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Scoping Opinion

THE ELECTRICITY WORKS (ENVIRONMENTAL IMPACT ASSESSMENT) (SCOTLAND) REGULATIONS 2017 (AS AMENDED)

THE MARINE WORKS (ENVIRONMENTAL IMPACT ASSESSMENT) REGULATIONS 2007 (AS AMENDED)

SCOPING OPINION FOR THE PROPOSED SECTION 36 CONSENT AND ASSOCIATED MARINE LICENCE APPLICATION FOR THE REVISED SEAGREEN PHASE 1 OFFSHORE PROJECT

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Note regarding changes to the Environmental Impact Assessment Directive

On the 16 May 2017 the requirements of the 2014 amendment (2014/52/EU) to the Environmental Impact Assessment ("EIA") Directive were transposed by:

- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (herein referred to as 'The Electricity Works 2017') and

For projects from 0-12 nautical miles:

- The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (herein referred to as "The Marine Works 2017") and

For projects from 12-200 nautical miles:

- The Marine Works (EIA) Regulations 2007 were amended by The Marine Works (EIA) (Amendment) Regulations 2017 (herein referred to as "The Marine Works 2007 (as amended)")

The Electricity Works 2017 and The Marine Works 2017 (are hereinafter referred to together as "the 2017 EIA Regulations") were subsequently amended by:

- The Environmental Impact Assessment (Miscellaneous Amendments) (Scotland) Regulations 2017 which came into force on 30 June 2017 and introduced minor changes

The Electricity Works 2017 and The Marine Works 2017 regulations revoke The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 (as amended) ("The Electricity Works 2000) and The Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended) ("The Marine Works 2007") for Scotland (i.e. the Scottish marine area out to 12 nautical miles ("nm")). Past 12 nm in waters adjacent to Scotland, The Marine Works 2007 (as amended) are applicable.

These regulations contain transitional arrangements and revocations and provide that in certain circumstances they will apply, in a modified form, in cases pre-existing as of the 16 May 2017. This is where an applicant for a section 36 consent or a marine licence for an EIA project has, before the 16 May 2017, either – (1) submitted an environmental statement in connection with an application to the Scottish Ministers; (2) made a request to the Scottish Ministers for a scoping opinion in connection with the project; or (3) made a request to the Scottish Ministers for a screening opinion.

Seagreen Wind Energy Limited (“Seagreen”) submitted their Scoping Report on 15 May 2017 requesting a scoping opinion for their Revised Development which is outwith 12nm i.e. the Scoping Report does not refer to any works in the Scottish marine area (inside of 12nm). Therefore The Electricity Works 2017 and The Marine Works 2007 (as amended) apply under the transitional arrangements.

1 Executive Summary

This is the scoping opinion adopted by the Scottish Ministers as to the scope and level of detail of information to be provided in the Environment Impact Assessment report ("EIA report") for the proposed Seagreen Phase 1 Offshore Project as described in the Scoping Report submitted by Seagreen Wind Energy Limited ("Seagreen").

This document sets out the Scottish Ministers' opinion on the basis of the information provided in the Scoping Report of 15 May 2017. The scoping request relates to the Seagreen Phase 1 Offshore Project ("Revised Development") to be situated in the same area of the Firth of Forth as the previously consented Seagreen Alpha and Seagreen Bravo wind farms. It does not include the associated Offshore Transmission Works ("OfTW").

The previous offshore consents (Section 36 and Marine Licence) were granted in 2014 for the construction and operation of the Seagreen Alpha and Seagreen Bravo wind farms and associated OfTW in the Firth of Forth ("Original Development"). The wind farms had a potential generating capacity of up to 1050 megawatt ("MW"). These consents were subject to Judicial Review. Legal proceedings brought by the Royal Society for the Protection of Birds ("RSPB") are ongoing. The RSPB were initially successful in their challenge, however the decision was overturned by the Inner House Court of Appeal. It is not yet known whether the case will be heard by the Supreme Court. In parallel with the Judicial Review Seagreen intends to pursue a new consent application for the Revised Development. The Revised Development is intended to take advantage of new developments in relation to offshore wind technology, whilst at the same time being likely (because of the reduced scale and scope of the Project) to lead to a reduction in the associated potential environmental impacts (when compared to the Originally Consented Projects).

This opinion can only reflect the proposal as currently described by Seagreen. The matters addressed by Seagreen in the Scoping Report have been carefully considered and use has been made of professional judgment (based on expert advice from stakeholders and Marine Scotland in-house expertise) and experience in order to adopt this opinion. It should be noted that when it comes to consider the Environmental Impact Assessment Report ("EIA Report"), the Scottish Ministers will take account of relevant legislation and guidelines (as appropriate). The Scottish Ministers will not be precluded from requiring additional information if it is considered necessary in connection with the EIA Report submitted with the application for section 36 consent and associated marine licence.

This Scoping Opinion has a shelf life of 12 months from the date of issue. If an application is not received within 12 months then Seagreen must contact the Scottish Ministers to determine whether this Scoping Opinion requires updating.

The Scottish Ministers have consulted on the Scoping Report and the responses received have been taken into account in adopting this opinion. A series of scoping meetings were held with stakeholders and Seagreen to discuss the Scoping Report further. The Scottish Ministers are satisfied that the topics identified in the Scoping Report encompass those matters identified in Schedule 4 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 and Schedule 3 of the Marine Works (Environmental Impact Assessment) Regulations 2007, as required by the transitional arrangements of The Electricity Works 2017 and The Marine Works 2007 (as amended) regulations.

The Scottish Ministers draw attention to the general points and those made in respect of the specialist topics in this opinion. Where significant effects were identified in the Original Development Environmental Statement ("ES"), and the assessment remains relevant, these matters must still be reported in the forthcoming EIA Report, but may be scoped out of further assessment work. Matters are not scoped out unless specifically addressed and justified by Seagreen and confirmed as being scoped out by the Scottish Ministers. Detailed information is provided in the specialist topic sections.

2 Introduction

2.1 Background to this scoping opinion

2.1.1 We refer to your letter of 15 May 2017 requesting a scoping opinion from the Scottish Ministers under Regulation 7 of the Electricity Works 2000 and Regulation 13 and Schedule 4 of the Marine Works 2007. We note in paragraph 4.1 of the Scoping Report that there is text that states that the Revised Development will require assessment under The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017. This is incorrect. As the Scoping Report only refers to works outwith 12nm it is the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended) that will apply.

2.1.2 The request was accompanied by a Scoping Report containing a plan sufficient to identify the site which is the subject of the Revised Development and a brief description of the nature and purpose of the Revised Development and of its possible effects on the environment. The Scoping Report used the Original Development ES to provide an evidence base for scoping certain topics out using the following process:

- Review of 2010 Scoping Report
- Review of baseline assessed in 2012 ES
- Review of methodology used in 2012 ES
- Consideration of required updates resulting from updated baseline and/or methodology
- Review of changes resulting from amendments to the design envelope and consideration of the Site as a whole
- Review of the amended cumulative baseline

2.1.3 The Scoping Report was accepted on 16 May 2017.

2.1.4 Where it was previously agreed with consultees for the Original Development that effects were not significant the Scoping Report references the 2012 ES and those discussions to provide the evidence for the basis on which the detailed review of these matters will not be repeated. The same approach is proposed for the EIA Report for the Revised Development.

2.1.5 Where, following consultation with statutory consultation bodies and other environmental stakeholders, the Scottish Ministers have confidence that previous assessments may be relied upon to inform a conclusion that there will be no significant environmental effects, the Scottish Ministers are content to conclude that certain topics can be scoped out, as described in 2.1.2, from

the environmental assessment to be undertaken in relation to the Revised Development.

2.2 The requirement for Environmental Impact Assessment

2.2.1 Under The Electricity Works 2017 and the Marine Works 2007 (as amended), the Scottish Ministers are required to consider whether any proposal is likely to have a significant effect on the environment. Any proposal to construct or operate an offshore power generation scheme with a capacity in excess of 50 megawatt and which lies outside 12nm requires the Scottish Ministers' consent under section 36 of The Electricity Act 1989. The Revised Development falls under Schedule 2 of The Electricity Works 2017.

2.2.2 The Developer is required to give consideration to the UK Marine Policy Statement, Scotland's National Marine Plan ("NMP"), Scottish Planning Policy, other relevant Policy and National Policy Planning Guidance, Planning Advice Notes, the relevant planning authority's Development Plans and any relevant supplementary guidance.

2.3 The content of the scoping opinion

2.3.1 With regard to your request for a scoping opinion on the proposed content of the required EIA Report, the Scottish Ministers have, in accordance with The Electricity Works 2017 Regulations and The Marine Works 2007 (as amended), considered the documentation provided to date and consulted with the appropriate consultation bodies and scientific advisors (see Appendix I and II) in reaching their scoping opinion.

2.3.2 Please note that the EIA process is vital in generating an understanding of the biological, chemical and physical processes operating in and around the Revised Development site and those that may be impacted by the proposed activities. We would however state that references made within the scoping opinion with regard to the significance of impacts should not prejudice the outcome of the EIA process. It is therefore expected that these processes will be fully assessed in the EIA Report unless scoped out.

2.4 Duration of consent

2.4.1 The consent granted for the Original Development had an operational period of 25 years, the Revised Development is proposed to be 50 years. Scottish Ministers consider that the Original Development ES assessment of the effects of a 25 year consent duration is appropriate to inform decisions on scoping topics in and out of the EIA. The topic most likely to be affected by the increased consent duration is ornithology. In order to address this

Scottish Ministers advise that for the bird species of concern population modelling must be provided for both a 25 year and 50 year time period as detailed in section 9.6.4.

2.4.2 Seagreen are advised to identify and, if possible, quantify, the uncertainties associated with modelling population effects over different timescales.

2.5 Consent conditions

2.5.1 The Scottish Ministers recommend that Seagreen continue to engage with relevant stakeholders, prior to submission of any application, to help resolve any issues. Time could be saved during determination and post consent if agreement could be reached by both parties. Where disagreements remain it is suggested that Marine Scotland-Licensing Operations Team ("MS-LOT") are included in discussions.

3 Description of development

3.1 Background to Original Development application and consent

3.1.1 In 2014 Seagreen gained offshore consents (Section 36 consents and Marine Licences) for the construction and operation of the Seagreen Alpha and Seagreen Bravo generating stations, situated approximately 27 km and 38 km respectively offshore, east of the Angus coastline off the east coast of Scotland. At that time, the consents allowed for delivery of two offshore wind farm projects with a potential total generating capacity of up to 1,050 MW. Separate consents for the Seagreen Phase 1 Offshore Transmission works were obtained in 2014.

3.1.2 In 2012 Seagreen submitted an ES, and later an addendum ("2012 ES"), which presented the outcomes of the Original Development EIA and supported the Original Application. The outcomes of the 2012 ES were accepted as the basis for the determination of the offshore consents by the Scottish Ministers.

3.1.3 The consents are currently the subject of an ongoing Judicial Review.

3.2 Background to the new application

3.2.1 Seagreen is seeking consent for the Revised Development, which is located in the same area as the Seagreen Alpha and Seagreen Bravo wind farms (Figure 1). It will be comprised of an offshore array of Wind Turbine Generators ("WTGs"), connected to one another by subsea inter-array cables, which will in turn connect the WTGs to an Offshore Substation Platform ("OSP"), where power generated by the WTGs is transformed and subsequently carried to an offshore landfall location via Offshore Export Cables.

3.2.2 The Offshore Transmission works are not included in this scoping process. The Scottish Ministers advise that the transmission works will require further discussion.

3.3 Description of the Proposed Development

3.3.1 The Revised Development will comprise of an offshore generating station outwith 12 nm with a capacity of greater than 50 MW and therefore requires Scottish Ministers' consent under Section 36 of the Electricity Act 1989 ("Section 36 consent") to allow its construction and operation. The Revised Development will also require a Marine Licence granted by the Scottish Ministers under the Marine and Coastal Access Act 2009 to allow for the

construction and deposit of substances and structures in the sea and on the seabed.

3.3.2 The Revised Development will, in summary, consist of the following changes compared to the original application;

- The maximum generating capacity of the turbines increases from 7 MW, to up to 15 MW
- The number of turbines will decrease from a maximum of 150 to a maximum of 120
- The maximum rotor diameter increases from 122–167m to 220m
- The maximum hub height above Lowest Astronomical Tide (”LAT”) increases to 140m from 126m
- The maximum tip height above LAT increases to 280m from 209.7m
- The minimum separation distance from WTGs will increase from 835m to 1000m

3.3.3 The Scoping Report provides more detail on these changes.

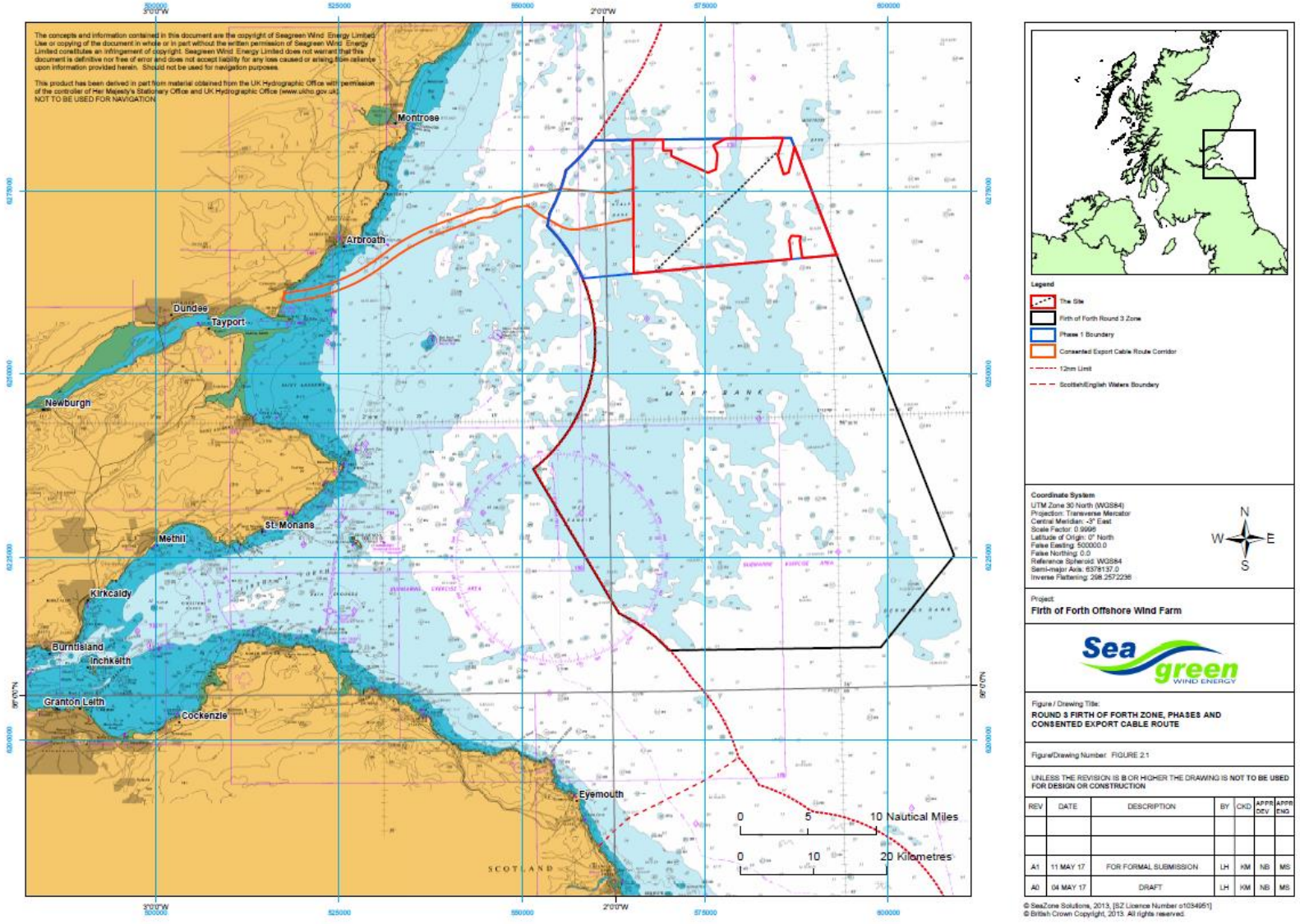

Figure 1 Location of the Revised Development.

4 Aim of this Scoping Opinion

4.1.1 Scoping is a key phase of the EIA process, providing an opportunity for the applicant to identify those potentially significant environmental effects that should be considered for further assessment in the EIA Report. This includes the scope of impacts to be addressed and the method of assessment to be used. The scoping process also allows consultees to have early input into the EIA process, to specify their concerns and to supply information that could be pertinent to the EIA process. In association with any comments herein, full regard has been given to the information contained within the Scoping Report.

4.1.2 The Scottish Ministers have also used this opportunity to provide advice in relation to the licensing requirements in addition to the EIA requirements (see Appendix VI).

5 Consultation

5.1 The consultation process

5.1.1 On receipt of the scoping opinion request documentation, the Scottish Ministers, in accordance with the EIA Regulations, initiated a 28 day consultation process, which commenced on 5 June 2017. The following bodies were consulted, those marked in **bold** provided a response, those marked in *italics* sent nil returns or stated they had no comments:

- **Angus Council "AC"**
- Atlantic Salmon Trust
- Babcock MCS Offshore
- **British Telecom Radio Network Protection Team "BT"**
- Carnoustie Community Council
- CHC Helicopters
- Civil Aviation Authority
- **Defence Infrastructure Organisation "DIO"**
- **Dundee City Council "DC"**
- **East Lothian Council "ELC"**
- **Fife Council "FC"**
- Fintry Community Council
- Fisheries Management Scotland
- Forth Ports
- Gullane Community Council
- Heathrow Airport Holdings Limited
- **Historic Environment Scotland "HES"**
- Joint Radio Company
- Letham & District Community Council
- **Mainstream Renewable Power Ltd "MRP"**
- Marine Safety Forum "MSF"
- Marine Scotland Compliance (Aberdeen)
- Marine Scotland Compliance (Anstruther)
- Marine Scotland Compliance (Eyemouth) "
- **Maritime and Coastguard Agency "MCA"**
- Monifeith Community Council
- Monikie and Newbigging Community Council
- *Murroes & Wellbank Community Council "MWCC"*
- **National Air Traffic Services "NATS"**
- National Trust for Scotland
- North East Regional Inshore Fishery Groups
- **Northern Lighthouse Board "NLB"**

- Prestonpans Community Council
- Red Rock Power Limited
- **Royal Society for the Protection of Birds "RSPB"**
- **Royal Yachting Association (Scotland) "RYA"**
- Salmon Net Fishing Association of Scotland
- **Scottish Borders Council "SBC"**
- Scottish Canoe Association
- Scottish Creel Fishermen Association
- **Scottish Environmental Protection Agency "SEPA"**
- **Scottish Fishermen's Federation "SFF"**
- Scottish Fishermen's Organisation
- Scottish Government Planning
- **Scottish Natural Heritage "SNH"**
- Scottish Surfing Federation
- Scottish Wildlife Trust
- Seagreen Wind Energy Ltd
- *Sport Scotland "SS"*
- Surfers Against Sewage
- **Tealing Community Council "TCC"**
- The Crown Estate Scotland
- Tranent & Elphinstone Community Council
- **Transport Scotland "TS"**
- *Transport Scotland Ports & Harbours "TS(P&H)"*
- **UK Chamber of Shipping "CoS"**
- Visit Scotland
- West Barns Community Council
- **Whale & Dolphin Conservation Society "WDC"**

5.2 Responses received

5.2.1 From the list above a total of 21 responses were received. Advice was also sought from Marine Scotland Science ("MSS") and their responses are attached in Appendix II. The purpose of the consultation was to obtain advice and guidance from each consultee or advisor as to which potential effects should be scoped in or out of the EIA.

5.2.2 A response from Tealing Community Council was received and provided comments on the onshore electrical transmission infrastructure. This infrastructure is not part of the new application but the comments have been noted and sent onto Seagreen for consideration.

5.2.3 The Scottish Ministers are satisfied that the requirements for consultation have been met in accordance with the EIA Regulations. The sections below highlight issues which are of particular importance with regards to the EIA Report. Full responses from consultees and MSS are attached in Appendix I and II, each should be read in full for detailed requirements. The Scottish Ministers expect all consultee concerns to be addressed in the EIA Report unless otherwise stated.

5.3 Meetings with stakeholders

5.3.1 A series of meetings were arranged in order to facilitate structured discussion between the Scottish Ministers, Seagreen and stakeholders. The meetings allowed for early engagement between stakeholders and Seagreen.

5.3.2 The meetings were topic related and covered marine mammals, natural fish and benthic ecology, commercial fisheries and ornithology. A further meeting between MS-LOT, MSS, SNH and RSPB was held on 19 July 2017 to discuss the ornithology receptor further, including common approaches to cumulative impact assessment, collision risk modelling, displacement assessment and non-breeding season effects etc. for all three Forth and Tay projects. A further teleconference meeting was held between MS-LOT, MSS, SNH and WDC on 22 August 2017 to have further discussions on marine mammals.

5.3.3 The aim of the meetings was to provide clarity and answer any questions the stakeholders had with regard to the Scoping Report. This allowed an opportunity to discuss issues in detail in advance of stakeholders completing their scoping responses. The meetings took the form of an overview from the developer and then a discussion on specific issues of concern.

5.3.4 The minutes of each meeting were recorded and these have informed the scoping opinion in addition to the formal consultee scoping responses.

6 Contents of the Environmental Impact Assessment Report

6.1 Requirements from the EIA Regulations

6.1.1 The Electricity Works 2017 and the Marine Works 2007 (as amended) require that the EIA Report is prepared by competent experts and must be accompanied by a statement from the applicant outlining the relevant expertise of qualification of those experts.

6.1.2 The EIA Report must be based on the Scoping Opinion and must include the information that may be reasonably required for reaching a reasoned conclusion, which is up to date, on the significant effects of the development on the environment, taking into account current knowledge and methods of assessment.

6.1.3 EU guidance on EIA identifies the following qualities of a good Environmental Statement (now known as an EIA Report):

- Includes a clear structure with a logical sequence, for example describing existing baseline conditions, predicted impacts (nature, extent and magnitude),scope for mitigation, agreed mitigation measures, significance of unavoidable/residual impacts for each environmental topic.
- Includes a table of contents at the beginning of the document.
- Includes a clear description of the development consent procedure and how EIA fits within it.
- Reads as a single document with appropriate cross-referencing.
- Is concise, comprehensive and objective.
- Is written in an impartial manner without bias.
- Includes a full description of the development proposals.
- Makes effective use of diagrams, illustrations, photographs and other graphics to support the text.
- Uses consistent terminology with a glossary.
- References all information sources used.
- Has a clear explanation of complex issues.
- Contains a good description of the methods used for the studies of each environmental topic.
- Covers each environmental topic in a way which is proportionate to its importance.
- Provides evidence of good consultations.
- Includes a clear discussion of alternatives.
- Makes a commitment to mitigation (with a programme) and to monitoring.
- Has a Non-Technical Summary (“NTS”) which does not contain technical

jargon.
- Further guidance can be found at http://ec.europa.eu/environment/eia/eia-support.htm

6.1.4 The Scottish Ministers are aware that the Commission is currently working on guidance to reflect the 2014 amendment to the EIA Directive. This guidance can be found using the above link when published.

6.2 Non-Technical Summary

6.2.1 This should be a concise stand-alone document written in a manner that is appealing to read and easily understood. The NTS should highlight key points set out in the EIA Report. The non-technical summary should include:

- a description of the project including a map and figures as appropriate;
- a description of the main environmental impacts the project is likely to have;
- a description of the measures envisaged to prevent, reduce and offset any significant adverse effects; and
- an outline of the main alternatives studied, including an indication of the main reasons for the primary choice of the project, taking into account the environmental effects of those alternatives and the project as proposed.

6.3 Mitigation

6.3.1 Within the EIA Report it is important that all mitigating measures are:

- clearly stated;
- accurate;
- assessed for their environmental effects;
- assessed for their effectiveness;
- fully described with regards to their implementation and monitoring, and;
- described in relation to any consents or conditions

6.3.2 The EIA Report should contain a mitigation table providing details of all proposed mitigation discussed in the various chapters. Refer to Appendix I for consultee comments and Appendix II for MSS advice on specific baseline assessment and mitigation.

6.3.3 Where potential environmental impacts have been fully investigated but found to be of little or no significance, it is sufficient to validate that part of the assessment by stating in the EIA Report:

- the work has been undertaken;
- what this has shown i.e. what impact if any has been identified, and
- why it is not significant?

6.3.4 It is suggested that a chapter is included in the EIA Report which describes the robust scoping process which has been conducted in order to scope certain receptors out of the EIA Report.

6.4 Design Envelope

6.4.1 Where flexibility in the design envelope is required, this must be defined within the EIA Report and the reasons for requiring such flexibility clearly stated. Seagreen must also describe the criteria for selecting the worst case, and the most likely, scenario and the impacts arising from these. The Scottish Ministers will determine the application based on the worst case scenario. The EIA may reduce the degree of design flexibility required and the detail will be further refined in a Construction Method Statement ("CMS") to be submitted to the Scottish Ministers, for their approval, before works commence. Please note however the information provided in Section 25 regarding multi-stage regulatory consent. The CMS will freeze the design of the project and will be reviewed by the Scottish Ministers to ensure that the worst case scenario described in the EIA Report is not exceeded.

7 Habitats & Birds Directives & Habitats Regulations

7.1 Background

7.1.1 The two most influential pieces of European legislation relating to nature conservation are the Habitats and Birds Directives. The Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora was adopted in 1992 and is commonly known as the Habitats Directive. It complements and amends (for classified Special Protection Areas ("SPAs")) Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds (this is the codified version of Directive 79/409/EEC as amended), commonly known as the Birds Directive.

7.1.2 The Birds Directive protects all wild birds, their nests, eggs and habitats within the European Community. It gives EU member states the power and responsibility to classify SPAs to protect birds which are rare or vulnerable in Europe as well as all migratory birds which are regular visitors.

7.1.3 The Habitats Directive builds on the Birds Directive by protecting natural habitats and other species of wild plants and animals. Together with the Birds Directive, it underpins a European network of protected areas known

as Natura 2000 comprising SPAs classified under the Birds Directive and Special Areas of Conservation ("SACs") designated under the Habitats Directive.

7.1.4 The Habitats and the Birds Directive are transposed into domestic law in Scotland by the "Conservation (Natural Habitats, &c.) Regulations 1994" For all onshore elements and marine elements from 0-12nm these amended Habitats Regulations will apply. From 12-200nm the The Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended) apply. Certain provisions of The Conservation of Habitats and Species Regulations 2010, as amended (the "2010 Habitats Regulations") apply to Natura sites in Scotland where they may be affected by activities consented under section 36 or section 37 of the Electricity Act 1989. Together these regulations are referred to as The Habitats Regulations.

