ltd., COWRIE, CIBIRD, London.)

- Marine Scotland (2015) *Guidance for Marine Licence applicants – Version 2*. Available from http://www.gov.scot/Resource/0052/00524064.pdf
- MMO (2014) *A Strategic Framework for Scoping Cumulative Effects. MMO Project No: 1055*. Available from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/389876/MMO1055_Report_Final.pdf
- NnGOWL (2012) *Neart na Gaoithe Offshore Wind Farm Environmental Statement. July 2012*; Doc Ref: 12/J/1/06/1664/1354. Available from http://marine.gov.scot/datafiles/lot/nng/Application/
- NnGOWL (2017) *Neart na Gaoithe Offshore Wind Farm Scoping Report. Dated May 2017.* Report ref: UK02-0504-0673-MRP-NNG SCOPING REPORT 2017-RPT-A1. Available from http://www.gov.scot/Topics/marine/Licensing/marine/scoping/NnGRev2017/NnG-ScopingReport-May2017
- RenewableUK (2013) *Cumulative Impact Assessment Guidelines – Guiding Principles for Cumulative Impacts Assessment in Offshore Wind Farms* (RenewableUK)
- Scottish Ministers (2017) *Scoping Opinion for the Proposed Section 36 Consent and Associated Marine Licence Application for the Revised Neart Na Gaoithe Cape Offshore Wind Farm and Revised Neart Na Gaoithe Offshore Transmission Works. Dated September 2017.* Available from http://www.gov.scot/Topics/marine/Licensing/marine/scoping/NnGRev2017/SO-092017
- SNH (2005) *Cumulative Effects of Wind Farms. Version 2 Revised 13.04.05*. Available from http://www.snh.org.uk/pdfs/strategy/cumulativeeffectsonwindfarms.pdf ;
- SNH (2013) *A Handbook on Environmental Assessment. Guidance for competent authorities, consultees and others involved in the Environmental Assessment Process in Scotland, 3rd ed.*