7.2 Habitats Regulations Appraisal

7.2.1 Where a plan or project could affect a Natura site, the Habitats Regulations require the competent authority (in this case Scottish Ministers) – the authority with the power to undertake or grant consent, permission or other authorisation for the plan or project in question – to consider the provisions . This means that the competent authority has a duty to:

- determine whether the proposal is directly connected with or necessary to site management for conservation; and, if not,
- determine whether the proposal is likely to have a significant effect on the site either individually or in combination with other plans or projects; and, if so,
- then make an appropriate assessment ("AA") of the implications (of the proposal) for the site in view of that site's conservation objectives.

7.2.2 This process is now commonly referred to as Habitats Regulations Appraisal ("HRA"). HRA applies to any plan or project which has the potential to affect the qualifying features of a Natura site, even when those features may be at some distance from that site.

7.2.3 The Scottish Ministers, with advice from SNH, decides whether an AA is necessary and carries it out if so. It is the applicant who is usually required to provide the information to inform the assessment. AA focuses exclusively on the qualifying features of the Natura site affected and their conservation objectives. A plan or project can only be consented if it can be ascertained that it will not adversely affect the integrity of a Natura site (subject to considerations relating to imperative reasons of overriding public interest

("IROPI")).

7.3 Further information and advice on HRA

7.3.1 Further information on the qualifying features and the conservation objectives for each relevant Natura site is available from the SNH Sitelink database.

7.3.2 For further advice on the HRA process we direct Seagreen to the SNH website, including the leaflet on "Natura sites and the Habitats Regulations" which provides a helpful summary. Some of the key concepts are explained in the European Commission's guidance on Article 6 of the Habitats Directive.

7.4 Proposed Special Protection Area

7.4.1 Information regarding HRA requirements is also included in the ornithology and marine mammal sections of this opinion. In addition to sites already designated, it has been highlighted in this scoping opinion that it will be necessary for Seagreen to consider the Outer Firth of Forth and St. Andrews Bay Complex proposed Special Protection Area ("pSPA"). In Scotland pSPAs receive policy protection, which effectively puts such sites in the same position as designated sites, from that point forward until a decision on classification of the site is made. This policy protection for pSPAs is provided by Scottish Planning Policy (paragraph 210), the UK Marine Policy Statement (paragraph 3.1.3) and the National Marine Plan for Scotland (paragraph 4.45).

7.4.2 The conservation objectives for the Outer Firth of Forth and St Andrews Bay Complex pSPA are currently in draft, further details can be found here.

7.5 HRA report – information to inform the appropriate assessment

7.5.1 Scottish Ministers advise that the HRA report (information to inform the AA) must be submitted along with the EIA report. It is appropriate for the HRA report to form a chapter within the EIA report.

8 Interests to be Considered Within the EIA Report

8.1.1 The Scoping Report contained a series of questions posed by Seagreen and these are used to inform the structure of this opinion. Each question is addressed below and the Scottish Ministers' answers or advice provided. Where necessary, consultee comments have been incorporated to provide further relevant information. The page and table numbers contained within the boxes refer to the Scoping Report.

8.1.2 This section contains a summary of main points raised by consultees and the Scottish Minister's opinion on whether EIA topics should be scoped in or out. The consultation responses are contained in Appendix I and Seagreen is advised to carefully consider these responses and use the advice and guidance contained within them to inform the EIA Report. Where conflicting views have been given by consultees, Scottish Ministers have directed the approach to be followed.

8.1.3 Seagreen has used an ES undertaken for the Original Development, which obtained consent in October 2014, for much of the baseline information in their Scoping Report and this is referred to as the Original Development ES in this opinion. The EIA Report to be submitted for the current project should be a standalone document without the need for users to refer back to the Original Development ES to understand the information contained within the 2017 EIA Report. The Scottish Ministers consider that it would be appropriate that where data from the Original Development are being used to inform the assessment this could be contained in appendices so that the main text of the EIA Report for the current project is concise.

8.1.4 All potential significant impacts must be reported within the EIA Report for the Revised Development application regardless of whether additional assessment is required from that previously undertaken in the 2012 ES for the Original development. Relevant conditions attached to the Original Development consents will also be reported in the EIA Report.

8.2 The Need for the Project

8.2.1 Seagreen provided background information regarding European and UK renewable energy targets, renewable energy and planning policy in Scotland and offshore wind in Scotland. More detailed information was provided in relation to offshore wind development in the Firth and Forth and the surrounding area and the Seagreen Revised Development in particular.

Scoping Question	Question
3.1	Are the policy and legislation documents identified within this chapter considered relevant to the Development?
3.2	Are there any other areas of policy guidance the determining authority would recommend is included within the application?
The SFF, in their response, indicate that they would expect that the Seagreen proposal should recognise that there are specific policies which guide their relationship with the commercial fishing industry. **The Scottish Ministers agree that the policy and legislation documents identified within this chapter are relevant to the Revised Development. The Scottish Ministers note that there is likely to be specific guidance for particular sectors as highlighted by the SFF and some stakeholders provide links to relevant documents. The Scottish Ministers recommend that Seagreen confirm with stakeholders that they are using all the relevant policy guidance available (see 9.2.2).**	

8.3 Environmental Impact Assessment

Scoping Question	Question
4.1	The 2014 AA, on the advice of the SNCBs, considered one over-arching SPA conservation objective (CO) which can be summarised as: ensuring that the population of a species as a viable component of the site is maintained in the long term. Is this approach still correct or should all COs be discussed at HRA?
The Scottish Ministers advise that the conservation objective relating to the population of species as a viable component of the site should be the focus of the assessment, although justification should be provided within the EIA/HRA Report as to why the other conservation objectives are less relevant or are addressed via this conservation objective.	

Scoping Question	Question
4.2	The COs of the pSPA differ from standard SPA COs in Scotland. Advice on how they should be interpreted is requested.
4.3	What are the current reference populations of each species at each protected area?
4.4	The pSPA population sizes for some species, e.g. gannet, are

	much smaller than those of the terrestrial breeding seabird SPA which abut the pSPA, e.g. Forth Islands SPA. For others, e.g. kittiwake, they are much larger. How should any effects, particularly in-combination, be interpreted and apportioned in relation to the pSPA?
4.5	How should connectivity be assigned between pSPA features and wind farm footprints outside the pSPA?
The Scottish Ministers advise that information on current reference populations of each species is provided by in Appendix A(ii) of the SNH advice). The Scottish Ministers agree with SNH advice that the impacts on the pSPA should be considered in relation to the relevant breeding colony SPAs as listed in Table 1 of the SNH advice (Appendix I of this scoping opinion, page 108).	

Scoping Question	Question
4.6	Are there 'common currency' HRA assessment methods which developers should adopt (see proposed approach to ornithological assessment in Chapter 5)?
4.7	How should effects on breeding seabirds outside the breeding season be assessed for HRA?
4.8	Are models developed for the 2014 AA still considered valid, e.g. Centre for Ecology and Hydrology (CEH) population models and PVAs?
4.9	Should effects be presented as an annual change in population or as a change over the lifetime of the Development, or both?
4.10	Where effects are deemed to be approaching levels considered significant, how should thresholds be established and agreed?
The Scottish Ministers advise that more detailed information is given below (see response in Section 9).	

9 Ornithology

9.1 Background

9.1.1 This section of the scoping opinion is presented in a different format. The questions provided by Seagreen are not answered individually but are dealt with by summarising the information from a meeting that was held on 19 July

2017 between MS-LOT, MSS, SNH and RSPB. The meeting took the form of answering very specific questions that had been raised in the consultee responses and by Seagreen in the Scoping Report.

9.1.2 This led to a very focussed discussion and the following text is based on the outcome of that meeting. The meeting followed a step by step process of working through each stage of the assessment. In the majority of cases agreement was reached on the discussion points. Where there were differences of opinion MSS have provided advice and the Scottish Ministers have used all this information to come to a decision on what they require.

9.1.3 The information below should answer the questions posed by Seagreen in the Scoping Report. Where this is not the case further detail is provided to answer specific questions (see above).

9.2 SPAs

9.2.1 It is the Scottish Ministers' opinion that the following SPAs/pSPA and qualifying features must be included in the assessment:

- Forth Islands SPA – gannet, kittiwake, herring gull, puffin, guillemot, razorbill
- Fowlsheugh SPA – kittiwake, herring gull, guillemot, razorbill
- Buchan Ness to Collieston Coast SPA and St Abb's Head to Fast Castle SPA should be scoped in due to connectivity. PVAs for these SPAs are required unless the cumulative effects from the Forth and Tay projects are estimated to be less than a reduction in annual adult survival of 0.2%.
- Firth of Forth and St Andrews Bay Complex pSPA - gannet, kittiwake, herring gull, puffin, guillemot, razorbill. The assessment carried out for these species at the breeding colony SPAs listed above should also be used for the assessment of the pSPA species.

9.2.2 For the existing colony SPAs the conservation objective relating to the population of the species as a viable component of the site should be the focus of the assessment, although justification should be provided within the EIA/HRA Report as to why the other conservation objectives are less relevant or are addressed via this conservation objective.

9.2.3 The reference populations to be used for the SPAs are those detailed in appendix a(ii) of the SNH advice (see Appendix I of this scoping opinion). For Buchan Ness to Collieston Coast SPA herring gull the final report on the 2016/17 colony count is due to be published in November/December this year, but SNH are currently obtaining the raw count data which they hope to

release to Marine Scotland mid-September, this can then be shared with Seagreen.

9.2.4 Apportioning effects to colonies and SPAs should be via a two-step process (also see section 9.5):

- apportioning between SPA and non-SPA colonies should be done using Seabird 2000 data
- impacts apportioned between SPAs should use most recent colony counts (see appendix a(ii) of SNH advice)

In order to inform the AA for the pSPA Seagreen should present information on the cable route to allow for the in-combination effects to be considered. The Scottish Ministers advise that information requested by SNH (in advice dated 07 September 2017) must be provided (see Appendix I).This information will also assist in the review of consents in relation to the transmission works marine licence required under the Habitats Regulations if the pSPA becomes designated.

9.2.5 ***Commentary on the consideration of SPAs***: SNH and RSPB largely agreed on the species and sites to be included in the assessment, although RSPB also requested that great black backed gull and lesser black backed gull be included in the EIA. SNH noted that great black backed gull was included in EIA assessment previously carried out by all three Forth and Tay developers and they were content with these assessments. SNH noted that lesser black backed gull is on the HRA short list (SNH previous advice of 07 March 2014) and that they have no outstanding concerns and that their review of the Collision Risk Model ("CRM") indicates no significant risk to this species. MSS advice was sought on this point, and it was their view that the assessed effects were negligible and that these two species could be scoped out of the EIA. The Scottish Ministers do not require great black backed gull and lesser black backed gull to be included in the assessment.

9.2.6 RSPB and SNH both agreed on the SPAs to be considered and on the apportioning method. The RSPB highlighted that the RSPB tracking data could be useful in providing information which might not be captured by other data. Seagreen should request these data from RSPB using the data request form which is available directly from RSPB or from MS-LOT. MSS advised that these data were incorporated into the MS commissioned Apportioning Tool.

9.2.7 SNH advised that for SPAs "the population of the species as a viable component of the site" should be used for all developments outwith the

protected areas. RSPB advised that all conservation objectives should be taken into account in order to review whether they can be discounted.

9.2.8 SNH advised that population modelling would not be required for Buchan Ness to Collieston Coast SPA and St Abb's Head to Fast Castle SPA. RSPB advised that population modelling should be undertaken for these sites. MSS advised that these sites should be scoped in due to connectivity and that PVA would be required unless the estimated cumulative effects from the Forth and Tay projects are less than a reduction in annual adult survival of 0.2%. This figure is intended to capture a scenario where the effects are predicted to be greater than expected based on our understanding of previous assessments carried out in relation to these SPAs for the Original Development.

9.2.9 For the pSPA, SNH initially advised that it would not be necessary for the Forth and Tay developers to include an assessment of the cable route. It is the SNH view that any habitats or prey disturbed during the cable laying should not take long to recover. SNH do not consider that cable installation will give rise to any significant amount of permanent habitat loss and are satisfied that the previous assessments adequately address cable impacts for each of the Forth & Tay wind farms. SNH however do recognise that the Scottish Ministers will need to address cable installation in any new AA(s) for the pSPA, but that previous work could be relied on (email from SNH to MS-LOT & RSPB dated 09 August 2017, see page 97). RSPB in response to that email (email dated 31 August 2017, see page 98) accept that potential impacts on the pSPA from the export cabling from the Forth & Tay wind farms and Neart na Gaoithe turbine array could be small, however this doesn't necessarily mean they are insignificant. RSPB note that all four offshore projects have export cables that cross through the pSPA. RSPB note that Seagreen has not quantified the scale of the affected area that lies within the pSPA as it was not considered previously but highlight that although Seagreen have a separate consent for their export cable this would require inclusion in the HRA. RSPB consider it necessary that further information be provided to inform the requirements of the Birds & Habitats Directive. The RSPB suggest information on the scale and longevity of effect on the supporting habitats needs to be presented. Some areas within the pSPA are clearly more important than others, as the bird distribution maps and pSPA documentation illustrate.

9.2.10 Further advice was received from SNH (dated 07 September 2017, see page 99) recognising that there may be insufficient detail on the cable routes from previous assessments to inform an AA and requesting that developers provide certain information. Although received after the formal scoping consultation, these emails and advice from SNH and RSPB are included in

Appendix I.

9.3 Displacement

9.3.1 It is the Scottish Ministers' opinion that a displacement assessment should be completed in the following way:

9.3.2 The species to be included are: puffin, guillemot, razorbill, kittiwake.

9.3.3 The breeding season months are those described in the SNH advice. Density estimates should be mean seasonal peaks and include a 2km buffer and should include all birds, both those in flight and on the water.

9.3.4 If available, the updated CEH model, (the SeabORD tool) due for publication on 10 October 2017, should be used to estimate displacement and barrier effects on guillemot, razorbill, puffin and kittiwake during the chick-rearing period.

9.3.5 Estimates of breeding season displacement should also be presented following the Statutory Nature Conservation Bodies ("SNCB") guidance[1]. Outputs from the SeabORD tool (if available) or, if not available, the CEH displacement modelling (Searle *et al.* 2014[2]) should be used for context. The most appropriate values should be identified and justified in the assessment.

9.3.6 Where displacement effects are considered using the SNCB guidance this should be in relation to changes in adult survival rates (Scottish Ministers recognise that the CEH models give outputs both in relation to adult survival and to productivity).

Non-breeding season effects

9.3.7 For non-breeding season effects use the SNCB advice on the matrix approach and a buffer of 2km as advised by SNH.

9.3.8 For kittiwake a qualitative assessment of non-breeding season displacement effects is required.

9.3.9 For non-breeding season displacement effects of guillemot and razorbill the approach described in the 2017 SNCB guidance should be used as it is not

[1] http://jncc.defra.gov.uk/pdf/Joint_SNCB_Interim_Displacement_AdviceNote_2017.pdf

[2] Searle *et al.* 2014 Population consequences of displacement from proposed offshore wind energy developments for seabirds at Scottish SPAs (CR/2012/03). Final report to Marine Scotland Science http://www.gov.scot/Resource/0046/00462950.pdf)

possible to use the CEH model for non-breeding season. For these two species, non-breeding season effects should be assigned to relevant SPAs as per the breeding season. It is acknowledged that this is likely to be highly precautionary due to the non-breeding season dispersal of the species. However, using the Biologically Defined Minimum Population Scales ("BDMPS") reference population is likely to underestimate the effects on the Forth and Tay breeding population during the non-breeding season due to e.g. guillemots returning to their colony during this period. Therefore for guillemot and razorbill the breeding season reference populations should be used with discussion provided around why the estimated effects are likely to be overestimates and reference to the BDMPS made.

9.3.10 For the assessment of non-breeding season displacement effects Seagreen should apportion impacts across all age classes based on stable age structure unless suitable at-sea survey data from the non-breeding season are available for kittiwake.

9.3.11 A displacement rate of 60% should be used for the auk species and 30% for kittiwake. A mortality rate from displacement of 2% for puffin and kittiwake (quantitative assessment is for the breeding season only) and 1% for guillemot and razorbill (same rate across breeding and non-breeding seasons) should be applied. The same rates should be used for immatures as for adult birds.

9.3.12 ***Commentary on the displacement assessment****:* SNH and RSPB largely agreed on the most appropriate displacement methodology. SNH advised that there was no need to include kittiwake, the data available from post construction monitoring indicate no significant avoidance behaviour by this species (e.g. Welcker and Nehls 2016[3] and Robin Rigg Year 5 monitoring report). RSPB advised that kittiwake should be included in the assessment, as the references do not provide adequate evidence during the breeding season. MSS advice was sought on this point. MSS advised that displacement should be included in the kittiwake assessment. Macro avoidance/displacement has been observed at some wind farms, and whilst displacement and collision effects may be mutually exclusive for individuals, this may not be the case at the population level. Also, the CEH displacement report (Searle *et al.*, 2014) indicated that displacement/barrier effects have the potential to affect individuals and impact populations.

9.3.13 Both SNH and RSPB agree that gannet does not need to be considered in the displacement assessment.

[3] Welcker and Nehls 2016 Mar Ecol Prog Ser 554:173-82; Krijgsveld 2014 – report for Rijjkswarerstaat Sea and Delta

9.3.14 RSPB, although supporting the presentation of the SeabORD model in principal, will need the opportunity to review the final model before coming to a formal view on its use.

9.3.15 RSPB suggested a 50% displacement rate for kittiwake, MSS advice was sought on this point. MSS advised that the displacement rate should be 30%. This value takes into account the advice from SNH (who do not consider that displacement of kittiwake is a potential effect that should be assessed), the advice from the RSPB, the approach taken in the original assessments for the Forth and Tay, and the lower number of WTGs (necessitating either a greater WTG spacing or reduced overall wind farm footprint) in the new applications.

9.3.16 With regards to the percentage mortality from displacement, SNH advised 2% for puffin and 1% for other species, RSPB advised 2% for all species. MSS advice for puffin, guillemot and razorbill agreed with that provided by SNH.

9.4 Collision Assessment

9.4.1 The Scottish Ministers note that the stochastic collision risk model commissioned by MSS will not be available until December 2017. Although, when completed, this may represent the best available method, the Scottish Ministers are aware of both the tight application timescales associated with all three Forth and Tay developments and a need for a consistent approach to the methods used to ensure comparable outputs that can be used by the Scottish Ministers to inform their decisions. In light of these requirements the Scottish Ministers advise that the Band 2012 collision risk model is used by all three developers. This is available to use and will allow a comparison of outputs from all three developments.

9.4.2 The Scottish Ministers advise that CRM is required for gannet, herring gull and kittiwake. The nocturnal activity scores of 2 (25%) should be used for herring gull and kittiwake and 1 (0%) for gannet.

9.4.3 The Scottish Ministers advise that for birds in flight, the mean monthly value should be used in the collision risk modelling, and density of birds in flight values should also have 95% confidence limits presented and discussed.

9.4.4 The Scottish Ministers confirm boat based bias should not be accounted for in density estimates.

9.4.5 The Scottish Ministers recommend that comparison is made of the proportion of birds at collision height using site specific flight height data and the generic flight height data (Johnson *et al.* 2014[4]). Any differences between the two should be discussed.

9.4.6 For kittiwake and gannet, the assessment should assume Option 2 using Johnson *et al.* (2014) with corrigendum. If sufficient site specific flight height data are available, outputs using Option 1 should also be presented. Option 2 (at a 98.9% avoidance rate) should be assumed for the PVA.

9.4.7 For herring gull, the assessment should present Options 2 and 3 using Johnson *et al.* (2014) with corrigendum flight height distributions. However, if sufficient site specific flight height data are available, outputs using Option 1 or 4 should also be presented. Option 3 (at a 99% avoidance rate) should be assumed for the PVA, this will allow effects across the Forth and Tay wind farms to be meaningfully compared and combined. However, discussion around how these estimates compare with those assuming Option 2, and how this helps inform the assessment, should also be included.

9.4.8 For avoidance rates the Scottish Ministers recommend using:

- Gannet – 98.9% (± 0.002)
- Kittiwake – 98.9% (± 0.002)
- Herring gull – 99.5% (± 0.001) for option 2, 99.0% (± 0.002) for option 3

9.4.9 The mean avoidance rate values should be used for PVA and the ± 2SD values can be used to inform conclusions. Uncertainty in collision estimates should be presented as ± 2SD and should take account of SNH advice provided in appendix A(iv) of their scoping response.

9.4.10 The Scottish Ministers note that the breeding season months as recommended by SNH are gannet (mid-March – September), kittiwake (mid April – August) and herring gull (April – August) and that non-breeding season effects should be included. The collisions attributed to the SPA should be as agreed in section 9.5.

9.4.11 The Scottish Ministers note that SNH have provided some advice with regard to how to update the flight height data in the Band collision risk model spreadsheets to Johnston *et al.* 2014. This is included in Appendix III.

9.4.12 The Scottish Ministers request (as noted by SNH) that CRM outputs are presented as described in the table below. This is to provide information on

[4] Johnson *et al.* 2014 with corrigendum https://www.bto.org/science/wetland-and-marine/soss/projects

the largest number of smallest turbines (lower end in the table) and smallest number of largest turbines (upper end in the table). The missing information is indicated by question marks. This information will allow comparisons with the 2014 'most likely' scenarios ("MLS") i.e. the parameters used in the AA for the Original Development. The Scottish Ministers suggest that the lower end of the 2017 design scenario could act as a 'worst case' for the Revised Development. Seagreen should clarify whether they would want to use this 'worst case' or whether they will define a 'most likely' 2017 scenario.

		2014 MLS	2017 lower end	2017 upper end
Seagreen	no. of turbines	150	120	?
	rotor diameter	167m	?	220m
	height to blade tip	194.5m	?	250m

9.4.13 ***Commentary on collision assessment:*** There was agreement on most of the points raised at the meeting. There were some differences of opinion.

9.4.14 The main area of disagreement was that both SNH and RSPB advised using the monthly maximum at-sea survey data whereas MSS advised using the mean monthly value. At the meeting on 19 July 2017 SNH and RSPB indicated that they preferred the use of the maximum value as it would capture uncertainty. MSS advised that the approach taken by SNH and RSPB actually ignores uncertainty, is overly precautionary and runs the very high risk of producing an estimated effect that is highly likely to be unreasonable and unrealistically high. MSS advised that for birds in flight, the mean monthly value should be used in the collision risk modelling, and density of birds in flight values should also have 95% confidence limits presented. The Scottish Ministers have considered all the advice presented (see Appendices I and II) and agree with MSS that the mean monthly estimates are presented alongside confidence limits, and that the mean values are those assumed in the effects scenarios incorporated into the PVAs because this is the most robust approach, is consistent with previous assessments, and will provide information on the uncertainty around estimated values.

9.4.15 For the nocturnal activity scores RSPB agreed with SNH apart from gannet where they would prefer a score of 2 (25%) as they have concerns regarding at-sea survey periods omitting dawn and dusk, when gannet activity may be greatest. MSS advised using the scores as suggested by SNH as the justification from RSPB to use different scores for gannet appears to conflate nocturnal activity with colony attendance, foraging activity and timing of at-

sea surveys and lacks an adequate empirical basis.

9.4.16 The flight height distribution and the Band CRM options to be used were discussed together. RSPB noted that comparison should be made of site specific and generic data and associated confidence intervals using Proportion at Collision Height ("PCH") as defined by survey height bands of both data sets. This should also include discussion of any significant differences. RSPB note such comparison does not necessarily need to involve running the CRM. There was agreement on this point.

9.4.17 RSPB agreed with the avoidance rates and Options advised by SNH with the exception of gannet where they advised that an avoidance rate of 98.0% should be applied during the breeding season. MSS advised that there was no evidence to support going against the advice provided by SNH and summarised in the joint SNCB document on avoidance rates.

9.5 Apportioning

Apportioning estimated effects from breeding season

9.5.1 It is the Scottish Ministers' opinion that apportioning should be carried out in the following way:

9.5.2 The methods that should be used are the SNH apportioning approach and (if available) the Apportionment tool being produced for Marine Scotland by CEH (though note that this uses Seabird 2000 data only).

9.5.3 The Scottish Ministers advise the two step approach as advised by SNH is used, the reference populations to be used for the SPAs are those detailed in appendix a(ii) of the SNH advice.

- apportioning between SPA and non-SPA colonies should be done using Seabird 2000 data
- impacts apportioned between SPAs should use most recent colony counts (see appendix a(ii) of SNH advice)

Apportioning estimated effects from non-breeding season

9.5.4 For gannet and kittiwake, apportioning the estimated effects from the non-breeding season the Scottish Ministers recommend using the biologically defined minimum population scales BDMPS (Furness, 2015[5]) using the

[5] Furness, R.W. 2015. Non-breeding season populations of seabirds in UK waters: Population sizes for Biologically Defined Minimum Population Scales (BDMPS). Natural England Commissioned

approach adopted in recent English casework e.g. Hornsea 2 and recommended by SNH. This will require two non-breeding apportioning calculations to cover spring and autumn. SNH guidance should be used to define the seasons. The overall non-breeding season is as follows; gannet – Autumn, October to November; Spring, December to mid-March; kittiwake – Autumn, September to December; Spring, January to mid April.

9.5.5 For herring gull the Scottish Ministers recommend presenting the updated CRM outputs for the breeding and non-breeding seasons. If further quantitative assessment is needed, collisions during the non-breeding season from Seagreen in isolation and in combination with the other Forth and Tay wind farms should be apportioned in the following way:

- Identify a suitable regional population for/around the Forth and Tay by considering the SPA summer population and any other non-SPA colonies.
- Review the position reached (including justifications and assumptions) in identifying a non-breeding season population for/around the Moray Firth, BOWL have applied a similar process to the Forth and Tay. The key steps are:
    - estimate the non-breeding season population,
    - estimate the percentage population of the non-breeding season population derived from regional SPA population
- For BOWL this approach equated to the non-breeding season population being 30% larger than the breeding season population and, of the non-breeding season population, 20% were estimated to be from the regional SPA population.
- Consider this against what is contained in the BDMPS report which indicates that 5.4% of birds in an area in the winter are likely to be from UK SPA colonies with the rest of birds coming in from non UK sources.
- Identify the winter regional population for the Forth and Tay.
- Calculate the Forth and Tay non-breeding season population likely to be connected to the SPAs by using either the methods in the Moray Firth – Beatrice application and/or BDMPS proportion.

9.5.6 For auks the Scottish Ministers advise no assessment is required for puffin in the non-breeding season and that for guillemot and razorbill all non-breeding season impacts should be assigned to SPAs as per breeding season (see 9.3.9). The Scottish Ministers recommend using the total SPA population, all ages, and apportioning impacts across age classes based on the PVA stable age structure.

Assigning estimated effects across age classes

9.5.7 The Scottish Ministers advise the following to assign effects between age classes:

- Breeding season gannet and kittiwake – effects apportioned to age classes using proportions derived from site survey data
- Non-breeding season gannet and kittiwake – effects apportioned to age classes using proportions derived from at sea survey data or, if not available, PVA stable age structure
- Breeding and non-breeding auks – effects apportioned to age classes using proportions from PVA stable age structure

9.5.8 ***Commentary on apportioning:*** SNH and RSPB were in agreement on most points. For apportioning estimated effects to non-adult age classes to SPAs, RSPB agree with the approach outlined by SNH and would prefer, if available, on site survey age structures for non-breeding gannet and kittiwake. MSS advise that for non-breeding gannet and kittiwake the age structure of the non-breeding season effects should be based on the age structure derived from the at sea survey data at this time of year. If this is not available then the PVA stable age structure will provide the best available evidence and should be used. For herring gull in the non-breeding season the advice on apportioning was received from SNH in an email dated 05 September 2017 and this information is included below (see section 9.5.5).

9.6 Population Viability Analysis (PVA)

9.6.1 The Scottish Ministers advise that PVA outputs are required for SPA breeding colonies where the assessed effects exceed a change to the adult annual survival rate of 0.2% and consider they are likely to be needed for the following:

- Forth Islands SPA – gannet, kittiwake, puffin, guillemot, razorbill
- Fowlsheugh SPA – kittiwake, guillemot, razorbill

9.6.2 PVAs should be produced for the estimated effects from:

- For guillemot, razorbill, puffin, gannet and kittiwake, the wind farm in isolation (effects throughout the year and on all age classes),
- For guillemot, razorbill, puffin, gannet and kittiwake, the wind farm in combination with the other three Forth and Tay wind farms (effects

throughout the year and on all age classes)

- For gannet and kittiwake the breeding season effects from the Forth and Tay wind farms combined with the non-breeding season effects from the offshore wind farms in UK waters

9.6.3 For kittiwake, PVAs for the following should also be provided:

- Collision effects (throughout the year and on all age classes) in isolation and
- Collision effects (throughout the year and on all age classes) in combination with displacement effects (during the breeding season and on all age classes)

Table 1 below shows the minimum in terms of PVAs which are likely to be required.

Table 1 PVAs which are likely to be required

Key: (KI = kittiwake, PU = puffin, GU = guillemot, RA = razorbill, GX = gannet, FI = Forth Islands SPA, Fow = Fowlsheugh SPA, WF = wind farm in isolation, FTOWDG = Neart na Gaoithe , Inch Cape, Seagreen Alpha and Seagreen Bravo)

Species	SPA	Site(s)	Collision	Displacement	Collisions + Displacement
KI	FI	WF	Y		
KI	FI	FTOWDG	Y		
KI	FI	All UK	Y		
KI	FI	WF			Y
KI	FI	FTOWDG			Y
KI	FI	All UK			Y
KI	Fow	WF	Y		
KI	Fow	FTOWDG	Y		
KI	Fow	All UK	Y		
KI	Fow	WF			Y
KI	Fow	FTOWDG			Y
KI	Fow	All UK			Y
PU	FI	WF		Y	
PU	FI	FTOWDG		Y	
GU	FI	WF		Y	
GU	FI	FTOWDG		Y	
GU	Fow	WF		Y	
GU	Fow	FTOWDG		Y	
RA	FI	WF		Y	
RA	FI	FTOWDG		Y	
RA	Fow	WF		Y	
RA	Fow	FTOWDG		Y	
GX	FI	WF	Y		
GX	FI	FTOWDG	Y		

GX	FI	All UK	Y		

9.6.4 The Scottish Ministers advise that stochastic, density independent PVA models should be used. The model will need to include:

- All age classes
- Sabbaticals for which the following rates should be used:
  - Large gulls 35%
  - Kittiwake 10%
  - Guillemot (and Razorbill/Puffin) 7%
  - Gannet 10%
- Effects during the non-breeding season for all species listed above apart from puffin
- A baseline demographic rate based on site specific information where available or alternatively Horswill and Robinson 2015[6].
- The impacts should be assessed over both 25 years and 50 years with no recovery period. If Seagreen intend to have an extended construction timeframe then the potential effects of this should be taken into consideration in the PVA.
- Presentation of the PVA metrics as
  i. median of the ratio of impacted to unimpacted annual growth rate
  ii. median of the ratio of impacted to unimpacted population size
  iii. centile for unimpacted population that matches the 50th centile for impacted population

9.6.5 MSS have provided guidance on the presentation of the assessed change using the results of PVA (see Appendix IV). They advise that the outputs of the PVA should be presented using these metrics. SNH advised that i) and ii) should be presented, and the RSPB that ii) should be presented.

9.6.6 ***Commentary on PVA:*** There were differences of opinion as to how to carry out the PVA. There was general agreement between SNH and RSPB on sites and species to be included although the SNH did not consider that Buchan Ness to Collieston Coast SPA and St Abbs to Fast Castle SPA should be included. Advice was sought from MSS on this point who suggested a PVA is undertaken if the estimated cumulative effects from the Forth and Tay projects are a reduction in annual adult survival of more than 0.2%.

9.6.7 SNH noted that they could not provide final advice on whether population

[6] Horswill and Robinson 2015 Review of seabird demographic rates and density dependence. JNCC Report No. 552. Joint Nature Conservation Committee, Peterborough

models were required until the outputs for the updated collision risk and displacement modelling were available. If further models were required SNH recommended that, as a minimum, deterministic, density independent Leslie Matrix Models were required. RSPB broadly agreed with SNH's view but considered stochastic models would also be helpful. MSS advice was sought on this point and they recommended stochastic models as they have been found to be precautionary[7], are able to provide a greater range of potentially informative outputs, and are recognised as the best available information. There was agreement that the PVAs should be density independent.

9.6.8 SNH do not require kittiwake to be included in the assessment of displacement effects (see 9.3.12). To take account of this the Scottish Ministers have advised that the PVAs for kittiwake are presented as collision effects in isolation and collision effects in combination with displacement effects. This will provide outputs that will allow SNH to provide advice on the effects of concern to them (collision) and will also provide information on collision effects in combination with displacement to take account of the concerns of RSPB and MSS.

9.6.9 MSS initially advised running the PVA with 10% greater and 10% lower impacts than the estimated impacts to provide an indication of the potential implications to the populations of interest. However, having reviewed the full list of effects scenarios that will result from this approach MSS note that the inclusion of the proposed wind farm in isolation, in combination with other Forth & Tay wind farms, and in combination with other UK wind farms will provide an indication of sensitivity of conclusions to the magnitude of effects assumed. MSS therefore advise that it is not necessary to provide the effects scenarios assuming ± 10% as outlined in the original MSS advice (see Appendix II). However, this does not mean that the developer is not able to provide PVA outputs assuming different effect scenarios if they felt them relevant to their assessment.

9.7 Cumulative Impact Assessment

9.7.1 The Scottish Ministers have taken into account all the advice received and advise the following:

Breeding season effects

9.7.2 For the breeding season, the CIA should consider effects from projects within mean max foraging range of the colony SPA under consideration.

[7] Lande, R., Engen, S. & Sæther, B.-E. (2003) Stochastic populated dynamics in ecology and conservation. Oxford University Press, Oxford

Non-breeding season effects

9.7.3 For guillemot and razorbill, the CIA should incorporate non-breeding season displacement effects from the Forth and Tay wind farms (Inch Cape and Neart na Gaoithe), apportioning effects as to SPA and non-SPA colonies in the same manner as the breeding season.

9.7.4 For gannet and kittiwake, the CIA should estimate non-breeding season collision effects from the Forth and Tay wind farms (Inch Cape and Neart na Gaoithe) in isolation, and in combination with the other UK wind farms.

9.7.5 For herring gull, if the CRM figures indicate an issue then non-breeding season impacts are assessed for wind farms and associated herring gull collisions as suggested at section 9.5.5.

9.7.6 For the CIA, the following assessment scenarios are both required:

Scenario 1

Effects should be considered quantitatively for the wind farm in isolation and in combination with the worst case scenario (for each species) from:

- Inch Cape (2014 as consented) or Inch Cape (2017 scoping report) and
- Neart na Gaoithe (2014 as consented) or Neart na Gaoithe (2017 scoping report) and
- Breeding season effects from other wind farms should be considered within the CIA qualitatively.

Scenario 2

Effects should be considered quantitatively for the wind farm in isolation and in combination with:

- Inch Cape (2017 scoping report) and
- Neart na Gaoithe (2017 scoping report) and
- Breeding season effects from other wind farms should be considered within the CIA qualitatively.

9.7.7 The Scottish Ministers consider that by carrying out the assessment of these two scenarios the cumulative impact of the worst case scenarios of all the current consented and proposed projects are considered but also takes into

account the scenario that the ongoing judicial review process may mean that the previously consented developments are no longer valid. If this was the case an assessment of the projects as described in the 2017 scoping reports alone will be required to allow the regulator to assess the cumulative impact of these.

9.7.8 ***Commentary on cumulative impact assessment:*** At the meeting on 19 July 2017 SNH and RSPB both indicated that the cumulative impact assessment ("CIA") should include non-breeding season effects for razorbill, guillemot, kittiwake and gannet. SNH considered that for kittiwake and gannet this should be for all UK wind farms in the North Sea and RSPB additionally requested a qualitative assessment for non UK sites. For guillemot and razorbill SNH advice is that, as these species are not so wide ranging, the cumulative assessment should apportion non-breeding season effects in the same manner, and from the same wind farms, as in the breeding season.

9.7.9 For herring gull SNH recommend presenting the updated collision risk modelling CRM outputs for the breeding and non-breeding seasons. SNH do not anticipate that these will be significant, however, if the herring gull CRM figures indicate an issue SNH would advise that any non-breeding season impacts are assessed as described in section 9.5.8.

9.7.10 MSS provided the following advice. For breeding season effects, the CIA should consider effects from projects within mean max foraging range of the colony SPA under consideration. If available, the Marine Scotland commissioned Apportioning Tool should be used. This tool provides an output that ranks colonies by likelihood of a bird at a wind farm originating from that colony. For the CIA, effects should be considered quantitatively for the wind farm in isolation and in combination with the other three Forth and Tay wind farms (as described above in 9.7.6). Effects from other wind farms should be considered within the CIA qualitatively.

9.7.11 MSS advise that the scope of the assessment for kittiwake and gannet during the non-breeding season relates to collision effects only. MSS agreed with the approach advised by SNH in relation to the inclusion in the CIA of non-breeding season effects on guillemot and razorbill.

9.7.12 MSS consider it will be challenging to identify gannet, kittiwake or herring gull collision estimates from the other offshore wind farms in the UK that have been estimated and/or reported in a consistent manner. Many will have been estimated using approaches that are no longer deemed to be the best available approach. The cumulative totals obtained should therefore be treated with extreme caution, as should the outputs from PVAs should these

cumulative effect totals be modelled.

10 Marine Mammals

10.1 Background

10.1.1 In the Scoping Report Seagreen stated that they considered that, apart from the increase in underwater noise, the likely impacts on Marine Mammals for the Revised Development will be less than those assessed for the Original Development and should therefore be scoped out of the EIA Report due to the following:

- Baseline data remaining valid
- No material change to assessment best practice

10.1.2 The advice provided below is based on responses from consultees, advice from MSS and the outcome of a workshop held with Inch Cape on 27 July 2017, which included SNH, MSS and WDC.

Scoping Question	Question
6.1	Does MS-LOT agree that the assessment on marine mammals should only consider the effects from underwater noise?
The Scottish Ministers agree that the assessment on marine mammals should only consider the effects from underwater noise. The Scottish Ministers agree that bottlenose dolphin, harbour seal, grey seal, harbour porpoise, minke whale and white beaked dolphin should be included in the EIA.	

10.1.3 The following sources of data are now available and can be used to ensure the information is the most up to date:

- The Sea Mammal Research Unit ("SMRU") photo identification project, which could be used for assessing the proportion of bottlenose dolphin from the Moray Firth SAC which can be expected to be utilising the Firth of Tay at any one time (Quick *et al.* 2014[8]).

- The CPoD data from the MSS funded survey the East Coast Marine Mammal Acoustic Survey (ECOMMAS[9]).

[8] Quick *et al.* 2014. The east coast of Scotland bottlenose dolphin population: Improving understanding of ecology outside the Moray Firth SAC. DECC SEA programme Report 14D/086

[9] East Coast Marine Mammal Acoustic Survey (ECOMMAS[9]) are available from: http://www.gov.scot/Resource/0050/00507404.pdf

10.2 Management unit populations

10.2.1 The following management unit populations are suggested for each species:

Bottlenose dolphin (*Tursiops truncatus*)

10.2.2 SNH advise that the reference population estimates in the statutory nature conservation bodies ("SNCB") guidance on management units for cetaceans should be used, this guidance is based on the Inter Agency Marine Mammal Working Group ("IAMMWG") 2015 figures (IAMMWG, 2015[10]). For bottlenose dolphin this is the coastal east Scotland population and SNH advise referring to Cheney *et al.* (2013[11]) for the most up to date population estimate. MSS agree with the management unit and population size recommended by SNH.

10.2.3 During a workshop with Inch Cape on 27 July 2017, which included SNH, MSS and WDC, a further discussion was had regarding distribution for bottlenose dolphin. An approach to update the distribution used in the Original Development ES was agreed. The Scottish Ministers consider that this approach is relevant to all three Forth and Tay developers and recommend that this is the approach followed. The outcome of the discussion is noted below and further information is available in the Inch Cape marine mammals scoping opinion:

Agreement reached to assume, as per the assessment for the Original Development, the reference bottlenose dolphin population (195 individuals) should be split 50:50 between the east coast and the Moray Firth, and that 98 dolphins would be present at the time of piling activities off the east coast.

Agreement reached that the 98 individuals assumed to be present off the east coast should be spread evenly across the area inside the 20 m depth contour as defined in the Original Development EIA, excluding areas in the Forth and Inner Tay where bottlenose dolphin are known not to be present (shaded red in Figure 1 in workshop). These 98 animals will be spread

[10] IAMMWG (2015) Management Units for cetaceans in UK waters. JNCC Report number 547. http://jncc.defra.gov.uk/pdf/Report_547_webv2.pdf

[11] Cheney B, Thompson PM, Ingram SN, Hammond PS, Stevick PT, Durban JW, Culloch RM, Elwen SH, Mandleberg l, Janik VM, Quick NJ, Islas-Villanueva V, Robinson KP, Costa M, Eisfeld SM, Walters A, Phillips C, Weir CR, Evans PGH, Anderwald P, Reid RJ, Reid JB and Wilson B (2013) Integrating multiple data sources to assess the distribution and abundance of bottlenose dolphins *Tursiops truncatus* in Scottish waters. *Mammal Review*, **43**, 71-88.

evenly across the remaining grid cells (thereby increasing the density per grid cell).

10.2.4 **The Scottish Ministers advise that the IAMMWG 2015 figures for the cetacean reference populations and the additional references suggested by SNH should be used. The Scottish Ministers confirm that the approach agreed at the Inch Cape workshop on 27 July 2017, and described above, with regard to bottlenose dolphin distribution should be used.**

Harbour porpoise (*Phocoena phocoena*), Minke whale (*Balaenoptera acutorostrata*) and White beaked dolphin (*Lagenorhynchus albirostris*)

10.2.5 SNH and MSS agree that the management unit for these species should be based on IAMMWG (2015) and the relevant management units are North Sea (harbour porpoise) and Celtic and Greater North Seas (minke whale and white beaked dolphin). For abundance estimates for these management unit MSS advise that the SCANS-III are the most up to date and should be used if available. If these are not available MSS agree with SNH that the IAMMWG (2015) guidance can be used. SNH and MSS agree that the estimate of abundance within the SCANS-III survey results for block R can be used to consider impacts at a regional scale. MSS note that if further information becomes available from SCANS-III in time to be used in the EIA Report then Seagreen should make reference to this. MSS note distribution data for these species can be taken from the Original Development ES unless other more recently published data are available. If absolute (rather than relative) densities are required then the distributions can be re-scaled to the SCANS-III abundances.

10.2.6 **The Scottish Ministers advise that:**

- **The management units based on the IAMMWG (2015) guidance should be used**
- **If available, the SCANS-III surveys should be used for abundance estimates as these are the most up to date, if not available then the IAMMWG (2015) guidance should be used**
- **The most up to date SCANS-III survey results for block R should be used to provide a regional abundance estimate for use within the assessment**
- **Distribution data for these species can be taken from the Original Development ES, unless other more recently published data are available**

Harbour seal (*Phoca vitulina*) and grey seal (*Halichoerus grypus*)

10.2.7 For these two species SNH advise that the population present in the east coast seal management unit should be used as the reference population for assessment and SNH take this as equivalent of the SAC population, these can be obtained from the Special Committee on Seals ("SCOS"). MSS agree and note that the 2016 population sizes will be available in the SCOS 2017[12] report, which will be available in draft in September 2017. MSS recommend that, until this report is published, the 2015 population sizes as published in the SCOS 2016 report should be used. MSS advise that the seal usage maps produced by SMRU should be used for distribution data on both species. These are currently available directly from SMRU but will be updated and made available on NMPi in the next few months.

10.2.8 **The Scottish Ministers advise that the SCOS seal management units and population estimates as described above are used and advise that the seal usage maps produced by SMRU are used for distribution data on both species.**

10.3 Advice on assessment methodology

10.3.1 Advice on this issue has been provided in the stakeholder meeting 21 June 2017, consultee responses and ongoing discussion with SNH and MSS. As the new applications for the three Forth and Tay developments are likely to be submitted within a short time of one another the Scottish Ministers want to ensure that they are able to compare the outputs of the assessments. The Scottish Ministers therefore provide the following advice on the assessments to be undertaken. This advice will be the same for all three Forth and Tay developments. The Scottish Ministers also recommend Seagreen arrange a stakeholder meeting once they have their initial outputs from the noise modelling to discuss these and to confirm what is required to carry out the cumulative impact assessment.

10.4 Underwater noise modelling and assessment

10.4.1 SNH and MSS agree that an update to the noise propagation modelling will be required and that both instantaneous and cumulative permanent threshold shift ("PTS") should be presented, modelled for each of the species noted above. SNH and MSS agree that Seagreen should provide the total number of individuals from each species that may suffer PTS and the number that may be displaced through disturbance.

[12] SCOS (2016) Scientific Advice on Matters Related to the Management of Seal Populations: 2016. http://www.smru.st-andrews.ac.uk/files/2017/04/SCOS-2016.pdf

http://www.smru.st-andrews.ac.uk/research-policy/scos/

10.4.2 PTS thresholds from both Southall *et al.* (2007[13]) and the NOAA (2016[14]) should be used. This is to allow comparability with the Original Development ES (which used Southall *et al.* (2007)) but takes into account that the NOAA criteria are the most up to date scientific information. Seagreen should note that the NOAA criteria are currently under review.

10.4.3 For flee speeds and startle responses for PTS modelling the mean swim speeds details in SNH guidance note (2016[15]) should be used. This provides mean swim speeds for minke whale, harbour porpoise and grey and harbour seal. It does not contain a mean swim speed for bottlenose dolphin and it was agreed that further information should be obtained from researchers at SMRU. MSS have subsequently obtained this advice and 1.52m/s is the recommended speed that should be used. This mean swim speed for bottlenose dolphin will be used as a proxy for white beaked dolphin. There was also discussion regarding how to take account of the use of Acoustic Deterrent Devices ("ADD") as a mitigation method. It was agreed that fleeing starts from the start of the ADD use i.e. 20 minutes before piling starts, and the PTS impacts from ADDs do not need to be considered as the ADDs will not be sufficiently loud to cause PTS for the period of time that they will be used for.

10.4.4 SNH and MSS agree that a dose response curve should be used to determine the proportion of animals likely to be disturbed sufficiently to displace them by piling noise. The Scottish Ministers note that this could use a re-interpretation of the data from the harbour porpoise acoustic signal detection during piling operations at Horns Rev II. It was also noted that data from the Moray Firth seismic survey work should also be examined to establish whether reaction to air-gun noise can be considered informative in the generation of a dose response curve. MSS also noted that they had some concerns regarding using the data from the Horns Rev II development relating to the small sample size and the very shallow water depths at the study site which may have an effect on noise propagation. Both SNH and MSS note that there are other data and approaches that could be used to improve this assessment and recommend Seagreen make use of these where possible (Brandt *et al.*, 2016,[16] Dähne *et al.*, 2013,[17] Russell *et al.*,

[13] Southall *et al.* (2007) Marine mammal noise exposure criteria**.** Aquatic. Mammals., 33, pp. 411-521, 10.1578/AM.33.4.2007.411

[14] http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm

[15] SNH (2016) Assessing collision risk between underwater turbines and marine wildlife. Guidance note.

[16] Brandt *et al.* (2016) Effects of offshore pile driving on harbour porpoise abundance in the German Bight. Assessment of Noise Effects. Final Report. Prepared for Offshore Forum Windenergie.

2016,[18] Thompson *et al.*, 2013a[19] and b[20]). MSS consider that in the absence of similar data for species other than harbour porpoise, that it is acceptable to use the same dose-response function for all species. The Scottish Ministers advise that Seagreen should request these data from the pile driving at the Beatrice Offshore Wind Farm directly from Professor Paul Thompson at the Lighthouse Field Station, Cromarty.

10.4.5 **The Scottish Ministers advise that Seagreen take into account the summary above, consultation responses and the minutes of the scoping meeting on 21 June 2017, the meeting with WDC on 28 June 2017 and the outcome of the Inch Cape workshop on 27 July 2017 (see Inch Cape marine mammals scoping opinion). The Scottish Ministers consider that the following should be used for the underwater noise modelling and assessment:**

- **both instantaneous and cumulative permanent threshold shift ("PTS") should be presented, modelled for each of the species noted above. Seagreen should provide the total number of individuals from each species that may suffer PTS and the number that may be displaced through disturbance.**
- **Swim speeds as outlined by SNH in the guidance note referenced above should be used along with information provided by SMRU in relation to bottlenose dolphin swim speeds (which can be used as a proxy for white beaked dolphin)**
- **Fleeing should be considered to begin from the start of ADD use**
- **PTS thresholds from both Southall et al. (2007) and the NOAA (2016) should be presented**
- **A dose response curve should be used to determine the proportion of animals likely to be disturbed sufficiently to displace them by piling noise. Seagreen should take into account the concerns noted above about the use of the Horns Rev II and make use of other relevant data as noted above, in particular the data from the**

http://bioconsult-sh.de/site/assets/files/1573/1573.pdf

[17] Dähne *et al.* (2013) Effects of pile-driving on harbour porpoises (Phocoena phocoena) at the first offshore wind farm in Germany. Environ. Res. Lett. 8, doi:10.1088/1748-9326/8/2/025002

[18] Russell *et al.* (2016) Avoidance of wind farms by harbour seals is limited to pile driving activities. Journal of Applied Ecology, 53(6), pp.1642-1652

[19] Thompson *et al.* (2013a) Short-term disturbance by a commercial two-dimensional seismic survey does not lead to long-term displacement of harbour porpoises. Proc Roy Soc B 280: 20132001. http://dx.doi.org/10.1098/rspb.2013.2001

[20] Thompson *et al. (*2013b*)* Framework for assessing impacts of pile-driving noise from offshore wind farm construction on a harbour seal population*.* Environmental Impact Assessment Review*,* 43*, pp.* 73–85*.*

Beatrice Offshore Wind Farm in relation to piling if available.

10.5 Species impact assessment

10.5.1 For bottlenose dolphin, MSS consider it will be necessary to assess the impacts of Seagreen alone on the East Scotland management unit population, as well as cumulatively with other developments. SNH and MSS each suggest a different approach for this assessment. SNH consider that if the impact of the project alone is the same or less that the impact of the Original Development then there would not be a requirement for a cumulative assessment. MSS have concerns that this could compromise the AA that will be conducted in relation to the Moray Firth SAC.

10.5.2 For harbour porpoise, minke whale, white beaked dolphin, harbour seal and grey seal Seagreeen should assess whether the new parameters of the Revised Development result in any greater impact to these species. If the Revised Development does not result in increased impact then no further assessment would be required. This approach aligns with the advice provided by SNH. MSS agree with this approach for these species but note that, although not part of the EIA process, Seagreen should give consideration to the information requirements for EPS licensing and, where needed, for an HRA and AA and how these can be readily transferred. This would ensure that any information required is readily available in a format that can be used in for the EPS process and contribute to a more efficient process.

10.5.3 **The Scottish Ministers advise that, for bottlenose dolphin, an assessment of the impacts of the Revised Development alone on the East Scotland management unit population as well as cumulatively with other developments that may impact on the same population is required. Seagreen should ensure that the information provided can be used for an Appropriate Assessment in relation to the Moray Firth SAC.**

10.5.4 **The Scottish Ministers advise for harbour porpoise, minke whale, white beaked dolphin, harbour seal and grey seal that further assessment is only carried out if the effects of the Revised Development are found to be greater than those assessed for the Original Development. The Scottish Ministers request that, where necessary, the information is provided in a form that means it can be used for the EPS process or, where needed, to inform the Appropriate Assessment as part of an HRA.**

10.6 Population level effect assessment

10.6.1 For species where population level impact assessments are undertaken,

MSS recommend using the Interim Population Consequences of Disturbance ("iPCOD") framework. The software for this model is available on the Marine Scotland website, along with a report which suggests appropriate parameters for each species. MSS note that a new version of the software will shortly be available (also on the Marine Scotland website), which will allow for the use of a dose-response function for the displacement of animals as a result of exposure to noise.

10.6.2 MSS note the interim nature of the iPCOD framework. This is because there are currently insufficient data on the consequences of disturbance to individual animals, and hence to populations. MSS flag this as an important knowledge gap. The iPCOD framework utilises formal expert elicitation to produce statistical distributions of responses to disturbance, and to estimate the effects on vital rates of individuals (e.g. survival probability, reproductive rate), including the uncertainty in these predictions. An alternative framework, the DEPONS model, is available and uses measured responses of tagged harbour porpoise to impulsive noise sources to understand the effects of disturbance. However, this framework is currently only parameterised for harbour porpoise and so does not represent a viable assessment method for this development.

10.6.3 MSS provided advice on the use of Population Viability Analysis ("PVA") for population level assessments and recommend iPCOD because it uses a formal expert elicitation, is capable of incorporating uncertainty, and is flexible in how impacts can be modelled. The Scottish Ministers are recommending that all three Forth and Tay developers use the same framework. This will mean all their results are comparable and will mean a cumulative assessment can be more readily undertaken.

10.6.4 In providing iPCOD outputs, MSS request that the EIA Report (or an appendix) provides a comprehensive list of the parameters input. This should be sufficiently detailed such that MSS staff would be able to replicate the analysis. As a minimum this will include the piling schedule, the demographic parameters, and starting population size. MSS request that Seagreen provides a copy of the code used to run the model and any QA/QC outputs that the software produces.

10.6.5 MSS have provided guidance on the presentation of the assessed change using the results of PVA (see Appendix IV). They advise that the results of an assessment using iPCOD should also be presented using these metrics.

10.6.6 **The Scottish Ministers advise that the iPCOD framework is used for species where population level impact assessments are undertaken. The Scottish Ministers request that a comprehensive list of the**

parameters input and other relevant information to allow MSS to be able to replicate the analysis is provided. As a minimum this must include:

- **The piling schedule**
- **The demographic parameters**
- **Starting population size**
- **Copy of the code used to run the model**
- **Any quality assurance/quality control outputs that the software produces**

10.6.7 **The Scottish Ministers advise that the results of the assessment using iPCOD should be presented using the metrics provided in the MSS guidance note.**

10.7 Cumulative Impact Assessment

10.7.1 SNH suggest any requirements for cumulative impact assessment can be discussed once the outputs from the updated noise modelling are available. A cumulative impact assessment will only be necessary if the piling (underwater noise) impacts are greater than previously assessed. As noted above MSS consider that this approach would not provide the information that will be required for the AA in relation to the Moray Firth SAC.

10.7.2 SNH suggest that if Seagreen wish to further develop their approach to cumulative impact assessment they recommend Seagreen review the marine mammals AA for the Aberdeen Harbour Expansion Project.

10.7.3 MSS agree with the list of projects to be included in a cumulative assessment that is provided in the Scoping Report and agree with SNH that the Aberdeen Harbour Expansion Project should also be included.

10.7.4 **The Scottish Ministers consider the following projects should be considered for inclusion in the cumulative impact assessment (for consistency the names are presented as they are found on the Marine Scotland webpage (where relevant)):**

- **Worst case scenario of Neart na Gaoithe (2014 as consented) or Neart na Gaoithe (2017 scoping report)**
- **Worst case scenario of Inch Cape (2014 as consented) or Inch Cape (2017 scoping report)**
- **Worst case scenario of Moray Offshore East Development or Moray East Offshore Wind Farm – Alternative Design**

- **Beatrice Offshore Wind Farm**
- **Moray West Offshore Wind Farm**
- **Aberdeen Harbour Expansion project**

10.7.5 **The CIA is likely to benefit from discussion once the initial results of the noise modelling are available, therefore the list of projects to be included may be refined following this.**

11 Fish and Shellfish Resource

11.1 Background

11.1.1 In the Scoping Report Seagreen stated that they considered that, except for the impacts resulting from underwater noise on noise sensitive fish species, all likely impacts of the Revised Development on Fish and Shellfish Resource, will be less than those assessed for the Original Development and therefore should be scoped out of the EIA Report due to the following:

- Baseline data remaining valid
- The cumulative baseline remaining valid
- No material change to assessment methodology/best practice

11.1.2 Seagreen outlined specific questions in their Scoping Report, the information below has been provided to answer these questions and to provide additional information with regard to issues raised by stakeholders. This information has been informed by advice from MSS.

Scoping Question	Question
7.1	Does MS-LOT agree that the assessment on fish and shellfish resource should only consider the effects from underwater noise?
7.2	Does MS-LOT agree that, with the exception of the changes to the underwater noise modelling, the assessment methodology for fish and shellfish resources can remain the same as used for the 2012 EIA?

11.2 Diadromous fish

11.2.1 The Scottish Ministers agree, in the majority of cases, that the existing fish and shellfish baseline and proposed updates are appropriate to the potential level of impact from the proposed Revised Development. The exception is in

relation to diadromous fish. The main points raised were:

11.2.2 MSS provided information on recently published work that provided more evidence on:

- Adult salmon routes to the coast during migration (Godfrey et al., 2014[21] and 2015[22])
- Coastal migration of salmon smolts (Lothian et al., 2017[23])
- The importance of geomagnetic navigation post-smolts in migrating to sea feeding grounds and by returning adult salmon in homing to their natal rivers (Putman et al., 2013[24] and Putman et al., 2014[25])
- The timing of salmon smolt movement across Scotland (Malcolm et al., 2015[26])

11.2.3 MSS note that this information provides more evidence to support the assumption from the Original Development ES that salmon are present in the Development Area. MSS consider that the Original Development ES understated the likelihood that salmon will be present and that this new evidence provides more detail regarding where the salmon are likely to be.

11.2.4 **The 2017 EIA Regulations require that the Scottish Ministers come to a reasoned conclusion, based on up to date information, on the**

[21] Godfrey, JD, Stewart, DC, Middlemas SJ and Armstrong JD (2014) Depth use and movements of homing Atlantic salmon (*Salmo salar*) in Scottish coastal waters in relation to marine renewable energy development. Scottish Marine and Freshwater Science. Volume 5 Number 18 http://www.gov.scot/Resource/0046/00466487.pdf

[22] Godfrey, JD Stewart, DC Middlemas, SJ and Armstrong, JD (2015) Depth use and migratory behaviour of homing Atlantic salmon (*Salmo salar*) in Scottish coastal waters. ICES Journal of Marine Science, 72: 568–575. http://icesjms.oxfordjournals.org/content/early/2014/07/16/icesjms.fsu118.full.pdf?keytype=ref&ijkey=y9lmPDRLdC04n7B

[23] Lothian AJ, Newton M, Barry, J, Walters M, Miller RC and Adams CE (2017) Migration pathways, speed and mortality of Atlantic salmon (Salmo salar) smolts in a Scottish river and the near-shore coastal marine environment. Ecology of Freshwater Fish. On line via http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1600-0633/earlyview as an early view paper

[24] Malcolm, IA, Millar CP and Millidine KJ (2015) Spatio-temporal variability in Scottish smolt emigration times and sizes. Scottish Marine and Freshwater Science. Volume 6 Number 2 http://www.gov.scot/Resource/0047/00472202.pdf.

[25] Putman,NF, Lohmann, KJ, Putman, EM, Quinn,TP, Klimley, AP and Noakes, DLG (2013) Evidence for Geomagnetic Imprinting as a Homing Mechanism in Pacific Salmon. Current Biology 23, 312–316 http://www.cell.com/current-biology/pdf/S0960-9822(13)00003-1.pdf

[26] Putman,NF,Scanlan,MM, Billman,EJ, O'Neil, JP, Couture, RB, Quinn, TP, Lohmann,KJ and Noakes, DLG (2014) An Inherited Magnetic Map Guides Ocean Navigation in Juvenile Pacific Salmon. Current Biology 24, 446–450 http://www.cell.com/current-biology/pdf/S0960-9822(14)00018-9.pdf

significant effects of the Revised Development. As the information noted above has been published since the previous assessment the Scottish Ministers advise Seagreen to consider whether it changes the outcome of the Original Development ES and, if so, carry out a further assessment. If Seagreen consider no further assessment is required they must provide justification of their reasons.

11.2.5 **The Scottish Ministers agree, with the exception of diadromous fish, that the existing fish and shellfish baseline and proposed updates are appropriate to the potential level of impact from the Revised Development.**

11.2.6 The Scottish Ministers note two potential impacts that require further consideration within the impact assessment:

11.3 Impact of suspended sediment and smothering on scallops and nephrops

11.3.1 The SFF raised the issue of the need for an assessment of the impact of suspended sediment in smothering species such as scallops and nephrops in their consultation response and during discussions at the stakeholder meetings.

11.3.2 Advice from MSS noted that the possible use of gravity base structures would require significant dredging operations and lead to increased suspended solids and increased smothering impacts. MSS note that structures such as monopoles or pin piles would not be likely to have such an effect. Adult and larval scallops have a low tolerance to smothering and to increases in suspended sediment levels although adults are able to swim and may be able to escape the impacts. The behaviour and survival of scallop larvae and their ability to settle on suitable substrate would also be affected. Adult nephrops are more tolerant to smothering and to suspended solid load increases and decreases but MSS noted that more information on larval production, larval development and juvenile nephrops behaviour is required to understand the effect on these life stages. MSS note that the dredging would also have an effect by destroying populations of nephrops and by removing sediments best suited to burrowing and that re-colonisation/recovery would be prolonged.

11.3.3 MSS provided advice on a suggested approach for assessing the impact of sediment on scallops and nephrops.

11.3.4 **If gravity base foundations are to be used the Scottish Ministers advise that for fish and shellfish ecology further work to assess the impact of**

sediment on scallops and nephrops is carried out. The Scottish Ministers advise that the following two pieces of work be undertaken:

- **A review of literature on effects of suspended sediments to scallops and nephrops (including different life stages); and**
- **Physical process modelling of likely spatial extent of suspended sediments from activities of concern.**

These could be used to provide a comparison with the spatial extent of the scallop and nephrops fishery, identified from commercial fisheries data (e.g. Vessel Monitoring System ("VMS") data as described by Kafas *et al* (2012[27]) and found online at Kafas *et al* (2013[28]). This would allow an understanding of the spatial extent of effects, if any, to scallops and nephrops and provide a context within which to consider them. If Seagreen consider that there are no significant effects and scope this potential impact out of further assessment they must provide justification for this decision.

11.3.5 **The Scottish Ministers advise Seagreen to follow the approach suggested by MSS and outlined above and provide an overview of the potential impact of suspended sediment and smothering on scallops and nephrops.**

11.4 Particle motion

11.4.1 Since the ES for the Seagreen Original Development was produced there has been a considerable increase in the relevant literature which suggests that there is potential for impacts from acoustic particle motion on fish and invertebrates. An issue that has been raised by MSS at the scoping meetings is the need to consider potential impact of acoustic particle motion on sensitive receptors in addition to the effects of sound pressure on fish species that are sensitive to this.

11.4.2 There is acknowledgement that understanding of the effects from particle motion, and extent of these effects, is currently an area for further development, and there are various initiatives being progressed. MSS considers that the currently available evidence suggests that particle motion could be an important mechanism of effect on fishes and invertebrates. As

[27] Kafas A, Jones G, Watret R, Davies I and Scott B (2012). Representation of the use of marine space by commercial fisheries in marine spatial planning. ICES CM I:23.

[28] Kafas A, Jones G, Watret R, Davies I and Scott B (2013) 2009 - 2013 amalgamated VMS intensity layers, GIS Data. Marine Scotland, Scottish Government. doi: 10.7489/1706-1

the 2017 EIA Regulations require the Scottish Ministers to come to a reasoned conclusion on the significant effects on the environment of the development, based on up to date information, this information needs to be taken into account. MSS has provided a list of references (Appendix V).

11.4.3 MSS suggests that Seagreen takes the following approach:

- Provide an overview of currently available information on particle motion within the vicinity of noise producing construction and operational activities, including, for example, pile driving, dredging and explosions – both within the water column and the sea bed. This should include consideration of the likely distances at which elevated levels of particle motion may be detected.
- Provide an overview of the published information on sensitive species and potential physiological and behavioural effects of particle motion.
- Give consideration to the potential effects of particle motion on species known to occur around the Revised Development site, making use of information on species distribution from the Original Development ES and information which has become available since then. Particular attention should be given to potential effects on species of commercial or conservation concern.
- Provide information on opportunities that the Revised Development may present to investigate effects of particle motion on fish and invertebrates.

11.4.4 **The Scottish Ministers agree that the potential impact of particle motion should be assessed and suggests that Seagreen follows the approach outlined by MSS.**

12 Seascape, Landscape and Visual Amenity

12.1 Background

12.1.1 In the Scoping Report Seagreen stated that due to the following reasons, it is necessary for a new assessment to be undertaken and therefore, this topic will be scoped into the EIA Report:

- Material changes to assessment methodology
- Amendments to the design (resulting in changes to impacts, but not expected to result in significant effect)
- Changes to the cumulative baseline data

Scoping Question	Question

8.1	Does MS-LOT agree that a revised SLVIA is required?
AC, ELC and SNH all comment that a revised SLVIA is required and provide information to inform the assessment. **The Scottish Ministers agree that a revised SLVIA is required, owing to the increase in the maximum wind turbine tip height and rotor diameter.**	

Scoping Question	Question
8.2	Does MS-LOT agree with the proposed SLVIA methodology?
SNH noted that they would welcome further explanation and discussion of the wind farm design objectives for Seagreen and taking the neighbouring wind farms into account. SNH provide detailed comments in their response and Seagreen are advised to consider these carefully. SNH note that their guidance [29] [30] remains relevant but note that the size of the turbines being proposed are considerably larger than any others which SNH has considered to date. SNH broadly accepts the use of a 50km study area but notes that there may be sensitive visual receptors located on the border or just beyond that may require consideration and SNH defer to the local authorities to identify these. SNH also provide comment on the changes in visibility from use of larger turbines and provide a suggested approach whereby a comparison of the model outputs of the increase in turbine size in appropriate increments (either as individual or composite ZTVs) with the ZTV for the 2014 consented scheme is provided to give more detailed information on the amount and range of visibility of the larger turbines. AC highlighted that lighting does not appear to form part of the proposed assessment, unlike the other Forth and Tay developments. Angus Council have requested that lighting scenarios are included in the SLVIA and compared the brightness of existing lighting on telecommunication masts within the Sidlaws. ACV highlight that the existing study area should be increased, due to the increase of the maximum height of the turbines. They note the latest SNH guidance on visualisations, which recommends a radius of 45km for turbines 150m+ and states that greater distances may need to be considered for larger turbines. AC also drew attention to their response to the consultation for the Original Development.	

[29] *Offshore renewables – guidance on assessing the impact on coastal landscape and seascape.* SNH (2012). Available from: www.snh.gov.uk/docs/A702206.pdf

[30] *Visual Representation of Wind Farms*. SNH (2014). Available from: **www.snh.gov.uk/planning-and-development/renewable-energy/visual-representation/**

AC also raised concerns regarding the potential for vastly different sizes of turbines within the Firth of Forth and Firth of Tay, which could lead to unacceptable cumulative impacts. Clarity is sought on the state of the existing consents and Angus Council highlighted the need for narrower design envelopes and greater consistency between developments in this area.

ELC note that it is not clear from the information provided whether or not the wind farm would be visible from East Lothian but have provided comment on the assumption it would be. ELC note that there is no reasoning given for concluding that at distances greater than 50km effects are expected to be insignificant. ELC consider that turbine development affecting the unbroken sea horizon as viewed from coastal areas is a significant seascape/landscape feature and could be considered significant. ELC also note that night time lighting may expand the visibility of the turbines upwards and outwards and potentially bring visibility which is not there is the daylight. ELC consider that as the turbines are higher than the lowest range of the highest turbine size given in the SNH advice for which a 45km study area is suggested then a larger study area than 50km could usefully be considered. ELC note that if the study area is expanded the potential for examination of further seascape units, settlements etc. should also be considered.

The Scottish Ministers:

- **Advise that the baseline coastal character assessment previously undertaken by the Forth and Tay offshore wind developer's group can be used.**
- **Agree that the additional potentially sensitive visual receptors should be agreed with the relevant local authorities**
- **Advise Seagreen to provide a clear explanation of the approach being taken to the wind farm design and the choice of layout taking into account advice from SNH and comments received previously from Angus Council**
- **Agree with the suggestion by SNH that a comparison of the model outputs of the increase in turbine size in appropriate increments (either as individual or composite ZTVs) with the ZTV for the 2014 consented scheme is provided to give more detailed information on the amount and range of visibility of the larger turbines**
- **Advise that wind farm lighting (including night time lighting) should be considered as part of the EIA Report**

The Scottish Ministers advise that the following developments should be considered in the cumulative impact assessment for SLVIA:

- **Worst case scenario of Neart na Gaoithe (2014 as consented) or Neart na Gaoithe (2017 scoping report)**
- **Worst case scenario of Inch Cape (2014 as consented) or Inch Cape (2017 scoping report)**
- **Kincardine Offshore Wind Farm**
- **Forthwind Offshore Wind Farm (2016 consent)**
- **Forthwind Offshore Wind Demonstration Project**
- **Onshore wind farms as advised by Local Authorities**

Scoping Question	Question
8.3	Does MS-LOT agree with the proposed SLVIA viewpoints?

SNH are content with the same viewpoint selection being used as for the previous assessment but defer to the local authorities to suggest additional viewpoints to take account of the larger turbines.

SNH broadly accept the continued use of the existing baseline photography but note that new photography may be necessary for any views that have changed substantially e.g. where changes such as afforestation/deforestation, new power lines or other new developments may alter the foreground significantly. SNH note that photographs for viewpoints along the Angus coast, including St Cyrus, Lunan and Arbroath signal tower (viewpoints 2, 5 and 6) have been taken with the sun to the southeast when turbines would be viewed partially looking into the sun. SNH recommend that at least one of these photographs is re-taken to represent clearer views during late afternoon when the turbines would be front-lit with the sun behind the viewer.

SNH note that any photomontages should address changes in circumference and height in order to consider whether they make a discernible difference to the appearance of the turbines, particularly in closer views.

SNH note that the main effect of an increase in turbine height will be a change in perspective, with the larger Seagreen turbines potentially appearing closer in view. SNH suggest using analysis based on the increased vertical field of view and comparing this with the previous assessment. SNH consider it is important to explore this issue and would welcome any other ideas on the approach.

Angus Council are satisfied with the original viewpoints subject to the potential inclusion of additional viewpoints from inland locations, due to the increase in blade tip height and rotor diameter. In order to accurately evaluate the need for additional viewpoints, Angus Council request ZTVs (and viewpoints) on a 50k OS base, at a resolution where place names are available, which should differentiate between hub and tip visibility. With an increased ZTV radius, Angus Council believes it is likely

viewpoints from the Braes of Angus may have to be included.

Angus Council also recommend that the baseline photography is checked, due to recent wind turbine developments which may now be visible in the photography. If new developments are now visible, the photography will have to be retaken.

ELC note distance and likely atmospheric conditions would reduce visibility of the development from East Lothian but request wireframes for two viewpoints within East Lothian (if the proposal is visible from these locations) regardless of whether they are included within the study area on not. These are North Berwick Law and a low lying coastal view such as Dunbar Cliffs, the A198, Tantallon Castle, St Baldreds cradle or Yellowcraig. ECL provide more detail in their response as to their reasoning for requesting these viewpoints and note that they will support public participation in the decision.

Mainstream Renewable Power, on behalf of Neart na Gaoithe Offshore Wind Limited, anticipate final agreement on the maximum tip height by mid-August 2017. This updated information will be provided to Seagreen to assist with cumulative impact assessment and the production of photomontages.

The Scottish Ministers advise Seagreen to consider the viewpoints as recommended by ELC and AC and to agree with ELC and AC whether they are required to be included.

The Scottish Ministers advise Seagreen to retake photographs where stakeholders have recommended that this should be done to represent clearer views or to adhere to SNH's new guidelines.

13 Shipping and Navigation

13.1 Background

13.1.1 In the Scoping Report Seagreen stated that they considered that Shipping and Navigation should be scoped into the EIA Report due to the prediction of significant effects in the Original Development ES.

Scoping Question	Question
9.1	Does MS-LOT agree with the suggested assessment receptors for the shipping and navigation assessment?
RYA Scotland agree with the proposed receptors for shipping and navigation. The	

MCA highlight that the ES should supply detail on the possible impacts on navigational issues for both Commercial and Recreational craft. The MCA will require an updated Navigational Risk Assessment to be submitted in accordance with MGN 543 and the MCA Methodology (see consultation response). MCA also highlight that particular attention should be paid to cabling routes, and where appropriate a Burial Protection Index study should be completed and, subject to traffic volumes, an anchor penetration study may be required.

The Scottish Ministers agree with the suggested assessment receptors for the shipping and navigation assessment.

Scoping Question	Question
9.2	Does MS-LOT agree that AIS surveys are required?

RYAS do not believe that the AIS surveys for recreational vessels need to be updated, due to the availability of updated track data for recreational vessels in the area.

The UK Chamber of Shipping agree that AIS, radar and observational data on shipping movements over appropriate periods will need to be recorded and analysed, and the requirements of MGN 524(M+F) taken into consideration.

The MCA highlight that particular consideration needs to be given to the implications of the site size and location on SAR resources and Emergency Response Co-operation Plans. They recommend that attention should be paid to the level of radar surveillance, AIS and shore-based VHF radio coverage and consideration should be given to appropriate mitigation, such as radar, AIS receivers and in-field, Marine Band VHF radio communications aerial(s) (VHF voice with Digital Selective Calling (DSC).

The Scottish Ministers agree that AIS surveys are required for shipping movements during the appropriate period, but not for recreational vessels.

Scoping Question	Question
9.3	Does MS-LOT agree that updated assessment for shipping and navigation will only be required to assess the significance of effects identified in 2012?

NLB have confirmed that they are satisfied with the topics to be included in the EIA report and those sections requiring updated data. NLB are also content with the extension of the operational lifespan to 50 years at this site.

The MCA note that traffic studies were conducted in 2011, however, they expect a

new traffic study to be undertaken to provide more current data. The MCA would be willing to discuss the survey data requirements with the developer.

The Scottish Ministers agree that the shipping baseline assessment requires updating with marine traffic survey data (in line with MGN 543) but recommend that Seagreen have on-going discussions with the MCA and the RYA to agree these requirements.

The Scottish Ministers recommend that Seagreen discuss and agree the specific requirements for an updated Navigational Risk Assessment with the MCA. The outcomes of these discussions should determine whether the previous NRA remains representative of the baseline. If so, the Scottish Minister agree that the conclusions of the Original Development EIA remain valid.

The Scottish Ministers recommend that Seagreen confirm with the MCA which receptors should be included in the Navigational Risk Assessment (if required, see above) to ensure the requirements the MCA outline in their consultation response are taken into account.

The Scottish Ministers advise that the following should be included in the cumulative impact assessment and advise that Seagreen confirm with the MCA that this is appropriate:

- **Worst case scenario of Inch Cape (2014 as consented) or Inch Cape (2017 scoping report)**
- **Worst case scenario of Neart na Gaoithe (2014 as consented) or Neart na Gaoithe (2017 scoping report)**

14 Military and Civil Aviation

14.1 Background

14.1.1 In the Scoping Report Seagreen provide details on the potential effects on civil and military aviation receptors resulting from the construction, operation and decommissioning of the Revised Development. Seagreen concluded that Military and Civil Aviation should be included within the EIA Report due to the proposed changes to the design envelope.

Scoping Question	Question
10.1	Does MS-LOT agree that military and civil aviation should be

	scoped into the 2017 EIA?

The DIO are satisfied that military aviation matters are adequately considered in the Scoping Report and will work with the developer to ensure MOD concerns are addressed.

NATS highlighted that the proposal would have significant adverse impacts on the Perwinnes Radar and air traffic control at Prestwick Centre, Prestwick Centre Military and Aberdeen en-route, which could be addressed through the implementation of agreed mitigation measures, outlined in their consultation response.

The Scottish Ministers agree that military and civil aviation should be scoped into the 2017 EIA and recommend that Seagreen have discussions, prior to submission of any application, to resolve any issues. Time could be saved post consent if agreements could be reached and agreed by both parties.

The Scottish Ministers consider that the following projects should be included in the Revised Development cumulative assessment:

- **Worst case scenario of Inch Cape (2014 as consented) or Inch Cape (2017 scoping report)**
- **Worst case scenario of Neart na Gaoithe (2014 as consented) or Neart na Gaoithe (2017 scoping report)**
- **Kincardine Offshore Wind Farm**
- **European Offshore Wind Deployment Centre**
- **Hywind Scotland Pilot Park**
- **Forthwind Offshore Wind Farm (2016 consent)**
- **Forthwind Offshore Wind Demonstration Project**
- **Blyth Offshore Wind Farm – 2 turbines**
- **Blyth Offshore Wind Demonstration Project – 15 turbines**
- **Beatrice Offshore Wind Farm**
- **Worst case scenario of Moray Offshore East Development or Moray East Offshore Wind Farm – Alternative Design**
- **Moray West Offshore Wind Farm**
- **Offshore Renewable Energy Catapult Levenmouth**

15 Physical Environment

15.1 Background

15.1.1 In the Scoping Report Seagreen stated that they concluded that the likely impacts on Physical Environment from the Revised Development will remain as previously assessed for the Original Development and will be scoped out

of the EIA Report due to the following:

- No significant effects concluded in the Original Development ES
- Baseline data remaining valid
- No material change to assessment best practice
- Changes in the revised design envelope

Scoping Question	Question
11.1	Does MS-LOT agree that no further work is required for validation of site characterisation in terms of the physical environment?
11.2	Does MS-LOT agree that no further assessment in the EIA is required in terms of physical environment?
SNH note they are satisfied that the proposed use of fewer, larger turbines falls well within the 'worst case' previously assessed and that there is no need to update metocean modelling or modelling of suspended sediment. SNH also note that for the transmission works there are conditions that apply to the relevant marine licence and that these will be transferred across to any new licence. SNH state they do not identify any outstanding matters requiring reassessment. **The Scottish Ministers note that there may be a requirement for physical process modelling of likely spatial extent of suspended sediments from activities of concern e.g. gravity bases to inform the assessment of the impact of suspended sediments and smothering on scallops and nephrops (see section 11.3.4).**	

16 Water and Sediment Quality

16.1 Background

16.1.1 In the Scoping Report Seagreen stated that they concluded that the likely impacts on Water and Sediment Quality from the Revised Development will remain as previously assessed for the Original Development and will be scoped out of the EIA Report due to the following:

- No significant effects concluded in the Original Development ES
- Baseline data remaining valid
- No material change to assessment best practice
- Changes in the revised design envelope

Scoping Question	Question
12.1	Does MS-LOT agree that no further work is required for validation of site characterisation in terms of water and sediment quality?
12.2	Does MS-LOT agree that no further assessment in the EIA is required in terms of water and sediment quality?
SEPA raised points regarding water quality during any onshore construction works, including provision for foul and surface water drainage. The SFF raise the point regarding assessment of impacts of suspended sediments and smothering on any seabed dwelling species. **The Scottish Ministers agree there is no requirement for further validation of site characterisation or further assessment in relation to water and sediment quality but advise Seagreen to note the comments with regard to the need to assess the impact of suspended sediment and smothering (see section 11.3.4).**	

17 Benthic Ecology

17.1 Background

17.1.1 In the Scoping Report Seagreen stated that they concluded that the likely impacts on Benthic Ecology from the Revised Development will remain as previously assessed for the Original Development and will be scoped out of the EIA Report due to the following:

- No significant effects concluded in the Original Development ES
- Baseline data remaining valid
- No material change to assessment best practice
- Changes in the revised design envelope

Scoping Question	Question
13.1	Does MS-LOT agree that no further work is required for validation of site characterisation in terms of benthic ecology?
13.2	Does MS-LOT agree that no further assessment in the EIA is required in terms of benthic ecology?
SNH note that the proposed use of fewer, larger turbines at the Seagreen wind farm	

will reduce the scale of habitat loss and / or habitat disturbance so that impacts fall within the 'worst case' previously assessed for all proposed foundation types. This previous 'worst case' assessment was based on use of gravity bases and although this foundation choice is still part of the design envelope the number of turbines will be reduced (from 150 for Seagreen Alpha and Bravo together up to a new maximum of 120 for Seagreen phase 1).

SNH also note that Seagreen overlaps part of the Firth of Forth Banks Complex Nature Conservation Marine Protected Area (MPA)[31] which was designated prior to the issue of consent for the original proposals (Alpha and Bravo).SNH have reviewed the information provided by Marine Scotland (informed by advice they requested from JNCC) in their submission to and confirm that no further assessment is required for any new application: as for other benthic interests, reducing the number of turbines will also reduce any impacts on the MPA from the 'worst case' previously assessed.

SNH are satisfied that the scoping report provides full consideration and justification for scoping out benthic interests from further assessment. A number of conditions apply to the consented scheme and will be transferred to any new consent: these will minimise and mitigate any impacts on benthic ecology, including MPA features of interest.

The Scottish Ministers agree that no further work to validate site characterisation or any further assessment in the EIA is required in terms of benthic ecology.

18 Commercial Fisheries

18.1 Background

18.1.1 In the Scoping Report Seagreen stated that they concluded that the likely impacts on Commercial Fisheries will be less than those assessed for the Original Development and will be scoped out of the EIA Report due to the following:

- No significant effects concluded in the Original Development ES
- Baseline data remaining valid
- No material change to assessment best practice
- No material change to data collection
- Changes in the revised design envelope
-

[31] Further information on the **Firth of Forth Banks Complex Nature Conservation MPA available from:**http://jncc.defra.gov.uk/page-6480

Scoping Question	Question
14.1	Does MS-LOT agree with the suggested assessment receptors for the commercial fisheries assessment?
14.2	Does MS-LOT agree that updated consideration of commercial fisheries will include a supplementary review of contemporary landings data to ensure the most representative baseline is considered?
14.3	Does MS-LOT agree that updated assessment for commercial fisheries will only be required should the review of contemporary landings data identify a significant change to the baseline and to assess the significance of effects on crab and lobster fishery?

At the stakeholder meeting on 27 June 2017 and in the consultation response from SFF it was noted that squid fishing has grown in significance in the area from Aberdeen to the Bass Rock. The SFF also noted that creel fisheries may have increased in this area and that this topic should be carefully examined. SFF highlighted that there has been an increase in the amount of static gear fishing and this would include as far out as the Seagreen site. Other topics raised were that the EIA Report includes information regarding shelter areas located outwith the Revised Development site during the construction period to ensure that, should consent be granted, fishing equipment is not damaged when construction vessels need to shelter. Further discussion regarding this topic will take place at the post-consent stage (if consented). The EIA Report should also include information regarding safety zones during construction, maintenance and operation – particularly any schedule for 'rolling safety zones' during construction, to support any future safety zone application(s) in relation to the proposed Revised Development. Seagreen should consider where best to deal with these issues, it may be more efficient to deal with them in the Shipping and Navigation assessment.

The SFF do not believe, given the dynamic nature of the environment and the commercial fishing industry, that there is sufficient reason to scope out commercial fisheries. The SFF expect that the updated fisheries data baseline will be verified, preferably through the Commercial Fisheries Working Group ("CFWG") to ensure stakeholder credibility. The SFF suggest that the CFWG should officially agree any form of mitigation prior to any consent being granted, to ensure on-going engagement and co-operation with the fishing industry (including engagement regarding areas lost to fishing, vessel movements during construction and cable works etc.).

It was suggested that these changes need to be taken into account and used to

update the baseline, this should then be checked by the Forth and Tay Commercial Fisheries Working Group to verify these data. MSS provided information on data sources at the stakeholder meeting (links below) and Seagreen are advised to consider these and use them to inform their baseline. SFF suggested a Crown Estate report on the effects on the fishery in the Irish Sea of an offshore wind farm could provide useful information[32].

- Kafas, A., McLay, A., Chimienti, M., Scott, B. E., Davies, I., and Gubbins, M. 2017. ScotMap: Participatory mapping of inshore fishing activity to inform marine spatial planning in Scotland. Marine Policy, 79.
- ScotMap report http://marinedata.scotland.gov.uk/dataset/scotmap-inshore-fisheries-mapping-scotland-recording-fishermen%E2%80%99s-use-sea/resource/2dd86dfa
- Plotter data from the Crown Estate's Fishermen's Information Mapping database
- "Evidence Gathering in Support of Sustainable Scottish Inshore Fisheries" http://www.masts.ac.uk/research/sustainable-scottish-inshore-fisheries/
- "Scottish Inshore Fisheries Integrated Data System (SIFIDS)" http://www.masts.ac.uk/research/emff-sifids-project/
- Interpolated VMS fishing tracks can assist with direction of fishing. MSS has a paper in preparation by a former student placement (Mailys Bilett) that might be useful. Available on request.

The Scottish Ministers have noted the comments provided by SFF and have taken into account the main issues raised during the stakeholder meetings with all three Forth and Tay developers. These are listed below and Seagreen is advised to consider these in relation to the proposed scope of the EIA:

- The need to update the baseline and the information required to do so (discussed above), this was discussed at the meeting on 27 June and Seagreen are advised to take into account the information provided to the meeting
- The importance of having a long enough data set for the scallop fishery to take account of the cyclical nature of the fishery
- The need to consider all vessels, including those under 15m in length, in any assessment
- The need to consult the Commercial Fisheries Working Group to validate data and agree mitigation measures (discussed above)
- The need for adequate spacing between structures, MSS recommend 1km and requested Seagreen provide information in their EIA Report to support using less than this.
- The need for cable burial to be carried out in a way that the seabed is left

[32] https://www.thecrownestate.co.uk/media/502008/ei-changes-to-fishing-practices-around-the-uk-as-a-result-of-the-development-of-offshore-windfarms.pdf - Crown Estate report referenced again to demonstrate uncertainty regarding impacts on commercial fisheries

in a safe condition for fishing and the need to take the most up to date information into account
- The need to consider anchorages and queuing of vessels. Seagreen could consider including this in the Vessel Management Plan
- MSS noted the Fisheries Liaison with Offshore Wind and Wet Renewables ("FLOWW") guidance in reference to disruption payments should be referenced in the EIA Report
- The potential effect of sediments and smothering for shellfish, scallops, nephrops, crabs and lobsters (discussed above)

The Scottish Ministers do not agree that the effects in Table 14.2 of the Scoping Report should be scoped out. The Scottish Ministers advise that there is a requirement to update and review the commercial fisheries baseline and advise Seagreen to take into account the information provided by stakeholders and during the stakeholder meeting on 27 June 2017.

The Scottish Ministers note that further information has been provided to update the baseline and advise Seagreen to include to inform the update of the baseline data in relation to commercial fisheries.

The Scottish Ministers advise Seagreen to obtain validation of the baseline data from the fishing industry and to discuss with the SFF how this could best be done.

The Scottish Ministers recommend the following projects are included in the cumulative impact assessment:

- **Worst case scenario of Neart na Gaoithe (2014 as consented) or Neart na Gaoithe (2017 scoping report)**
- **Worst case scenario of Inch Cape (2014 as consented) or Inch Cape (2017 scoping report)**
- **Kincardine Offshore Wind Farm**
- **Forthwind Offshore Wind Farm (2016 consent)**
- **Forthwind Offshore Wind Demonstration Project**
- **Offshore Renewable Energy Catapult Levenmouth**

In addition the Scottish Ministers advise the following list of projects for assessing the cumulative impact on the nomadic scallop fleet. The Scottish Ministers note that these projects may be relevant for assessment the cumulative impact on the squid fishery.

- **European Offshore Wind Deployment Centre**
- **Hywind Scotland Pilot Park**

- **Blyth Offshore Wind Farm – 2 turbines**
- **Blyth Offshore Wind Demonstration Project – 15 turbines**
- **Beatrice Offshore Wind Farm**
- **Worst case scenario of Moray Offshore East Development or Moray East Offshore Wind Farm – Alternative Design**
- **Moray Firth Offshore Wind Western Development Area**
- **Rampion Offshore Wind Farm**

The Scottish Ministers also note the concerns raised by SFF in relation to anchoring of oil rigs and the development of anchorages and moorings by Forth Ports and the potential cumulative impact these could have and advise Seagreen to consider whether these will have a significant impact.

19 Archaeology and Cultural Heritage

19.1 Background

19.1.1 In the Scoping Report Seagreen stated that they concluded that whilst some changes to the design envelope for the Revised Development are considered likely to increase the visual impact from the Original Development, it is expected that the effects will remain the same as those assessed for the Original Development and therefore should be scoped out of the EIA Report due to the following:

- No significant effects concluded in the Original Development ES
- Baseline data remaining valid
- No material change to assessment best practice
- No material change to data collection
- Changes in the revised design envelope

Scoping Question	Question
15.1	Does MS-LOT agree that cultural heritage can be scoped out of the assessment?
Historic Environment Scotland (“HES”) confirm that there are no marine or terrestrial heritage assets within their remit located within the proposed development area. HES are content that direct impacts on marine archaeology are scoped out of the EIA report, in light of the previous survey work undertaken and the detailed baseline data available. HES welcomed the identified mitigation measures for direct impacts, including the archaeological exclusion zones, a written scheme of investigation and a protocol for archaeological discoveries. HES are satisfied that, given the distance between them, the offshore works will not result in significant adverse impacts on the	

setting of terrestrial assets within their remit. HES are content that revisions to the scheme will not alter the findings of the 2012 ES in relation to cumulative setting impacts, nor will the proposed development lead to significant cumulative impacts.

Angus Council, in their consultation response to the Original Development, raised concerns regarding the lack of assessment on the Bell Rock lighthouse and Ladyloan Signal Tower. Angus Council considers that, due to the change in turbine numbers and the potential increase in blade tip height, an updated Settings analysis should be included in the ES, using Managing Change in Historic Environment: Setting (HES 2016[33]) to assess impacts on setting.

The Scottish Ministers agree that cultural heritage can be scoped out of the EIA assessment but recommend that Seagreen note the concerns of Angus Council with respect to Bell Rock Lighthouse and Ladyloan Signal tower and discuss with AC how this can be resolved.

20 Socio-Economics, Tourism and Recreation

20.1 Background

20.1.1 In the Scoping Report Seagreen stated that they considered that the revised parameters and methodology will not alter the conclusions of the previous ES and therefore Socio-Economics, Tourism and Recreation should be scoped out of the EIA Report due to the following:

- No significant effects concluded in the Original Development ES
- Baseline data remaining valid
- No material change to assessment best practice
- No material change to data collection

Scoping Question	Question
16.1	Does MS-LOT agree that socio-economics, tourism and recreation can be scoped out of the 2017 EIA?
The Scottish Ministers agree that socio-economics, tourism and recreation can be scoped out of the 2017 EIA.	

[33] https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=80b7c0a0-584b-4625-b1fd-a60b009c2549

21 Other Marine Users and Activities

21.1 Background

21.1.1 In the Scoping Report Seagreen stated that they concluded that the likely impacts on Other Marine Users and Activities from the Revised Development will not be altered from the Original Development and can be scoped out of the EIA Report due to the following:

- No significant effects concluded in the Original Development ES
- Baseline data remaining valid
- No material change to assessment best practice
- No material change to data collection
- Changes in the revised design envelope

Scoping Question	Question
17.1	Does MS-LOT agree that other marine users and activities can be scoped out of the assessment?
RYAS recommend that Kincardine and Aberdeen Bay should also be included within any cumulative impact assessment, due to the impact of increased levels of watchkeeping on recreational vessels, as a result of displaced commercial vessels. Transport Scotland request that potential trunk road related environmental impacts (associated with increased traffic), such as driver delay, severance, pedestrian amenity, safety etc. should be considered and assessed as appropriate within the ES. Transport Scotland have also provided thresholds for further assessment and assessment methodology within their response. **The Scottish Ministers agree that other marine users and activities can be scoped out of the EIA.**	

22 Marine Planning

Offshore Renewable Energy development should be in accordance with the UK Marine Policy Statement and Scotland's National Marine Plan ("NMP").

The UK Marine Policy Statement 2011 – The UK Administrations share a common vision of having clean, healthy, safe, productive and biologically diverse oceans and seas. Joint adoption of a UK-wide Marine Policy Statement provides a consistent high-level policy context for the development of marine plans across the UK to achieve this vision. It also sets out the interrelationship between marine and terrestrial planning regimes. It 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.

Scotland's NMP 2015 – Developed in accordance with the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009 (as amended), the NMP provides a comprehensive statutory planning framework for all activities out to 200 nautical miles. This includes policies for the sustainable management of a wide range of marine industries. The Scottish Ministers must make authorization and enforcement decisions, or any other decision that affects the marine environment, in accordance with the NMP. The NMP sets out a presumption in favour of sustainable development and use of the marine environment when consistent with the policies and objectives of the Plan.

23 Land Use Planning

The Scottish Government's planning policies are set out in the National Planning Framework, Scottish Planning Policy, Designing Places and Circulars.

The National Planning Framework is the Scottish Government's Strategy for Scotland's long term spatial development.

Scottish Planning Policy is a statement of Scottish Government policy on land use planning and contains:

- The Scottish Government's view of the purpose of planning,
- the core principles for the operation of the system and the objectives for key parts of the system,
- statutory guidance on sustainable development and planning under Section 3E of the Planning etc. (Scotland) Act 2006,
- concise subject planning policies, including the implications for development planning and development management, and
- The Scottish Government's expectations of the intended outcomes of the planning system.

Other land use planning documents which may be relevant to this proposal include:

- Angus Council Renewable Energy Implementation Guide
- Angus Council Strategic Landscape Capacity Assessment for Wind Energy in Angus
- Angus Local Development Plan
- Angus windfarms – landscape capacity and cumulative impact study
- Dundee Local Development Plan
- East Lothian Local Development Plan
- Fife Local Development Plan (FIFEplan)
- Fife Planning Guidance – Renewable Energy
- Fife Planning Guidance – Wind Energy
- Marine Guidance Note ("MGN") 543 (M+F) Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – UK Navigational Practice, Safety and Emergency Response
- MCA Methodology for Assessing the Marine Navigational Safety & Emergency Response Risks of Offshore Renewable Energy Installations
- PAN 1/2011: Planning and Noise
- PAN 1/2013: Environmental Impact Assessment
- PAN 51: Planning, Environmental Protection and Regulation (Revised 2006)
- PAN 60: Planning for Natural Heritage
- PAN 62: Radio Telecommunications
- PAN 68: Design Statements
- PAN 75: Planning for Transport
- PAN 79: Water and Drainage
- Planning Advice Note ("PAN") 2/2011: Archaeology – Planning Process and Scheduled Monument Procedures
- SNH Guidance – Visual Representation of wind farms 2017

24 General EIA Report Issues

24.1 Gaelic Language

24.1.1 Where developments are located in areas where Gaelic is spoken, Developers are encouraged to adopt best practice by publicising the project details in both English and Gaelic.

24.2 Application and EIA Report

24.2.1 A gap analysis template is attached at Appendix VII to record the environmental concerns identified during the scoping process. This template

should be completed and used to inform the preparation of the EIA Report. Please note that the EIA Report must contain all of the information specified in the scoping opinion. On submission of the application and supporting EIA Report, the Scottish Ministers, via a gatecheck process, will review the completed template in conjunction with the EIA Report to ensure this is the case. The gatecheck will also include an EIA audit. If information requested at scoping stage has not been provided in the EIA Report then the applicant will be asked to provide that information.

24.2.2 Please note all aspects of this scoping opinion should be considered when preparing a formal application to reduce the need to submit further information in support of the application. The consultee comments presented in this opinion are designed to offer an opportunity to consider all material issues relating to the development proposals.

24.2.3 The exact nature of the work that is needed to inform the EIA may vary depending on the design choices. The EIA must address this uncertainty so that there is a clear explanation of the potential impact of each of the different scenarios. It should be noted that any changes produced after the EIA Report is submitted may require further environmental assessment and public consultation.

24.2.4 In assessing the quality and suitability of applications, the Scottish Ministers will use the gap analysis and this scoping opinion in assessment of the application. In addition to scoping, applications are required to go through a gate check process. See Appendix VI for further information on this. Developers are advised not to publicise applications in the local or national press, until advised to do so by the Scottish Ministers.

25 Multi-Stage Regulatory Consent

25.1 Background

25.1.1 The Marine Works 2017 (as amended) and The Electricity Works 2017 (as amended) both contain provisions regulating the assessment of environmental impacts. A multi-stage consent process arises where a consent procedure comprises more than one stage, one stage involving a principal decision and one or more other stages involving an implementing decision(s) within the parameters set by the principal decision. While the effects which a project may have on the environment must be identified and assessed at the time of the procedure relating to the principal decision if those affects are not identified or identifiable at the time of the principal decision, assessment must be undertaken at the subsequent stage.

25.1.2 The definition in The Electricity Works 2017 (as amended) is as follows (the definition in The Marine Works 2017 (as amended) provides for the same but in relation to "regulatory approvals": "*application for multi-stage consent" means an application for approval, consent or agreement required by a condition included in an Electricity Act consent where (in terms of the condition) that approval, consent or agreement must be obtained from the Scottish Ministers before all or part of the development permitted by the Electricity Act consent may be begun."*

25.1.3 A section 36 consent or marine licence granted by the Scottish Ministers for your Revised Development is likely to have several conditions attached requiring approvals etc. which fall under this definition, for example the approval of a CMS.

25.1.4 When making an application for multi-stage consent Seagreen will be required to satisfy the Scottish Ministers that no significant effects have been identified in addition to those already assessed in the EIA Report. In doing so, Seagreen will be required to account for current (meaning at the time of application for multi-stage consent) knowledge and methods of assessment which address the likely significant effects of the development on the environment so to enable the Scottish Ministers to reach a reasoned conclusion which is up to date.

25.1.5 If during the consideration of the information provided in support of an application for multi-stage consent the Scottish Ministers consider that the development may have significant environmental effects which have not previously been identified in the EIA Report (perhaps due to revised construction methods or updated survey information), then information on such effects will be required. This information will fall to be dealt with as additional information under the EIA Regulations and procedures for consultation, public participation, public notice and decision notice of additional information will apply.

26 Judicial review

All decisions may be subject to judicial review. A judicial review statement should be made available to the public.

Signed

Gayle Holland
15 September 2017
Authorised by the Scottish Ministers to sign in that behalf

Appendix I: Consultee Responses

Consultee Comments relating to Seagreen Phase 1 Offshore Project

Angus Council

In response to your email of 7 June 2017 in connection with the above my Council would offer the following response.

The key considerations from the proposal in relation to impacts on Angus are:

1. Landscape impact;
2. Seascape impact;
3. Visual impact;
4. Cumulative landscape;
5. Cumulative seascape impact;
6. Cumulative visual impact; and
7. Impact on cultural heritage

Therefore our response is related to Chapters 8 and 15 of the Scoping Report.

Scoping Questions – SLVIA

8.1 Does MS-LOT agree that a revised SLVIA is required?

The maximum height of the turbines have been increased to 280m therefore the turbines would be visible over an increased distance therefore it is considered that the study area should be increased. It is noted that the latest SNH published guidance on visualisations recommends a radius of 45km for turbines 150m+. The guidance does however state that greater distances may need to be considered for the larger turbines used offshore.

Angus Council is concerned that lighting does not appear to form part of the proposed assessment unlike Inch Cape and Neart na Gaoithe developments. Given the potential height of turbines we would request that lighting scenarios be included in the SLVIA and compared with the brightness of lighting which currently exists on telecommunication masts within the Sidlaws.

8.2 Does MS-LOT agree with the proposed SLVIA methodology?

Angus Council is generally content with the proposed methodology and approach to conducting the SLVIA but this would be subject to our specific comments made in Angus Council's response to Marine Scotland in respect of the original development

being addressed in the SLVIA (paragraphs 6.12-6.17).

In relation to the cumulative assessment of the offshore developments we have concerns regarding the potential for vastly different sizes of turbines in the different off-shore developments which could lead to unacceptable cumulative impacts. It is considered that the applicants make clear their intentions with regards to the existing consents as these design envelopes could have to form part of the cumulative assessment. It would be likely that an acceptable proposal would seek to narrow envelope size and create greater consistency between developments.

8.3 Does MS-LOT agree with the proposed SLVIA viewpoints?

The same viewpoints will continue to be relevant and it would be appropriate that they are used again. However, given the increase in blade tip height and rotor diameter, we would wish to consider the need for additional viewpoints from inland location. To evaluate the need for additional viewpoints, we would request the ZTVs (and viewpoints) on a 50k OS base, at a resolution where place names are legible. These should differentiate between hub and tip visibility. With an increased ZTV radius it is likely that viewpoints from the Braes of Angus may have to be included.

It is noted that the baseline photography will be checked to assess changes. In particular, there is likely to be some viewpoints where turbines have been erected in recent years which would now be visible in the photography. In these circumstances, the photography will have to be retaken. This is less likely to affect coastal viewpoints.

Scoping Question – Archaeology and Cultural Heritage

15.1 Does MS-LOT agree that cultural heritage can be scoped out of the assessment?

Angus Council, in its consultation response to the original development raised concerns regarding the lack of assessment on the Bell Rock lighthouse and Ladyloan Signal Tower in the ES (paragraphs 6.33-6.38) and considers that due to the change in turbine number and the potential increase in blade tip height that an updated Settings analysis should be included in the ES with impacts on setting being assessed using Managing Change in Historic Environment: Setting (HES 2016).

BT Radio Network Protection

We have studied this offshore wind farm proposal with respect to EMC and related problems to BT point-to-point microwave radio links.

The conclusion is that the project should not cause interference to BT's current and presently planned radio networks.

Defence Infrastructure Organisation

Please accept this email as confirmation that the Defence Infrastructure Organisation (DIO), on behalf of the Ministry of Defence (MOD), wishes to be considered a Consultation Body and be duly notified of the project updates.

DIO is content that military aviation matters are adequately considered in the Scoping Report at Chapter 10 and will work with the developer to ensure that the MODs concerns are addressed.

Dundee City Council

Thank you for your invitation to comment on the Scoping Report associated with development of Seagreen Offshore Windfarm Phase 1. The framework for the Environmental Assessment of the proposal laid out in the report appears satisfactory and at this time I have no other comments to make.

East Lothian Council

I refer to your consultation of East Lothian Council on the above.

The Council has three areas of interest in this application.

Ornithology

Firstly, the conservation of the bird population of the Special Protection Areas of our coast in particular that of the Forth Islands SPA, Firth of Forth SPA and the Outer Firth of Forth and St Andrews Bay Complex. We are content to defer to the expertise of Scottish Natural Heritage on this matter.

Landscape/seascape

Secondly, the appearance of the windfarm in views from East Lothian. I agree that landscape, seascape and visual impact should be scoped in. It is not clear from the information supplied whether or not the windfarm would in fact be visible from East

Lothian, and the following comments are based on the assumption that it would be.

The study area chosen is 50km. SNH advice in Visual Representation of Windfarms ("SNH advice") is that (paragraph 50) "wind turbines can be visible at considerably greater distances than 30km and, regardless of likely significance, potential visibility should be illustrated on the ZTV to an agreed radius. The reasons for establishing the eventual radius of a windfarm ZTV for use in an ES should be clearly established." The Scoping Report does not give reasoning for concluding that at distances greater than 50km effects are expected to be insignificant. Whilst recognising that effects are certainly lessened by distance, the unbroken sea horizon as viewed from coastal areas is a significant seascape/landscape feature. Turbine development affecting this feature, especially if it takes up a noticeable proportion of that horizon, could be considered significant in coastal views despite the distance. Lighting of the proposal at night may expand the visibility of the turbines upwards and outwards, and potentially bring visibility which is not there in the daylight. The turbines envisaged at 280m are considerably higher than the lowest range of the highest turbine size given in SNH advice (150m+) which is at which a 45km study area is suggested. At nearly double the turbine size, a larger study area than 50km could usefully be considered. If the study area is expanded, the potential for examination of further seascape units, settlements &c should also be considered.

I recognise that both distance and likely atmospheric conditions would reduce visibility of the development from East Lothian. However, I would request that wireframes are provided for two viewpoints within East Lothian, if the proposal is visible from these locations, regardless of whether they are included within the study area or not. These are:

- North Berwick Law: 355642 E 684254 N

- A lower lying coastal view: our preference would be Dunbar Cliffs: 367102 E 679370 N, though if there is no visibility there but visibility at other similar locations another point could be chosen: alternatives that could be considered for this include the A198 (358200, 685137), Tantallon Castle (359583, 685026), St Baldreds cradle (viewpoints at around 363821, 681268) or Yellowcraig, either on the beach (351985, 686072) or Yellowcraig itself (359583, 685026).

Wireframes are considered sufficient to consider any impact, with photomontages thought unlikely to be helpful at this distance. Should the proposal not be visible from North Berwick Law, no replacement wireframe would be requested. If it is not visible from Dunbar Cliffs, but is visible from other low lying coastal locations, one of the alternatives should be chosen.

North Berwick Law is a well used panoramic viewpoint, with open views in all

directions. It should be included in the recognised vantage points on page 72 of the Scoping report. The Law is also an Area of Great Landscape Value, and also proposed as a Special Landscape Area through the emerging Local Development Plan.

Dunbar Cliffs has a clear view towards the development, and this view is intended to represent both recreational users and views from the town of Dunbar, as well as views from other lower lying coastal parts of East Lothian. The viewpoint is within an Area of Great Landscape Value, and is proposed to be within a Special Landscape Area through the emerging Local Development Plan, as is much of the East Lothian coast. The alternatives given are views primarily from coastal recreational areas. It is not anticipated that the impact from these views would be significant due to the distance and atmospheric conditions. However, the view of the sea horizon from recreational and residential areas is considered a sensitive receptor, and an impact on this therefore has the potential to be significant which should be explored through the Environmental Statement. The inclusion of these wireframes is also requested to support public participation in the decision.

Fishing

Thirdly, impact on fishing interests in East Lothian. Fisheries baseline information should include information what fish are actually being caught and where, as noted in the Scoping Report. This information could be supported by surveys of the industry as well as commercial fisheries data.

Additional information for the applicant

The development plan for East Lothian consists of the South East Scotland Plan (SESPlan) and the East Lothian Local Plan 2008, links to which can be found here: http://www.eastlothian.gov.uk/info/204/local_development_plan/231/statutory_development_plans/3

The proposed East Lothian Local Development Plan has just been submitted to the DPEA for Examination. Links to submitted documents can be found here: http://www.eastlothian.gov.uk/info/204/local_development_plan/1818/proposed_ldp_submitted_to_scottish_ministers_for_examination/2

Other supporting documentation (including Technical Note 9: Landscape Review) can be found here: http://www.eastlothian.gov.uk/info/204/local_development_plan/1777/proposed_local_development_plan

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Fife Council

Thank you for the opportunity to comment on the scoping request submitted by Seagreen's operators.

Having looked at this, and the scoping reports for the Inch Cape and Neart Na Gaoithe wind farms also, it appears that there are slightly different approaches being used and this is a concern especially as the in-combination assessment of these proposals is an important consideration. One example is as follows.

Seagreen Phase 1 scoping report states that:

'additional boat-based data collected during the 2017 breeding season (April to September). This is in recognition of the increasing age of the current dataset and potential population changes in a regional environment where some seabird species appear to be declining whilst others, such as gannet, are increasing (JNCC 2016). It will allow the density and population of each species within the Site to be recalculated and the list of sensitive receptors to be reviewed. As before, this data will be supplemented by existing seabird tracking data and literature relevant to the Site plus any which has become available since 2013.'

Neart Na Gaoithe scoping report states that:

'It is considered unlikely that any significant alteration to the seabird populations and distribution in the survey area will have taken place between the time of surveying and the present, other than natural variations associated with, for example, small-scale variations in prey distribution. Therefore, it is concluded that the data remains adequate to provide a basis for the assessment of potential effects on birds and in respect of this Scoping process.'

It is essential that there is consistency in the assessment methodologies used across the different projects, however Marine Scotland and SNH specialists will need to advise on the detail/technicalities.

Historic Environment Scotland

Thank you for your consultation which we received on 06 June 2017 about the above scoping report. We have reviewed the details in terms of our historic environment interests. This covers world heritage sites, scheduled monuments and their settings, category A-listed buildings and their settings, inventory gardens and designed landscapes, inventory battlefields and historic marine protected areas (HMPAs). In this case our advice also includes matters relating to marine archaeology outwith the scope of the terrestrial planning system.

The relevant local authority archaeological and cultural heritage advisors will also be able to offer advice on the scope of the cultural heritage assessment. This may include heritage assets not covered by our interests, such as unscheduled archaeology, and category B- and C-listed buildings.

Proposed Development

I understand that the proposed development comprises revised proposals for the Seagreen Phase 1 Off-shore Wind Farm (previously known as Seagreen Alpha and Seagreen Bravo) and associated transmission works, located in the Phase 1 area of the Firth of Forth.

It is my understanding that the revised scheme will consist of an array between 70 and 120 turbines, with an anticipated approximate height to tip of 280m. We welcome the clear description of the alterations to the scheme from the consented scheme as presented in the scoping report.

Scope of assessment

Direct impacts

I can confirm that there are no marine or terrestrial heritage assets within our remit located with the proposed development area.

We note that it is proposed to scope direct impacts on marine archaeology out of the EIA assessment. In light of the previous survey work undertaken, and the detailed baseline data available, we are content that this is acceptable for our interests.

We welcome the identified mitigation measures for direct impacts. These include archaeological exclusion zones, a written scheme of investigation, and a protocol for archaeological discoveries. We would be happy to provide comments on any of these elements of the scheme.

Impacts on setting

We can also confirm that there are a number of terrestrial heritage assets within a seascape setting in the vicinity of the proposed development area which may be affected by the proposals.

Overall, we are content that the offshore works will not have any direct impacts on terrestrial assets within our remit. Having reviewed the submitted information, taking into account the conclusions of the 2012 Environmental Statement (ES) and the distance between proposed offshore wind farm and the terrestrial assets, we are content that the offshore works will not results in significant adverse impacts on the setting of terrestrial assets within our statutory remit. We are also content that it is unlikely that the revisions to the scheme will alter the conclusions of the 2012 ES in relation to cumulative setting impacts and that the proposed development will not

lead to significant cumulative impacts.

We are therefore content that it is acceptable for this aspect of the assessment to be scoped out of the revised ES.

Mainstream Renewable Power

Thank you for your email and for the opportunity to comment on the recent Seagreen scoping report. I have a small number of comments on behalf of Neart na Gaoithe Offshore Wind Limited (NnGOWL). These all relate to the cumulative assessments and are as follows:

1. **Updated NnG design.** NnGOWL has submitted a scoping report for an updated design for the Neart na Gaoithe project. The updated design comprises a maximum of 56 turbines. The maximum tip height is anticipated to be fixed early-mid August and this information can be provided to Seagreen when available, to inform any relevant cumulative assessments or photomontages.

2. **Existing NnG consent.** Table 4.5 states that NnG has a maximum of 64 turbines and it is indeed our intention to construct no more than 64 turbines. However it should be noted that the consent was granted for 75 turbines (granted in October 2014, varied in March 2016), which I am highlighting for consideration when establishing scenarios for the cumulative impact assessments.

3. **Future submissions.** NnGOWL is open to working collaboratively with Seagreen and other neighbouring offshore developers, to seek to gain consistency in assessment approaches and cumulative design envelopes. We would be happy to meet Seagreen at any time to discuss relevant topics.

Maritime & Coastguard Agency

The MCA has reviewed the Offshore Scoping Report 2017 provided for by Seagreen Wind Energy for the Seagreen Phase 1 Offshore Project as detailed in your email dated 5th June 2017 and would comment as follows:

The Environmental Statement should supply detail on the possible the impact on navigational issues for both Commercial and Recreational craft, viz.

Collision Risk
Navigational Safety
Visual intrusion and noise
Risk Management and Emergency response
Marking and lighting of site and information to mariners
Effect on small craft navigational and communication equipment
The risk to drifting recreational craft in adverse weather or tidal conditions
The likely squeeze of small craft into the routes of larger commercial vessels.

A Navigational Risk Assessment update will need to be submitting in accordance with MGN 543 and the MCA Methodology for Assessing the Marine Navigational Safety & Emergency Response Risks of Offshore Renewable Energy Installations.

It is noted that traffic studies were carried out in 2011, however in line with the requirement that traffic studies should be completed within 24 months prior to the Environmental Statement submission we would expect a new traffic study to be undertaken. We would welcome discussions with the developer to agree the survey data requirements.

Particular attention should be paid to cabling routes and where appropriate burial depth for which a Burial Protection Index study should be completed and, subject to the traffic volumes, an anchor penetration study may be necessary. If cable protection are required e.g. rock bags, concrete mattresses, the MCA would be willing to accept a 5% reduction in surrounding depths referenced to Chart Datum. This will be particularly relevant where depths are decreasing towards shore and potential impacts on navigable water increase.

Any application for safety zones will need to be carefully assessed and additionally supported by experience from the development and construction stages.

Particular consideration will need to be given to the implications of the site size and location on SAR resources and Emergency Response Co-operation Plans (ERCoP). Attention should be paid to the level of radar surveillance, AIS and shore-based VHF radio coverage and give due consideration for appropriate mitigation such as radar, AIS receivers and in-field, Marine Band VHF radio communications aerial(s) (VHF voice with Digital Selective Calling (DSC)) that can cover the entire wind farm sites and their surrounding areas.

Murroes and Wellbank Community Council

Murroes and Wellbank Community Council have a “nil response” to the scoping document.

National Air Traffic Services

1. Background

1.1 En-route Consultation

NATS is responsible for the safe and expeditious movement in the en-route phase of flight for aircraft operating in controlled airspace in the UK. To undertake this responsibility it has a comprehensive infrastructure of radars, communication systems and navigational aids throughout the UK, all of which could be compromised by the establishment of a wind farm.

In this respect NATS is responsible for safeguarding this infrastructure to ensure its integrity to provide the required services to Air Traffic Control (ATC).
In order to discharge this responsibility NATS is a statutory consultee for all wind farm applications, and assesses the potential impact of every proposed development in the UK.

Section 3 of this document defines the assessments carried out against the development proposed in section 2, with the result detailed in section 5.1.

2. Application details

Seagreen Wind Energy submitted a request for a NATS En-Route assessment for Round 3 Offshore windfarm development known as Firth of Forth. The details of the development are yet to be finalised however phase 1 is likely to comprise of between 70-120 turbines and residing within the following boundary points.

Boundary	Lat	Long	East	North	Hub (m)	Tip (m)
1	56.6776	-1.9980	400221	753982	140	280
2	56.6767	-1.5846	425550	753959		
3	56.5317	-1.4885	431560	737861		
4	56.5075	-2.0512	396948	735050		
And then following the 12nm boundary of territorial water						

3. Assessments Required

The proposed development falls within the assessment area of the following systems:

Radar	Lat	Long	nm	km	Az (deg)	Type
Alanshill Radar	57.6431	-2.1655	58.3	108.0	168.6	CMB
Great Dun Fell Radar	54.6841	-2.4509	110.4	204.6	10.9	CMB
Lowther Hill Radar	55.3778	-3.7530	88.9	164.7	41.2	CMB
Perwinnes Radar	57.2123	-2.1309	32.4	60.1	162.9	CMB
Nav	**Lat**	**Long**	**nm**	**km**	**Az (deg)**	**Type**
None						
AGA	**Lat**	**Long**	**nm**	**km**	**Az (deg)**	**Type**
None						

Table 1 – Impacted Infrastructure

3.1 En-route radar technical assessment

3.1.1. Predicted impact on Perwinnes

Using the theory as described in Appendix A and development specific propagation profile it has been determined that with the limited terrain screening available to attenuate the signal, this development is likely to cause false primary plots to be generated.

3.1.2. En-route operational assessment of radar impact

Where an assessment reveals a technical impact on a specific NATS radar, the users of that radar are consulted to ascertain whether the anticipated impact is acceptable to their operations or not.

Unit or role	Comment
Prestwick Centre ATC	**Unacceptable**
Prestwick Centre Military ATC	**Unacceptable**
Aberdeen En-route ATC	**Unacceptable**

Note: The technical impact, as detailed above, has also been passed to non-NATS users of the affected radar, this may have included other planning consultees such as the MOD or other airports. Should these users consider the impact to be unacceptable it is expected that they will contact the planning authority directly to raise their concerns.

3.2 En-route navigational aid assessment

No impact on En-route Navigational Aids predicted or expected.

3.3 En-route radio communication assessment

No impact on Radio Communications predicted or expected.

4. Mitigation

4.1.1. Mitigation Proposal

Given the traffic patterns in the area and the availability of coverage from Lowther Hill at approx 4,500ft it was determined that simply blanking out PSR returns from Perwinnes should provide sufficient mitigation for this development as long as certain procedural changes are implemented and a map is provided on controllers displays indicating where no primary coverage is available in the event of a Lowther Hill failure.

The proposed procedural changes which would have to successfully make it through the procedure change process would affect traffic in Class G airspace underneath P18, or all traffic when P18 is not available.

Aberdeen can currently work traffic in the area of the Forth Windfarm Development to 55nms from the airfield. PC Tay sector and ScATCC (Mil) will have to amend procedures to transfer this traffic at 35nms from Aberdeen airfield rather than 55nms due to the poor PSR coverage due to the radar blanking required in the area of Forth Windfarm Development. The potential for later handovers of traffic may cause Aberdeen issues with traffic sequencing.

The MoD have expressed some reservations as to the acceptability of this mitigation is isolation however capturing their concerns was deemed to be out with the scope of this document.

5. Conclusions

5.1. En-route consultation

As of today’s date, in respect of the proposed development and the conditions detailed in section 2, NATS would be likely to raise an objection against the granting of planning permission, however a mitigation has been proposed that would allow NATS to withdraw any objection subject to its delivery.

Appendix A – background radar theory

Primary Radar False Plots

When radar transmits a pulse of energy with a power of $\mathbf{P_t}$ the power density, **P**, at a range of **r** is given by the equation:

$$P = \frac{G_t P_t}{4\pi r^2}$$

*Where **G_t** is the gain of the radar's antenna in the direction in question.*

If an object at this point in space has a radar cross section of **σ**, this can be treated as if the object re-radiates the pulse with a gain of **σ** and therefore the power density of the reflected signal at the radar is given by the equation:

$$P_a = \frac{\sigma P}{4\pi r^2} = \frac{\sigma G_t P_t}{(4\pi)^2 r^4}$$

The radar's ability to collect this power and feed it to its receiver is a function of its antenna's effective area, **A_e**, and is given by the equation:

$$P_r = P_a A_e = \frac{P_a G_r \lambda^2}{4\pi} = \frac{\sigma G_t G_r \lambda^2 P_t}{(4\pi)^3 r^4}$$

*Where **G_t** is the Radar antenna's receive gain in the direction of the object and **λ** is the radar's wavelength.*

In a real world environment this equation must be augmented to include losses due to a variety of factors both internal to the radar system as well as external losses due to terrain and atmospheric absorption.

*For simplicity these losses are generally combined in a single variable **L**.*

$$P_r = \frac{\sigma G_t G_r \lambda^2 P_t}{(4\pi)^3 r^4 L}$$

Secondary Radar Reflections

When modelling the impact on SSR the probability that an indirect signal reflected from a wind turbine has the signal strength to be confused for a real interrogation or reply can determined from a similar equation:

$$P_r = \frac{\sigma G_t G_r \lambda^2 P_t}{(4\pi)^3 r_t^2 r_r^2 L}$$

Where $\mathbf{r_t}$ and $\mathbf{r_r}$ are the range from radar-to-turbine and turbine-to-aircraft respectively. This equation can be rearranged to give the radius from the turbine within which an aircraft must be for reflections to become a problem.

$$r_r = \sqrt{\frac{\lambda^2}{(4\pi)^3}} \sqrt{\frac{\sigma G_t G_r P_t}{r_t^2 P_r L}}$$

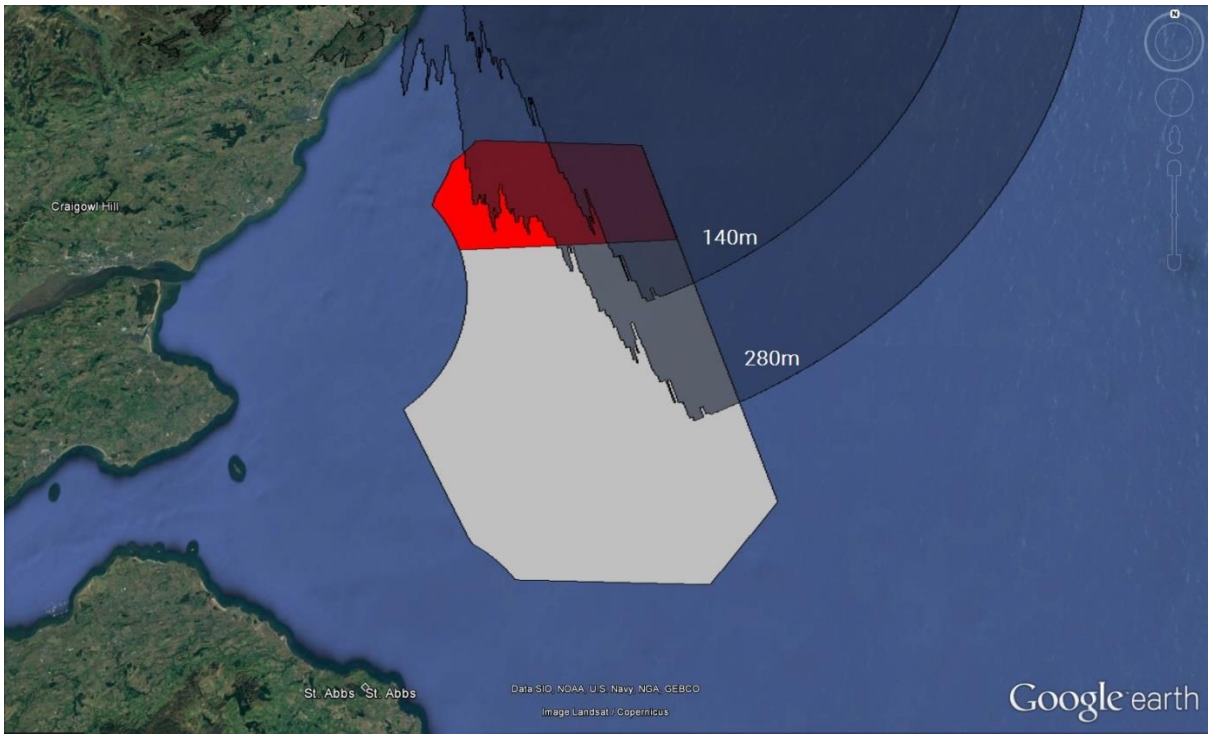
Shadowing

When turbines lie directly between a radar and an aircraft not only do they have the potential to absorb or deflect, enough power such that the signal is of insufficient level to be detected on arrival.
It is also possible that azimuth determination, whether this done via sliding window or monopulse, can be distorted giving rise to inaccurate position reporting.

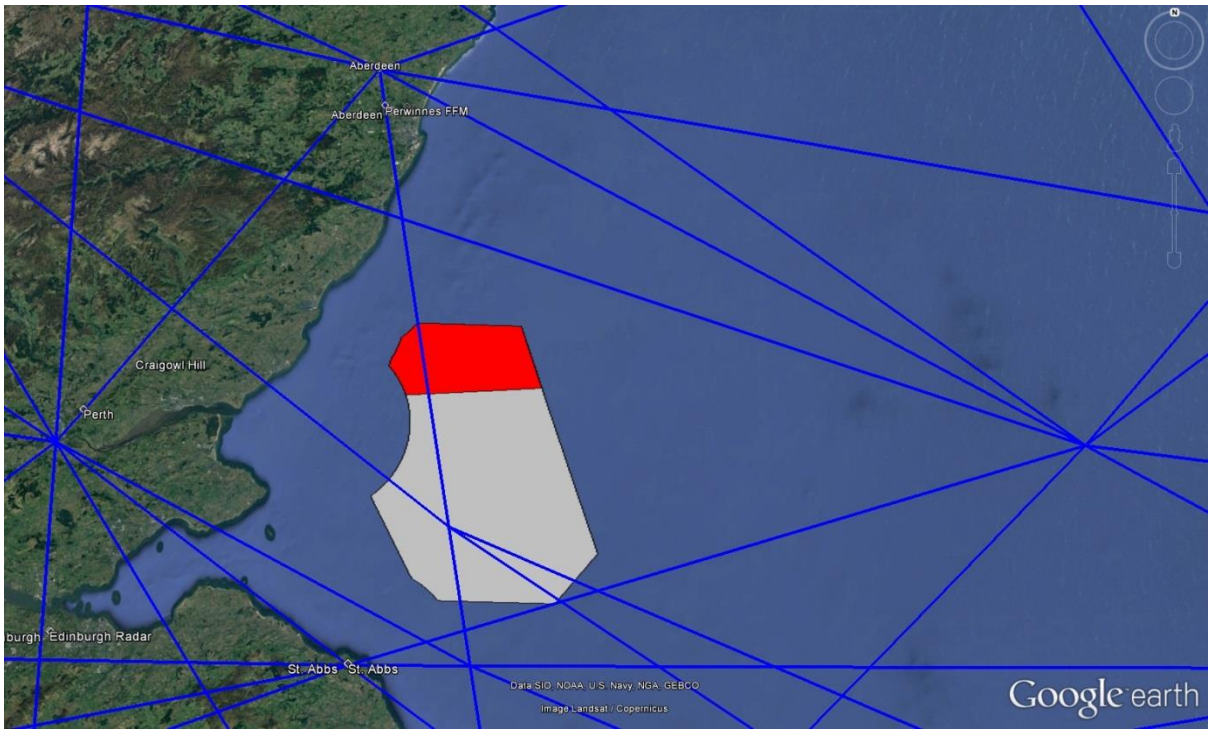
Terrain and Propagation Modelling

All terrain and propagation modelling is carried out by a software tool called ICS Telecom (version 6.99). All calculations of propagation losses are carried out with ICS Telecom configured to use the ITU-R 526 propagation model.

Appendix B – Diagrams



Seagreen site overlaid with line of sight coverage from Perwinnes



Seagreen site overlaid with Upper Air Route Structure

Northern Lighthouse Board

Thank you for your correspondence dated 05 June 2017 requesting a response to the submission by **Seagreen Wind Energy Limited** in which they seek confirmation that Northern Lighthouse Board is satisfied with the topics covered in preparation of an Environmental Impact Assessment submission for the revised development layout consisting of an array of between 70 and 120 turbines and associated infrastructure at the Seagreen Phase 1 OWF.

We would advise that the Northern Lighthouse Board are content with the topics to be included in the EIA and those sections requiring updated data. NLB are likewise content with the extension of operational life to 50 years at this site.

Royal Society for the Protection of Birds

RSPB Scotland welcomes this opportunity to comment on the scoping report for the above noted proposed offshore windfarm.

We recognise the significant reduction in turbine numbers of this new application when compared with the original project. The scale of potential impacts to seabirds is likely to be reduced in line with these changes. However, this project is located within an environmental sensitive region and is within foraging range of a number of breeding seabird colony SPAs. We therefore continue to have significant concerns with the risks this project poses to these seabird populations. In addition we have concerns with the potential in-combination impacts with other offshore proposals, including the Inch Cape and Neart na Gaoithe projects.

To assess these risks adequately through the Environmental Impact Assessment and Habitats Regulations Appraisal and to ensure the population scale effects of the proposal are clearly understood by the decision-maker, use must be made of the latest and best available science. In particular the relevant science and environmental information which has emerged since the original project consent was granted in October 2014.

Following discussions with Marine Scotland, Scottish Natural Heritage, Seagreen Wind Energy Ltd and the other two Firth of Forth developers, we have tried to establish as prescriptive a response as possible at this scoping stage. Our recommendations are included in the detailed annex and are intended to be consistent with those we have and will provide to the other developers.

Further discussion may be required to address some outstanding issues. We are

very keen to offer our support where clarification or further discussion is required.

ANNEX: RSPB Scotland scoping response – 5th July 2017

1.0 Operational Lifetime

In principle we support seeking to extend the operational lifetime of offshore wind projects. This could increase renewable energy generation and increase the overall lifecycle efficiencies of large scale renewable infrastructure. However, a proposed operating lifetime of up to 50 years presents challenges to the environmental assessment, which need to be overcome to enable a determination.

Our primary concern is the degree of uncertainty in predicting population scale effects on protected seabird colonies. Confidence in projected population model outputs decreases as time increases. This increasing lack of confidence extending to 25 years and beyond has a direct effect on the decision-makers' ability to reach an ecologically robust conclusion on the potential adverse effects to the Natura network and its protected species. We would welcome further discussion on this topic as mechanisms for addressing the issue may exist.

2.0 Environmental Baseline

2.1 Impacts and Species Scoped In

Potential Impact	Species to be included in assessment
Displacement	Puffin Razorbill Guillemot Kittiwake
Barrier	Puffin Razorbill Guillemot Kittiwake
Collision	Kittiwake Gannet Herring Gull Great Black Backed Gull Lesser Black Backed Gull

2.2 Cumulative/ In-combination Assessment

To undertake this part of the assessment a worst case scenario must be established. All three Forth and Tay developers have indicated their intention to submit new

alternative designs with fewer, larger turbines. However, all four project consents issued in 2014 could still be progressed.

Working on the above basis and with the assumption that the 2014 projects have the greatest potential impact to birds, we would suggest the worst-case scenario is the Seagreen revised development plus the Inch Cape and Neart na Gaoithe consented projects issued in 2014.

Verification will be required to demonstrate the working assumption above; that the 2014 consents are in fact the worst case in terms of impact. Another aspect, which will require further discussion, is that since 2014 further relevant science and environmental information has emerged and there have been changes to the methods of assessing ornithological impacts and these need to be accommodated.

2.3 EIA/HRA & Conservation Objectives

We recommend the Environmental Impact Assessment (EIA) and the Habitats Regulations Appraisal (HRA) are supported by a common impact assessment to avoid alternative or different methods of assessment being used to inform one but not the other. Ultimately, we are of the view that conclusions reached in both the EIA and HRA will invariably be consistent are not mutually exclusive.

We recommend the appropriate assessment of the implications of this project, in-combination with the other relevant projects, are made in view of all the SPA site/s conservation objectives. As required by regulation 48(1) the Habitats Regulations.

3.0 Assessment Methodologies

3.1 Reference Populations

The RSPB holds the results of an extensive seabird tracking programme. The information could provide additional evidence of seabird foraging distances. Information that can be used to identify reference populations for assessment purposes.

We have previously raised the potential of providing analysed information on foraging ranges to support the assessment. We will seek to provide this in due course.

3.2 Displacement

We defer to the guidance provided by SNH on the various attributes for undertaking

a displacement assessment.

3.3 Barrier

We defer to the guidance provided by SNH on the various attributes for undertaking an assessment of barrier impacts.

3.4 Collision risk modelling:

At present Band (2012) is the preferred model for undertaking the collision risk assessment.

Model Options: We recommend the use of the following model options and species specific avoidance rates. These recommendations align with SNH guidance, (as detailed in *Joint Response from the Statutory Nature Conservation Bodies to the Marine Scotland Science Avoidance Rate Review* 2014) except for our request to also present collisions for gannet applying a 98% avoidance rate during the breeding season. This is to account for the fact that the evidence presented in Cook et *al.* (2014)[34] for a change in avoidance rate for gannet was based almost entirely on non-breeding birds and as such is considered to ensure suitable precaution is applied in the assessment. This is in contrast to other species where the BTO review's evidence base included breeding birds. We also recommend the use of confidence measures as described in the SNCB guidance.

Species	Basic model	Extended model
Gannet	98.9% non-breeding & 98.0% breeding	n/a
Kittiwake	98.9%	n/a
Lesser black backed gull	99.5%	98.9%
Herring gull	99.5%	99.0%
Great black-backed gull	99.5%	98.9%

Nocturnal activity: We recommend that values are used as per the previous 2013/4 guidance provided by SNH. While, in line with Hamer 2009[35] we accept that gannets rarely forage at night, (although

[34] Cook, A.S.C.P., Humphreys, E.M., Masden, E.A. and Burton, N.H.K. 2014. The avoidance rates of collision between birds and offshore turbines. BTO Research Report No. 656.
[35] Hamer, K.C., et al. "Fine scale foraging behaviour of a medium ranging marine predator." *Journal of Animal Ecology* 78.4 (2009): 880-889.

note that Warwick-Evans *et al*., (2015)[36] recorded some plunge dives outwith sunrise and sunset) we do not accept the suggested change for breeding gannet (rate of 1 which equates to 0%), unless a detailed breakdown of the timing of surveys is presented. This is because including a proportion of birds flying at night compensates for the likely under-recording of birds associated with peaks in foraging activity outwith the survey timings.

For example, Warwick-Evans *et al*., (2015)[37] reported that activity associated with foraging by plunge diving, when collision risk is greatest[38], was highest between 0500 and 0600 and between 1900 and 2000 GMT. The purpose of differentiating between night-time and daytime flight activity, as detailed in the Band Model Guidance, is simply to separate between times when surveys take place ("daytime") and where they do not ("night-time") and the flight activity factor applied is a correction for this. In this absence of presentation timings for when the original surveys were carried out, it is unlikely they carried out surveys so far from shore between 1900 and 2000. As such the results for gannet could omit a large part of flight activity and therefore produce a potentially serious underestimation of collision risk. Reducing the nocturnal activity rating to 0% is therefore not considered sufficiently precautionary.

Summer

Breeding season:	As per SNH guidance
Boat based bias:	We support SNH's current position of not accounting for boat based biased as there is a lack of data to support any assumptions.
Proportion from SPA:	As per SNH approach.
Age classes:	Recommend including all age classes as per SNH advice and justification provided below which is equally relevant in this instance.

[36] Warwick-Evans, V., Atkinson, P.W., Gauvain, R.D., Robinson, L.A., Arnould, J.P.Y. & Green, J.A. (2015). Time-in-area represents foraging activity in a wide-ranging pelagic forager. Marine Ecology Progress Series, 527, 233-246.
[37] Warwick-Evans, V., Atkinson, P.W., Gauvain, R.D., Robinson, L.A., Arnould, J.P.Y. & Green, J.A. (2015). Time-in-area represents foraging activity in a wide-ranging pelagic forager. Marine Ecology Progress Series, 527, 233-246.
[38] Cleasby, I.R., Wakefield, E.D., Bearhop, S., Bodey, T.W., Votier, S.C. & Hamer, K.C. (2015). Three-dimensional tracking of a wide-ranging marine predator: flight heights and vulnerability to offshore wind farms. Journal of Applied Ecology, 52(6), 1474-1482.

Winter

Is it vital for consideration to also be made to potential impacts during the non-breeding season.

Non-breeding season:	Non breeding season mortality should be detailed.
Boat based bias:	As per above.
Proportion from SPA:	Non-breeding season collision mortality impacts must be considered in the context of the relevant SPA populations. To account for potential in-combination impacts to seabird populations we would also welcome further discussion on how to consider these mortalities in the context of regional BDMPs (east coast region) as listed in Furness, 2015[39]. We state this requirement for non-breeding season impact assessment as the JNCC guidance "The UK SPA network: its scope and content" recognises in the following paragraphs, protection requirements must apply across the year in order for the special conservation measures to achieve their conservation objectives: "A5.5 Qualifying species… In all these and similar instances, the provisions of the Habitats Regulations apply throughout the year, with no implied seasonality. … A5.5.2 Season occurrence… The inclusion of a site within a species suite ensures consideration of the conservation needs and ecological requirements of the relevant species at all times of year."
Proportion immature birds:	Not to excluded as per above justification.
Proportion adults:	As above.
Remove winter influx adults:	As per SNH advice.
Remove winter influx immature:	As per SNH advice.

3.5 PVAs

Species to be addressed:	As per SNH advice.

[39] Furness, R.W. 2015. Non-breeding season populations of seabirds in UK waters: Population sizes for Biologically Defined Minimum Population Scales (BDMPS). Natural England Commissioned Reports, Number 164.

Model population:	As per SNH advice.
Type:	Leslie Matrix Model, in either deterministic or stochastic form. If stochastic is used a full justification of how the measures of stochasticity have been incorporated must be provided, and whether the model includes demographic or environmental stochasticity, or both.
Run:	As per SNH advice.
Demographic rates:	As per Horswill & Robinson, 2015[40].
Output metrics:	Present either as formula or table to allow for testing a range of mortality input scenarios. To present counterfactuals as per Cook & Robinson 2016[41].

3.6 pSPAs

Firth of Forth and St Andrew's Bay Complex proposed SPA (pSPA) requires inclusion in the assessment. We defer to SNH's guidance on what is required to inform the HRA.

Responses from RSPB and SNH with regard to cable installation works

Response from SNH to RSPB and MS-LOT – 09 August 2017

Thank you for raising your query about SNH advice on the cable installation works for the Forth & Tay wind farms in relation to the Outer Forth and St Andrew's Bay Complex pSPA.

In providing our scoping advice to MS-LOT, we considered all possible impacts from the cables on the pSPA. We considered whether designation of the new pSPA would make a material difference to previous assessment or raise any new or different ornithological issues which had not been previously assessed.

We did consider potential loss or damage to supporting habitat and prey species within the pSPA, arising from cable installation, as well as any disturbance to pSPA bird interests. We advise that any habitats or prey disturbed during the cable laying should not take long to recover and we'd note that developers are seeking to

[40] Horswill, C. & Robinson R.A. 2015. Review of seabird demographic rates and density dependence. JNCC Report No. 552. Joint Nature Conservation Committee, Peterborough.
[41] Cook, A.S.C.P. & Robinson, R.A. 2016. Testing sensitivity of metrics of seabird population response to offshore wind farm effects. JNCC Report No. 553. JNCC, Peterborough.

minimise the amount of cable protection, if it's used at all. We do not consider that cable installation will give rise to any significant amount of permanent habitat loss. We're satisfied that the previous assessments adequately address cable impacts for each of the Forth & Tay wind farms. The Section 36, marine licence and onshore planning consents, as issued, require submission of a cable installation plan (or cable lay strategy). This will set out good practice working measures and any required mitigation to minimise habitat / prey disturbance and to avoid any significant disturbance of seabirds and waterfowl, including pSPA features of interest.
We therefore do not require further assessment or information from developers in this regard. We do, however, recognise that MS-LOT will need to address cable installation in any new appropriate assessment(s) for the pSPA – hence we've copied them in.

We note that East Lothian Council have undertaken an appropriate assessment for the Inch Cape transmission works (as attached). This addresses the impacts of cable installation on wintering waterfowl as features of the Firth of Forth SPA, and seabirds as features of Forth Islands SPA. In respect of the Outer Forth and St Andrew's Bay Complex pSPA, any new appropriate assessments for Forth & Tay wind farms can be informed by this previous work and the conclusions reached.

Response from RSPB to SNH and MS-LOT – 31 August 2017

Thank you for your email clarifying SNH's position on the assessment of the pSPA. We accept that potential impacts on the pSPA from the export cabling and NNG turbine array could be small, however this doesn't necessarily mean they are insignificant. We consider it necessary that further information be provided to inform the requirements of the Birds & Habitats Directive.

Previous 2013/14 assessment was undertaken to fulfil the requirements of the EIA regulations/ Directive, however we don't consider this to be sufficient to inform the stricter requirements of the Habs Regs and assessing against the new pSPA and its conservation objectives.

The pSPA introduces very specific conservation objectives for maintaining the extent and distribution of supporting habitats and processes. We suggest information on the scale and longevity of effect on these supporting habitats needs to be presented. Some areas within the pSPA are clearly more important than others, as the bird distribution maps and pSPA documentation illustrates. The East Lothian Council HRAs do not provide this information as they relate to SPAs that do not extend beyond the low tide ranges/ or limited to coastal waters around the islands.
From a brief review of existing EIA documents from the old consents the proposals are summarised as follows. All four offshore projects have export cables that cross through the pSPA:

Installation includes:

- Trenching of cables to 2-3m depth wherever possible. Where not possible - use of scour protection/ rock armour/ concrete mattresses etc.
- Trenches up to 1-6m width direct impact per cable.
- Affected width up to 10-15m but could be more – up to 40m.
- Use of boulder clearance ploughs where required. For soft sediments use of trenching ploughs and cable burial ploughs/ jetting trenchers. For hard substrate rock wheel cutters/ HDD or open cut trenching.

Export Cable Lengths:

Inch Cape – 2 cables at 83.3km each.
NnG – 2 cables at 43km each. Total Impact footprint of array and export cable estimated at – 2.65Km2.

This scale of infrastructure deployment within an pSPA is not insignificant.

Furthermore:

Both ICOL and Seagreen have not quantified the scale of affected area that lies within the pSPA as it was not considered first time around. Also, Seagreen have a separate consent for their export cable, which would require inclusion in the HRA. We recommend that all possible impacts from the cables on the pSPA are quantified as far as is practically possible (given baseline data limitations) to inform the Appropriate Assessment.

Advice from SNH to MS-LOT (dated 07 September 2017)

Both MS and SNH have recently received an email from RSPB (31 August 2017) regarding scoping advice on the cabling works associated with the Forth and Tay proposals and the proposed Special Protection Area (pSPA).

Whist SNH remains of the opinion that the effects arising from the cabling works can be managed to reduce impacts, we realise that there may be insufficient details to inform any appropriate assessments required. The conservation objectives are not yet finalised for the pSPA, however we would recommend that the developers should provide the following information:

- Extent and route of export cable corridors and number of cables.
- Duration and method of cable deployment including start and finish dates.

- Type and number of vessels involved in cable laying operations
- Habitat mapping within cable corridor and the likely prey species of pSPA interests where the cable route crosses the pSPA.
- Use of any cable protection materials – type, location and method of deployment.
- Schedule of operational maintenance checks, types of vessels, duration and timing.
- Any proposed mitigation and inclusion of draft cable laying plan and cable maintenance plan.

Provision of this information can then be used to help inform any appropriate assessment.

Royal Yachting Association (Scotland)

I have read the revised scoping document, particularly Chapter 9: Shipping and Navigation, on behalf of RYA Scotland and make the following response.

1. I agree with the suggested assessment receptors for the shipping and navigation assessment.

2. I disagree that additional AIS surveys are required for recreational vessels. Since the 2012 ES was published, a new edition of the UK Coastal Atlas of Recreational Boating has been released (http://www.rya.org.uk/knowledge-advice/planning-environment/Pages/uk-coastal-atlas-of-recreational-boating.aspx). Unlike the previous version, it is based on AIS transmissions as research has shown that about 20% of recreational boats on passage transmit an AIS signal. In locations such as that for Seagreen, the tracks of these vessels are considered representative of all recreational boats on passage. If this new dataset is used I see no need to collect additional AIS data for recreational craft. There may also be relevant data in the Scottish Marine Recreation & Tourism Survey 2015 (http://www.gov.scot/Topics/marine/seamanagement/national/RecandTourism).

3. The updated assessment for shipping and navigation is only required to assess the significance of effects identified in 2012.

4. A Pilot book for these waters based on the existing Imray *Yachtsman's Pilot North and East Scotland* and the Forth Yacht Clubs Association *Pilot Handbook East Coast of Scotland* is currently being prepared for publication by Imray, Norie & Wilson Ltd. Incorporation of details of the windfarm in this pilot would be a helpful additional form of mitigation for the operational phase.

5. While the key cumulative sites consist of Inch Cape and Neart na Gaoithe offshore wind farms as noted in section 9.16, the Kincardine floating wind farm and the Aberdeen Bay scheme should also be considered. This is not

due to a direct increased risk of collision but rather the impact of increased levels of watchkeeping that will be required on passages up or down the east coast as commercial vessels are likely to be displaced.

Scottish Environment Protection Agency

Thank you for consulting SEPA on the scoping opinion for the above development proposal by your email received on 05 June 2017.

1. The Scope of the EIA

1.1. SEPA's remit does not extend into the marine environment in which this wind farm will be located and, therefore, we have no advice to contribute to the scope of the EIA for the turbines.

1.2. It is likely; however, that there might be an onshore construction and maintenance compound and we believe it is important that this is addressed in the EIA. Elements we would like to see considered, and developed through the EIA if there are likely significant impacts include the following.

- Flood risk to the on-shore elements or increased flood risk elsewhere, as a consequence of the development of the compound. The compound is likely to have a coastal location and coastal flood risk is a possibility that should be considered.

- Provision for foul and surface water drainage. Will foul water drain to the Scottish Water sewer or will a private arrangement be made for construction and maintenance workers. If a private discharge is required then a licence from SEPA may be necessary and early contact should be made with the relevant, local SEPA team (details at Section 2). Also, there may be the need for the local fresh water environment to be protected from disturbance and the discharge of sediments and spoil from the construction of the compound and there may need to be a surface water management system to be in place to ensure no longer term impacts to the on-shore water environment.

2. Details of regulatory advice

2.1. Details of regulatory requirements and good practice advice for the applicant can be found on the Regulations section of our website. If you are unable to find the advice you need for a specific regulatory matter, please contact a member of the regulations team in the local SEPA office.

2.2. Should the onshore elements of the windfarm be located in Fife, please contact:
SEPA, Pentland Court, The Saltire Centre, Glenrothes, KY6 2DA, Tel. 01592 776910

2.3. Should the onshore elements of the windfarm be located on the southern side of the Forth, please contact:
SEPA, Silvan House, 3rd Floor, 231 Corstorphine Road, Edinburgh, EH12 7AT, Tel: 0131 449 7296

Scottish Fishermen's Federation

The Scottish Fishermen's Federation is pleased to respond to this application on behalf of the 500 plus fishing vessels in membership of its nine constituent associations:- the Anglo Scottish Fishermen's Association, the Clyde Fishermen's Association, the Fife Fishermen's Association, the Fishing Vessel Agents and Owners Association (Scotland) Ltd, the Mallaig and North-West Fishermen's Association, the Orkney Fisheries Association, the Scottish Pelagic Fishermen's Association Ltd, the Scottish White Fish Producers Association Ltd and the Shetland Fishermen's Association.

The SFF agrees with the need to reflect the knowledge and experience gained from the initial EIA process of 2012, but given the dynamic nature of the environment and the commercial fishing industry we do not believe that gives sufficient reason to scope out the details of water and sediment quality, Benthos Ecology or commercial fisheries.

The SFF would expect that the Seagreen proposal, if citing Scottish planning policy, should recognise there are specific policies which guide their relationship with the commercial fishing industry.

In response to Q5.9.1, although not a windfarm the SFF considers the development of Anchorages and Moorings, amongst other items, by Forth Ports, should be included in the assessment of cumulative impacts on the fishing industry.

Regarding Q7.1 the SFF would not agree that only noise is assessed for the fish and shellfish resource. The SFF remains to be convinced that there is enough understanding of the impacts of any disturbance/suspension/smothering effects of seabed substances. The SFF would share the impacts found in the Crown Estate report on the Irish Sea as showing a much greater impact than developers' claim.

Moving to Q7.2 the SFF expects the methodology to include full and proper assessment of all relevant species in the development area, paying particular attention to scallops, crab, lobster, nephrops and any fish of quantity. Questions 12.1 and 12.2 should cover the previously understated effect of any disturbance/suspension/smothering of any seabed dwelling species.

Moving to the commercial fisheries data, the SFF as stated above would expect to see the effects of smothering on scallops and their spat to be fully delineated. The baseline for scallops should be updated to as recently as possible, but additional to the already existing dataset, to give a clear understanding of the lengthy cyclical nature of the fishery.

Similarly, the squid fishing has, in the time since the original EIA, grown in significance in the area from Aberdeen to the Bass Rock, so should be assessed in detail.

It is understood that Creel fisheries may have increased in the general area and should be carefully examined. The evidence base for impacts of renewables developments is quite sparse, but the Crown Estate report on the effects on the fishery in the Irish Sea, post development would suggest that the impacts are much more serious than the developers claim in the beginning. Therefore the SFF would expect that the fisheries data baseline is verified, preferrably using the apparatus of the Commercial Fisheries Working Group, to give it stakeholder credibility.

The SFF believe that the CFWG should agree officially any form of mitigation prior to the development being consented as this will help the developer to assure the engagement and continued co-operation of the fishing industry. This is particularly relevant to areas lost to fishing but also included all the other subjects, which infringe on fishing, such as (but not confined to) vessel movements during construction and cable works.

Scottish Natural Heritage

Thank you for this scoping consultation, requesting advice from SNH on natural heritage interests to be addressed under Environmental Impact Assessment (EIA) and Habitats Regulations Appraisal (HRA) for the Seagreen offshore wind farm. The applicant is scoping for a new application in respect of the wind farm (proposing use of larger turbines) but proposes no change to the export cable (paragraphs 2.17-2.18 of the scoping report).

SNH's previous advice (7 March 2014 and 4 July 2014) raised significant issues in relation to the cumulative impacts of the Forth & Tay wind farm proposals –

Seagreen alongside Inch Cape and Neart na Gaoithe – in relation to ornithology and seascape, landscape and visual interests. These responses are important context for any reapplications now being made for the Forth & Tay wind farms.

We advise that Seagreen's new application should update assessment for the following receptors:

- **ornithology** – please see **Appendices A(i) – A(iii)**
- **marine mammals** – please see **Appendix B**
- **seascape, landscape and visual interests** – please see **Appendix C**

We also provide our advice on the receptors we consider can be scoped out of any reassessment – please see **Appendix D.**

This scoping response provides our recommendations on the approach to impact assessment for each receptor. We also recommend that pre-application dialogue continues after scoping in order to address any queries or points of clarification and to confirm final methodological details. We strongly recommend that this is co-ordinated, as far as possible given uncertain time-scales for resubmission, across all three Forth & Tay developers.

There are four key areas for reassessment where we highlight that further discussion may be helpful, to agree approaches and ensure consistency across the three applications:

- Displacement modelling for seabirds
- Addressing non-breeding season seabird impacts
- Population modelling for seabirds
- Underwater noise modelling for marine mammals

Please see the relevant appendices for further advice in this regard.

Seagreen is applying for a consent duration of 50 years (paragraph 2.6 of the scoping report), whereas their existing consent is for a period of 25 years, with all supporting assessments undertaken on this basis. If there is to be a change to the period of consent it will need further discussion as it has particular implications for population modelling in respect of seabird interests and marine mammals – please see **Appendix A(i)** and **Appendix B.**

Further Information and Advice

We would be grateful if you could alert us to the formal scoping opinion once issued. As you are aware, there's likely to be advances in assessment methodologies over the next 12 months so that if the Seagreen application is significantly delayed we may wish to update our advice on some aspects. Please don't hesitate to contact us if you need any further information or advice from SNH in respect of this response.

APPENDIX A(i) – ORNITHOLOGY
ADVICE FOR SEAGREEN OFFSHORE WIND FARM

Ornithological interests are addressed in chapter 5 of Seagreen's scoping report. Changes to turbine numbers and parameters are the key considerations for reassessment of potential ornithological impacts in respect of this wind farm site.

We note that there are no proposed changes to the transmission works and confirm that the previous assessment addressed all relevant bird interests – seabirds and waterfowl – including proposed pSPA interests (see further discussion below). We confirm that no reassessment is required for the transmission works in relation to the pSPA and we consider that the previously agreed mitigation measures and marine licence conditions can be relied upon in this regard.

On the basis of current timeframes we confirm that no further baseline survey is required (SNH advice note of 2 February 2017), however, this advice may change if there is any significant delay to the intended submission date for the new application.

BIRD RECEPTORS FOR REASSESSMENT

For the original assessments, the Forth & Tay developers – Seagreen, Inch Cape and Neart na Gaoithe – collaborated on an extensive scoping exercise to consider the range of bird species potentially impacted by the developments. We have reviewed the final HRA short-list of SPA populations requiring assessment (as presented in Appendix A3 of our 7 March 2014 response) to give the following advice on requirements for the new application.

- **SPA seabird colonies**

For seabird species of concern, we confirm that SNH does not require any assessment against regional populations – our focus remains on the individual breeding colonies, particularly SPAs. In this regard, the final HRA short-list comprised a range of breeding seabird interests from a range of SPA colonies within foraging range of the proposed Forth & Tay wind farms. SNH has reviewed this list in order to confirm key species and SPAs for reassessment.

Table 1. SPA seabird interests for reassessment

Species	Impact	Key SPAs for reassessment
Gannet	Collision	Forth Islands SPA (Bass Rock)
Kittiwake*****	Collision	Forth Islands SPA, Fowlsheugh SPA
Herring gull*****	Collision	Forth Islands SPA, Fowlsheugh SPA
Puffin	Displacement	Forth Islands SPA
Guillemot*****	Displacement	Forth Islands SPA, Fowlsheugh SPA

Razorbill*	Displacement	Forth Islands SPA, Fowlsheugh SPA
* We will review the updated apportioning calculations for these three species in order to confirm whether or not any further reassessment is needed for either Buchan Ness – Collieston Coast SPA or St Abb's – Fast Castle SPA. On the basis of previous advice we consider this unlikely.		

On the basis of previous advice, we don't consider that Seagreen (on its own or in combination with the other Forth & Tay proposals) will give rise to significant population level impacts in relation to lesser black-backed gull, fulmar, common tern or Arctic tern at any of the identified SPAs.

Seagreen only presents a risk to seabirds when they're outwith SPA (or pSPA) boundaries. Therefore, as previously advised, any potential wind farm impacts should be considered in relation to the conservation objective for 'population of the bird species as a viable component of the SPA'. This means that the significance of any collision mortality, disturbance or displacement of individual birds at sea is considered in relation to the consequent effects on SPA breeding populations. We do not require any assessment against regional populations nor do we require a separate assessment for the pSPA.

Appendix (ii) provides the up-to-date population counts for each relevant SPA within foraging range – see below for further discussion on their use in assessment.

- **Outer Firth of Forth & St Andrews Bay pSPA**

Scottish Government is currently considering the designation of a new suite of marine SPAs. This process is significantly further ahead than it was at the time of the original assessments and the formal proposals were submitted to Government for consideration on 30 June 2015. The proposed site boundary and features of interest are now available[42] and in this regard we provide the following scoping advice.

Table 2 gives an overview of proposed pSPA seabird interests and whether or not these are also qualifying interests of SPA breeding colonies in the area. We have considered potential impacts on these pSPA features in order to confirm our scoping advice for the wind farm in **Table 3.** As confirmed above, no further assessment is required in respect of the transmission works.

[42] http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/proposed-marine-spas/

Table 2. Firth of Forth and St Andrews Bay Complex pSPA – breeding colony and marine seabird interests

Species	SPA breeding colonies HRA shortlist	Marine pSPA	
		Breeding	non-breeding
Gannet	✓	✓	✗
Kittiwake	✓	✓	✓
Herring gull	✓	✓	✓
Puffin	✓	✓	✗
Guillemot	✓	✓	✓
Razorbill	✓	✗	✓
Common tern	✓	✓	✗
Arctic tern	✓	✓	✗
Shag	✗	✓	✓
Manx shearwater	✗	✓	✗
Little gull	✗	✗	✓
Black-headed gull	✗	✗	✓
Common gull	✗	✗	✓

Table 3. Firth of Forth and St Andrews Bay Complex pSPA – SNH scoping advice

pSPA seabirds	SNH scoping advice: include for assessment (yes / no) and rationale	
Gannet, Kittiwake, Herring gull, Puffin, Razorbill, Guillemot	✓	These key species and pSPA interests should be **scoped in** to the Seagreen reassessment. Impacts should be considered in relation to the relevant breeding colony SPAs as listed in Table 1 and discussed below.
Common tern, Arctic tern	✗	Neither tern species was recorded on-site at Seagreen in any significant numbers. We do not consider that the wind farm presents any significant risk to these species and they can be **scoped out** of assessment.
Shag	✗	Shag was included on the original Forth & Tay 'long-list' but none of the developers recorded this species on-site in any significant numbers. We do not consider that Seagreen presents any significant risk to shag and it can be **scoped out** of assessment.

Manx shearwater	×	Manx shearwater was included on the original Forth & Tay 'long-list'. Although this species is difficult to survey, we do not consider it will be present on-site at any of the wind farms in any great numbers. We do not consider that any of the wind farms present a significant risk to this species and confirm that it can be **scoped out** of assessment.
Little gull, Common gull, Black-headed gull	×	We have reviewed available information on these wintering gull species. The boundary of the pSPA is drawn to protect the key concentrations of these birds in the non-breeding season. We confirm that Seagreen has not recorded any of these species on-site in any significant numbers so that they can be **scoped out** of assessment.

- **Other birds**

All other bird interests were fully considered and addressed in pre-application dialogue and in final assessments for the previous application. This includes great black-backed gull which is addressed in Seagreen ES chapter 10 and Appendix F1 (p209-219). In respect of wildfowl and waders (as discussed in paragraphs 5.27-5.28 of the scoping report), Marine Scotland commissioned a strategic 'worst case' collision risk assessment[43] for all wind farms proposed in Scottish waters at the time. We used the outputs from this strategic CRM to inform our previous advice.

Since this work was published, a number of the wind farms included for assessment have been withdrawn, and the remaining schemes are in the process of refining their design envelopes. We note that the proposed changes at Seagreen lie well within the 'worst case' previously assessed, and that the outputs from Marine Scotland's strategic CRM can be relied upon. We confirm that current offshore wind proposals in Scottish waters do not present significant risk to any other bird interests and we do not require any individual developer to submit further information in this regard.

ASSESSMENT METHODOLOGIES

- **COLLISION RISK**

The key species at risk of collision from Forth & Tay wind farms are **gannet, kittiwake** and **herring gull.** Please refer to SNH guidance[44] for advice on seasonality:

[43] *Strategic Assessment of Collision Risk of Scottish Offshore Windfarms to Migrating Birds*. Available from: http://www.gov.scot/Resource/0046/00461026.pdf
[44] Explanatory notes for table of 'Seasonal Periods for Birds in the Scottish Marine Environment'. http://www.snh.gov.uk/docs/A2200567.pdf

Species	Breeding	Non-breeding
Gannet	mid-March - September	October - mid-March
Kittiwake	mid-April - August	September - mid-April
Herring gull	April - August	September - March

Work on ways to incorporate uncertainty into collision risk modelling is ongoing but there is not yet any agreement on a final approach so that we advise the Band offshore model continues to be used for the updated assessment[45]. If possible, we would find it helpful if Seagreen could provide the information listed in **Appendix A(iii**), however please note this is not a formal statutory request to inform the EIA report.

We provide copies of our final collision risk workings for Seagreen, as consented; alpha and bravo, 75 turbines at each site, blade length of 83.5m and hub height of 111m. We request that the developer uses such spreadsheets in presenting the updated calculations for the new phase 1 application – the changes in turbine numbers and the new turbine parameters.

We recommend that collision risk modelling is undertaken for the two scenarios at either 'end' of the updated design envelope. For these scenarios our advice on updating the CRM for each species is as follows:

- **Gannet, kittiwake**
  CRM outputs should be presented for model options 1 and 2 using Johnston et al flight heights[46] and a 98.9% (+/- 2 standard deviations, SD) avoidance rate. Until better data becomes available, we do not require, nor do we recommend, that option 3 outputs are presented for kittiwake or gannet. This recommendation is based on advice agreed between SNH and the other statutory nature conservation bodies[47].

- **Herring gull**
  CRM outputs should be presented for model options 1, 2 and 3 using Johnston et al flight heights and a 99.5% (+/- 2 SD) avoidance rate.

In order to consider any population consequences arising from these estimated collisions, the overall impacts will need to be apportioned by season, between SPAs and across age classes. We advise on this as follows:

[45] Band collision risk model, guidance and model spreadsheets available from: https://www.bto.org/science/wetland-and-marine/soss/projects
[46] Flight height data available from https://www.bto.org/science/wetland-and-marine/soss/projects
[47] SNCB advice on use of the Band model and avoidance rates: http://www.snh.gov.uk/docs/A1464185.pdf

Apportioning collision mortality between seasons

Annual CRM totals will need to be apportioned between breeding and non-breeding seasons following SNH guidance as defined above[44]. For half months the collisions calculated for that month should be split equally between breeding and non-breeding period.

Apportioning collision mortality between age classes

Collision mortality will need to be apportioned between age classes. In respect of sabbaticals we recommend that all adults recorded during survey work are considered as breeding adults. This is a precautionary assumption and it may be possible to refine it, depending on the choice and structure of population models. For the breeding season, we recommend apportioning between adults and immatures on the basis of developers' site-specific survey work. For the non-breeding season, assessment may cover a wider geographic area so that we recommend using stable age structure modelling to determine these proportions.

Apportioning collision mortality in the breeding season to breeding colonies

Impacts which occur during the breeding season will need to be apportioned between the breeding colonies (SPA and other) within foraging range of the proposed wind farm. The current method for doing so is set out in SNH guidance[48].

We advise that this is a two-step process:

- The first step is to apportion impacts between SPA and non-SPA breeding colonies within foraging range of the wind farm. We recommend that this is done on the basis of Seabird 2000 data as this provides a common reference point and many of the non-SPA breeding colonies have not been counted since this time. Seabird 2000 data is available from JNCC who manage the seabird monitoring database[49].

- Impacts assigned to the SPA component then need to be further apportioned between the individual SPAs within foraging range. For this step, the most recent colony counts should be used and those for the key SPAs are presented in **Appendix A(ii).**

Addressing collision mortality in the non-breeding season

We advise that assessment of collision mortality in the non-breeding season for **herring gull** can use the approach agreed during Moray Firth determinations. While many herring gull will remain locally in the Forth & Tay over-winter, there is also an influx of wintering birds from elsewhere. Any collisions which might occur at the wind farm will therefore need to be apportioned between the local SPA breeders and these other wintering birds.

[48] SNH guidance on apportioning breeding season impacts: http://www.snh.gov.uk/docs/A1355703.pdf
[49] Seabird monitoring programme: http://jncc.defra.gov.uk/smp/

Kittiwake and **gannet** range more widely in the winter and we are currently considering possible approaches to non-breeding season assessment for the species.

- **DISPLACEMENT**

We advise that reassessment of displacement impacts should be undertaken for **puffin, guillemot** and **razorbill.** Please refer to SNH guidance definitions of breeding and non-breeding seasons:

Species	Breeding	Non-breeding
Puffin	April - mid-August	mid-August – March
Guillemot	April - mid-August	mid-August – March
Razorbill	April - mid-August	mid-August – March

Previously both gannet and kittiwake had been species included for displacement assessment. However, the CEH modelling undertaken for Forth & Tay[50] indicated that gannet suffered no significant energetic costs or impacts on survival or productivity from displacement.

For kittiwake, collision risk and displacement are currently considered to be mutually exclusive impacts, so we advise that assessment focuses on collision risk as the impact of most concern (presenting a greater risk of population consequences). So far, post construction monitoring indicates no significant avoidance of wind farms by kittiwake (e.g. Welcker and Nehls 2016 Mar Ecol Prog Ser 554:173-82; Krijgsveld 2014 – report for Rijjkswarerstaat Sea and Delta; and Robin Rigg Year 5 monitoring report).

Our preferred approach to assessment would be to use the updated displacement model commissioned by MSS and produced by CEH[51], if available in time. If not, then developers should provide displacement estimates based on the approach given in joint SNCB guidance[52]. Such estimates should be discussed alongside the outputs from the original CEH models[50].

We require the assessment of breeding season impacts for all three species. If the SNCB approach is needed then we advise the estimates for the breeding season are

[50] CEH original displacement model for the Forth & Tay, further information available from: http://www.gov.scot/Topics/marine/marineenergy/Research/SB7

[51] CEH simplified displacement model: http://marine.gov.scot/data/simplified-displacement-model-foraging-birds

[52] SNCB joint guidance note on displacement assessment http://jncc.defra.gov.uk/pdf/Joint_SNCB_Interim_Displacement_AdviceNote_2017.pdf

based on a **60% rate of displacement** and a **2% rate of mortality**. Any such estimates of displacement during the breeding season will need to be apportioned and assigned back to the relevant SPA breeding colonies using a similar approach to that recommended above for collision risk:

- Apportionment displacement mortality between seasons following SNH guidance[44].
- Apportion displacement mortality between age classes – it's not possible to differentiate between adult and immature auks during site survey so that these proportions should be based on stable age structure modelling. Note that all adults should be assumed to be breeding adults.
- Apportion displacement mortality between breeding colonies following the same approach as discussed above for collision risk.

We also require assessment of non-breeding season impacts for guillemot and razorbill, but not puffin. Guillemot and razorbill remain in the Forth & Tay over-winter and are proposed features of the pSPA. Puffin disperse widely and will not be present in any significant numbers. The CEH models only address the breeding season, so that estimates of non-breeding season impacts will be needed for guillemot and razorbill based on SNCB guidance[51]. For this we recommend a **60% rate of displacement** and a **1% rate of mortality.**

We are still developing our advice on methods to apportion and assign non-breeding season impacts. For **guillemot** and **razorbill** we would hope to define an overall wintering population of these species in the Forth & Tay area, and then determine what proportion of this population comprises birds from the relevant SPA breeding colonies.

- **IMPACTS ON PREY**

Although Seagreen has included monopoles in their design envelope (paragraph 2.8, p7 of the scoping report), we do not require any further assessment of potential impacts on seabird prey species from piling (underwater noise) impacts during construction. Any such impacts are relatively short-term and we believe would be offset by greatly reduced long-term impacts (habitat/prey loss) from using fewer turbines.

We also note that Seagreen lies over 25km from the Firth of Forth and St Andrews Bay Complex pSPA so that we do not identify are likely significant effects from the proposed wind farm piling on any prey species or supporting habitats within this pSPA.

POPULATION CONSEQUENCES

The impacts of collision and displacement will need to be considered in the context

of relevant SPA breeding colonies. Where apportioned impacts are large and / or the SPA populations are small it is likely that population models will be required to establish whether or not there could be long-term impacts on population viability. We cannot provide our final advice in this regard until the outputs are available for the updated collision risk and displacement modelling. We will compare these outputs against the previous estimates (taken from the SNH collision risk spreadsheets and the CEH displacement models) in order to provide advice on the requirements for population modelling.

If population modelling is required for the revised Seagreen proposal, we recommend:

a) Reviewing the utility of the models commissioned by Marine Scotland and produced by CEH[53] for kittiwake, herring gull, guillemot and razorbill;

b) Reviewing the Macarthur Green population modelling for gannet and puffin;

c) Only producing further models for particular species if it's not possible to utilise either (a) or (b); in this case we would be requesting the production of deterministic, density independent Leslie Matrix Models.

As well as modelling their individual impacts Seagreen should also model cumulative impacts with the other Forth & Tay proposals (see below). We request that the counterfactual of population size and population growth rate are presented as part of the model outputs[54].

Finally, we request that the modelling of impacts is undertaken over two time periods; 25 years (as used for the original consent) and 50 years (as proposed now). No recovery period should be applied to either model run. **We highlight** that it is more difficult to make predictions over a longer time-frame as uncertainty in the model outputs increases with the length of model run. For SPA seabird species this may make it harder to conclude no long-term impacts on population viability and no adverse impact on site integrity.

CUMULATIVE IMPACTS

We have reviewed the projects listed in the Seagreen scoping report for cumulative impact assessment (Table 4.5, p25-27). In this regard, we advise that assessment focuses on Seagreen phase 1 in combination with the other Forth & Tay wind farms:

[53] The 2014 CEH population modelling report is available here: http://www.gov.scot/Topics/marine/marineenergy/Research/SeabirdsForthTay
Further information may also be available from the recent MS contract on 'Testing and Validating Metrics of change produced by Population Viability Analysis (PVA)'

[54] Cook, A.S.C.P. & Robinson, R.A. 2016. Testing sensitivity of metrics of seabird population response to offshore wind farm effects. JNCC Report No. 553. JNCC, Peterborough.

Neart na Gaoithe and Inch Cape. This assessment will require population models to consider the impacts of each wind farm individually and together.

APPENDIX A(ii) – SEABIRD POPULATION COUNTS

Table 4. Most recent population counts for the key seabirds and SPAs of relevance to the Seagreen reassessment.

Species	SPAs	SPA citation population	P/I	SNH/JNCC 2014 advice: SPA counts	P/I	SNH/JNCC 2014 advice: dates of counts	Most recent counts	P/I	Dates of most recent counts
Gannet	Forth Islands	21,600	P	55,482[§]	P	*2009*	75,259	P	*2014*
Kittiwake	Buchan Ness / Collieston Coast	30,452	P	12,542[§]	P	*2007*	*Counts undertaken 2016-2017˜*		
	Forth Islands	8,400	P	3,776[§]	P	*2012*	4,333	P	*2015*
	Fowlsheugh	36,650	P	9,337[§]	P	*2012*	9,655	P	*2015*
	St. Abb's Head to Fast Castle	21,170	P	6,317[§]	P	*Trend applied*	2,779	P	*2016*
Herring Gull	Buchan Ness / Collieston Coast	4,292	P	3,079[§]	P	*2007*	*Counts undertaken 2016-2017˜*		
	Forth Islands*****	6,600	P	5,027[§]	P	*2002*	6,500	P	*2014-2016*
	Fowlsheugh	3,190	P	259[§]	P	*2012*	125	P	*2015*
	St. Abb's Head to Fast Castle	1,160	P	356[§]	P	*Trend applied*	325	P	*2016*
Puffin	Forth Islands	14,000	P	50,282	P	*2009*	51,956	P	*2013*
Guillemot**	Buchan Ness / Collieston Coast	17280[ƛ]	I	25,857	I	*2007*	*Counts undertaken 2016-2017˜*		
	Forth Islands	8000[ƛ]	I	29,169	I	*2011*	30,910	I	*2015-16*
	Fowlsheugh	56,450	I	60,193	I	*2012*	55,507	I	*2015*
	St. Abb's Head to Fast Castle	31,750	I	58,617	I	*1998/2000**********	33,627	I	*2016*
Razorbill**	Forth Islands	2800[ƛ]	I	4,950	I	*2011*	4,993	I	*2015*
	Fowlsheugh	5,800	I	7,048	I	*2012*	7,426	I	*2015*
	St. Abb's Head to Fast Castle	2,180	I	4,588	I	*Trend applied*	2,067	I	*2016*

* Please be aware that herring gull at Forth Islands SPA and fulmar at Forth Islands SPA and Fowlsheugh SPA may not qualify as designated interests.

** For guillemot and razorbill the counts were converted to 'individuals on land equivalent' then corrected using (x 1.34) to give total breeding adults in population.

*** Best available estimate at the time of our 2014 advice.

˜ Buchan Ness / Collieston Coast counted 2016-17, counts should be available shortly from the seabird monitoring database. If not, we will provide further advice.

§ Our 2014 advice used number of individuals – converted to pairs (0.5*individuals) for consistency.

ƛ The SPA citation uses number of pairs – so converted to number of individuals (2*pairs) for consistency.

APPENDIX A(iii) – ORNITHOLOGY
UNCERTAINTY IN COLLISION RISK MODELLING

The following request is additional to our statutory scoping advice, and the information does not need to be included in any application submission (provided this is not significantly delayed).

While there is current discussion around ways to incorporate uncertainty into collision risk modelling there is no agreement on a final approach. However, if possible, we would find it helpful if Seagreen could provide the following information. This would help us in thinking about these issues for the future.

Table 5. Incorporating uncertainty in collision risk modelling

Data	Parameter	Unit	Figures to be presented and notes
Survey data	*Proportion of birds at collision risk height		Used for Basic Band model Option 1 only. Mean + standard deviation (SD) of proportion of birds in site survey data estimated to be flying in the rotor swept area.
	*Bird density estimates	birds/km^2	Mean + SD for survey data with multiple counts per month and/or per season and/or per year.
Development data	Total power output of proposed development	MW	Single value required.
	Turbine rating / capacity	MW	Single value required.
	Width of development	km	Single value required.
	Latitude of development	decimal degrees	Single value required: central point of wind farm footprint.
	Number of blades		Single value required.
	Rotor radius	m	Single value required.
	Maximum blade chord width	m	Single value required.
	Hub height	m	Single value required: measured from

			Highest Astronomical Tide.
	Tidal offset	m	Single value required.
	Blade pitch	degrees	Going forward we would welcome further discussion on whether this parameter can be calculated as a function of wind speed.
	Turbine rotation speed	rpm	Going forward we would welcome further discussion on whether this parameter can be calculated as a function of wind speed.
	Turbine operation time	%	Going forward we would welcome further discussion on methods to calculate and refine this parameter.

APPENDIX B
MARINE MAMMALS

Marine mammals are addressed in chapter 6 of Seagreen's scoping report. Changes to proposed piling activity and associated underwater noise impacts will be the key issue for the marine mammals reassessment – this will need to include consideration of monopiles, now included as a potential foundation option (see paragraph 2.8, p36 of the scoping report and Table 6.1 (p55).

SPECIES FOR REASSESSMENT

Based on previous advice and discussion at the Forth & Tay offshore wind developers' group (FTOWDG), we advise that reassessment focuses on the following marine mammal interests (as discussed in chapter 6, p49-53 of the Seagreen scoping report):

- **Bottlenose dolphin**
  Bottlenose dolphin is a qualifying interest of the Moray Firth Special Area of Conservation (SAC) and we advise that there is connectivity between Seagreen and this SAC. The reference population for assessment is that given in guidance from the statutory nature conservation bodies (SNCBs) on management units for cetaceans in UK waters[55]. For bottlenose dolphin this is the coastal east Scotland population and we advise referring to Cheney *et al* (2013) for the most up-to-date population estimate[56].

- **Harbour seal / Grey seal**
  Harbour seal are a qualifying interest of the Firth of Tay and Eden Estuary SAC and we advise that there is connectivity between Seagreen and this SAC. Grey seal are a qualifying interest of the Isle of May SAC and Berwickshire and North Northumberland Coast SAC and we advise that there is connectivity between Seagreen and these two SACs. For each species, the population present in the east coast seal management unit[57] should be used as the reference population for assessment and we take this as equivalent to the SAC population. The most up-to-date population estimates can be obtained from the Special Committee on Seals (SCOS)[57].

- **Harbour porpoise**
  For harbour porpoise, we advise that the reference population against which

[55] Guidance on cetacean management units from: http://jncc.defra.gov.uk/pdf/Report_547_webv2.pdf
[56] Cheney, B., Thompson, P.M., Ingram, S.N., Hammond, P.S., Stevick, P.T., Durban, J.W., Culloch, R.M., Elwen, S.H., Mandleberg, l., Janik, V.M., Quick, N.J., Islas-Villanueva, V., Robinson, K.P., Costa, M., Eisfeld, S.M., Walters, A., Phillips, C., Weir, C.R., Evans, P.G.H., Anderwald, P., Reid, R.J., Reid, J.B. & Wilson, B. 2013. Integrating multiple data sources to assess the distribution and abundance of bottlenose dolphins *Tursiops truncatus* in Scottish waters. *Mammal Review*, **43**, 71-88.
[57] Seal management areas are determined by the Special Committee on Seals (SCOS): http://www.smru.st-andrews.ac.uk/documents/SCOS.pdf

to judge impacts is that for the North Sea management unit. We advise using the population estimate in SNCB guidance[55] unless any more up-to-date information becomes available for assessment commences. Recent data from the Small Cetaceans in European Atlantic waters and the North Sea survey (SCANS III) can be used to consider impacts at a regional scale – refer to survey block R[58].

- **Minke whale**
  For minke whale, we advise that the reference population against which to judge impacts is that for Celtic and Greater North Seas management unit. We advise using the population estimate in SNCB guidance[55] unless any more up-to-date information becomes available before assessment commences. In addition, the estimate of abundance within SCANS III block R can be used to consider impacts at a regional scale[58].

- **White beaked dolphin**
  For white beaked dolphin, we advise that the reference population against which to judge is that for Celtic and Greater North Seas management unit. We advise using the population estimate in SNCB guidance[55] unless any more up-to-date information becomes available before assessment commences. In addition, the estimate of abundance within SCANS III block R can be used to consider impacts at a regional scale[58].

- **European protected species (EPS)**
  All cetaceans (species of whale, dolphin, porpoise) are classed as European protected species (EPS) for which Government has published guidance on licensing requirements[59]. The scoping report discusses the range of cetaceans recorded during boat-based survey work (paragraphs 6.8 – 6.12) and these will need consideration in relation to EPS licensing requirements. In this regard, we advise referring to the joint SNCB guidance[55] to determine the reference populations against which to judge favourable conservation status.

APPROACH TO UNDERWATER NOISE MODELLING

Marine mammals densities

Knowledge of marine mammal densities in the study area (or zone of impact) is required in order to predict the number of individuals which might be impacted by underwater noise. Information should be available from SCANS for cetaceans[58] and from SCOS / Marine Scotland for seals[57]. For bottlenose dolphins, Quick *et al* (2014)[60] provides an estimate for the Forth & Tay based on data up to 2013, but

[58] Small Cetaceans in European Atlantic waters and the North Sea, SCANS III survey (2016): https://synergy.st-andrews.ac.uk/scans3/
[59] EPS licensing guidance available from: www.gov.scot/Resource/0044/00446679.pdf
[60] Quick, N.J., Arso, M., Cheney, B., Islas-Villanueva, V., Janik, V.M., Thompson, P.M. & Hammond,

there may be even more recent information than this.

We note that Marine Scotland's passive acoustic monitoring network on the Scottish east coast may give some background context in relation to dolphin species and harbour porpoise[61].

Methodology

We discussed methodologies for nosie impact assessment at the scoping meeting held 21 June 2017. There have been developments in approach and recommended guidance since the time of previous assessment (as acknowledged in paragraphs 6.3.7 – 6.40, so we think there's a typo in paragraph 6.1). For assessing risk of injury from noise, SNH is recommending that both the instantaneous and cumulative thresholds for permanent threshold shift (PTS) are addressed: the instantaneous PTS threshold will inform the choice of mitigation methods, while the cumulative PTS threshold will inform any required assessment of population consequences.

For behavioural disturbance, we advise that assessment incorporates a dose-response function (to address the range of individuals' responses to noise), rather than relying on a single-number threshold. We recommend adapting the approach presented in Thompson et al (2013)[62] – based on harbour porpoise data from Brandt et al (2011)[63] – to allow for this more realistic assessment.

POPULATION CONSEQUENCES / CUMULATIVE IMPACTS

As discussed at the scoping meeting, the outputs from the updated noise modelling should be considered and compared against the previous predictions. Despite differences in methodology, it should be possible to compare these outputs: the predicted number of animals suffering hearing loss (permanent threshold shift, PTS) and the predicted number of animals disturbed.

This will allow us to consider whether or not the revised predictions are any worse than those previously assessed. If not, then we don't require any further consideration of population consequences – these were already assessed as acceptable for the consented development. However, in the meantime, Seagreen may wish to further develop their approach to population modelling, as a contingency in case piling noise impacts do prove to be greater than those previously assessed.

P.S. 2014. The east coast of Scotland bottlenose dolphin population: Improving understanding of ecology outside the Moray Firth SAC. Report to the UK Department of Energy and Climate Change's Offshore Energy Strategic Environmental Assessment Programme (14D/086).

[61] Further details on the East Coast Marine Mammal Acoustic Survey (ECOMMAS) are available from: http://www.gov.scot/Resource/0050/00507404.pdf

[62] Thompson, P.M., Hastie, G.D., Nedwell, J., Barham, R., Brookes, K.L., Cordes, L.S., Bailey, H. & McLean, N. (2013) Framework for assessing impacts of pile-driving noise from offshore wind farm construction on a harbour seal population. Environmental Impact Assessment Review, 43, 73–85.

[63] Brandt, M., Diederichs, A., Betke, K. & Nehls, G. (2011) Responses of harbour porpoises to pile driving at the Horns Rev II offshore wind farm in the Danish North Sea. Marine Ecology Progress Series, 421, 205–216.

Any assessment of cumulative impacts will also only be necessary if the piling noise impacts are greater than previously assessed. Again, as a contingency, Seagreen may wish to further develop their approach to address cumulative impacts. As a first step, we recommend they review the available marine mammal assessment for Aberdeen Harbour expansion works[64].

[64] Appropriate assessment for Aberdeen Harbour expansion works, see p40 onwards for the marine mammal assessment: http://www.gov.scot/Resource/0050/00509289.pdf

APPENDIX C
SEASCAPE, LANDSCAPE & VISUAL IMPACT ASSESSMENT

Summary of previous SNH advice

In our response of 7 March 2014, we advised that:

> The proposed Forth & Tay wind farms [will] cause widespread and significant adverse landscape and visual impacts along the Scottish east coast from St Cyrus in Aberdeenshire, through Angus and Fife south to Dunbar in East Lothian. The scale and extent of development, if consented, is unprecedented within Scotland (onshore or offshore) in recent times.

This forms the context to any resubmission. For Seagreen we note the following points from our previous advice:

- Impacts from Seagreen are primarily restricted to the South Aberdeenshire / Angus coast where it makes some contribution to the cumulative effects from Forth & Tay wind farms in this area.

- In views from East Fife, it lies at distances >50km and appears behind Inch Cape, so only makes a minor contribution to the landscape and visual impacts along this coastline.

- It is unlikely to be visible from East Lothian (although this may change with the proposed increase in the height of turbines).

Approach to wind farm design

Seascape, landscape and visual interests are addressed in Chapter 8 Seascape, landscape and visual amenity (p68-78) of Seagreen's scoping report. The proposed design changes are significant and have the potential to cause greater effects (as discussed in Table 8.1, p74) – the new application is for up to 120 turbines, with a maximum height of 280m to blade tip. While the scoping report acknowledges these design changes, we would welcome explanation and further discussion of the design objectives for Seagreen taking the neighbouring wind farms into account.

While we have not received preliminary wirelines for Seagreen, it is evident from those for Inch Cape that the cumulative design issues are likely to intensify with the significant increase in turbine height and drop in turbines numbers. In particular we note the following:

- The proposed changes will draw particular attention to wind farm design on its own and in combination with other resubmitted proposals in the area.

- Due to the increases in turbine height and spacing, individual turbines will be more easily seen and the rotational blade movement may become more noticeable.

- The depth of field will also be more apparent; it might be possible to see into the wind farm and potentially pick out the more distant turbines.

- Overall, the visual complexity will increase: this will be of particular concern in relation to views from the closest coastal stretches and nearby coastal settlements.

In this context, there should be a clear statement of the design rationale, including any technical constraints which have influenced the turbine layout. We also suggest there would be benefit in reworking the previous 'design sensitivity analysis' undertaken for the Forth & Tay wind farms in order to compare the merits of alternative turbine layouts (grid, offset grid and arc) for the revised proposals.

Information required for reassessment

SNH has produced guidance on scoping for offshore renewables[65] and on *Visual Representation of Wind Farms* (including those offshore)[66]. While this remains relevant, we note that the turbines now being proposed in the Forth & Tay are considerably larger than any others which SNH has considered to date. In this regard, we advise that the following information is likely to be needed to inform and support the reassessment.

- **Study area and viewpoints**

SNH broadly accepts the use of a 50km study area, but defers to the local authorities to identify whether there are any sensitive visual receptors located on the border or just beyond, requiring consideration.

- **Coastal character – baseline information**

We advise that Seagreen can utilise the baseline coastal character assessment previously undertaken by the Forth & Tay offshore wind developer's group (FTOWDG).

- **Visibility and zones of theoretical visibility**

We consider it would be helpful to explore the changes in visibility from use of larger turbines. In this regard, we suggest that the increase in turbine size could be modelled in appropriate increments (determined by the design process) with the outputs presented on a composite ZTV, or perhaps as individual ZTVs. These could

[65] *Offshore renewables – guidance on assessing the impact on coastal landscape and seascape*. SNH (2012). Available from: www.snh.gov.uk/docs/A702206.pdf
[66] *Visual Representation of Wind Farms*. SNH (2014). Available from: www.snh.gov.uk/planning-and-development/renewable-energy/visual-representation/

then be compared against the ZTV for the consented scheme which may help us understand if there is any 'step change' to the amount or range of visibility.

- **Viewpoint Selection and Assessment**

We are content with the same viewpoint selection being used as for the previous assessment, but defer to the local authorities if there could be need for additional viewpoints from the use of larger turbines.

- **Baseline photography**

We broadly accept continued use of existing baseline photography (collectively produced by FTOWDG), but new photography may be necessary for any views have changed substantially (this would mainly be a risk in relation to inland viewpoints, where changes such as afforestation / deforestation, new power lines or other new development may alter the foreground significantly).

We note that the photographs for viewpoints along the Angus coast – including St Cyrus, Lunan and Arbroath signal tower (viewpoints 2, 5 and 6) – have been taken with the sun to the southeast (when turbines would be viewed partially looking into the sun). We recommend that at least one of these photographs is re-taken to represent the clearer views during late afternoon when the turbines would be front-lit with the sun behind the viewer.

- **Wirelines**

The main effect of an increase in turbine height will be a change in perspective, with the larger Seagreen turbines potentially appearing closer in view. We think it should be possible to explore this issue quite straightforwardly using analysis based on the increased vertical field of view, and comparing this with the previous assessment. We think it important to explore this issue and would welcome any other ideas on the approach.

- **Photomontages**

It is our understanding that the 280m turbines may have larger circumference (thicker) towers, and there may also be an increase in blade width. Although Seagreen lies at greater distance than either Neart na Gaoithe or Inch Cape, we recommend that this issue is investigated to determine whether it makes a discernable difference to the appearance of the turbines.

- **Lighting**

The landscape and visual impacts of wind farm lighting are not specifically discussed in the scoping report, however, this matter should be included as part of the assessment at application stage.

Cumulative impact assessment

The cumulative impacts of Seagreen in combination with Inch Cape and Neart na Gaoithe are likely to intensify with use of larger turbines. A rigorous design process is therefore imperative in order to address this.

We defer to the relevant local authorities to provide up-to-date information on current onshore wind farms to be considered.

APPENDIX D
NATURAL HERITAGE INTERESTS SCOPED OUT OF FURTHER ASSESSMENT

We confirm that we have reviewed our previous advice for all other natural heritage interests – benthic ecology, physical processes and fish of conservation concern. We consider that these receptors can all be scoped out of any assessment for the revised proposals at Seagreen on the basis of the following advice:

Benthic interests

The proposed use of fewer, larger turbines at the Seagreen wind farm will reduce the scale of habitat loss and / or habitat disturbance so that impacts fall within the 'worst case' previously assessed for all proposed foundation types. This previous 'worst case' assessment was based on use of gravity bases and although this foundation choice is still part of the design envelope the number of turbines will be reduced (from 150 for Seagreen alpha and bravo together up to a new maximum of 120 for Seagreen phase 1).

Seagreen overlaps part of the **Firth of Forth Banks Complex Nature Conservation Marine Protected Area** (MPA)[67] which was designated prior to the issue of consent for the original proposals (alpha and bravo). Marine Scotland fully considered potential impacts to the MPA in their submission to Ministers, informed by advice they requested from JNCC. Having reviewed this information we confirm that no further assessment is required for any new application: as for other benthic interests, reducing the number of turbines will also reduce any impacts on the MPA from the 'worst case' previously assessed.

We are satisfied that the scoping report provides full consideration and justification for scoping out benthic interests from further assessment. A number of conditions apply to the consented scheme and will be transferred to any new consent: these will minimise and mitigate any impacts on benthic ecology, including MPA features of interest. The same is true for the marine licence relating to the transmission works and export cable.

Physical processes

For the wind farm, we are satisfied that the proposed use of fewer, larger turbines falls well within the 'worst case' previously assessed and that no updates are needed to metocean modelling or modelling of suspended sediment dispersal. In respect of the transmission works, we note that conditions apply to the relevant marine licence and will be transferred to any new licence. In this regard we do not identify any outstanding matters requiring reassessment.

[67] Further information on the Firth of Forth Banks Complex Nature Conservation MPA available from: http://jncc.defra.gov.uk/page-6480

We are satisfied that the scoping report provides full consideration and justification for scoping out physical processes from further assessment.

Fish of Conservation Concern
We have discussed marine fish with Marine Scotland Science (MSS) and they will provide advice on these interests, particularly in relation to cod, herring and sandeel.

Potential impacts on diadromous fish species (and other qualifying interests of SAC rivers) were fully considered in Appendix D of our 7 March 2014 advice where we set out good practice measures and mitigation options to address any impacts. These recommendations have been adopted via conditions on the Section 36 consent and marine licences. The conditions will be transferred to any new consent (and licences) so that we require no reassessment in this regard.

We are satisfied that the scoping report provides full consideration and justification for scoping out diadromous fish species (and other qualifying interests of SAC rivers) from further assessment.

Sport Scotland

I can advise that **sport**scotland has reviewed the information, and contacted RYA Scotland, and the Outdoor Pursuits Group of the Scottish Sports Association in relation to the proposal. I note that RYA Scotland has responded, and can advise that **sport**scotland does not have anything further to add.

Tealing Community Council

16/00520/EIAN – Community Council OBJECTION
Formation of onshore electrical transmission infrastructure between Carnoustie and Tealing to service Seagreen Alpha and Seagreen Bravo Phase 1 Offshore Wind Farms, comprising of 19km of underground electricity transmission cables, a new substation/convertor station at Tealing and formation of associated vehicular access and temporary and permanent ancillary works. Land Between Mean Low Water Mark At Carnoustie Beach and Tealing Substation Tealing Angus.

On behalf of local residents, we wish to place an objection to the above planning renewal on the grounds that the applicant and the National Grid authorities have NOT satisfactorily demonstrated that the substation in our village, Tealing, is the best connection point.

We have repeatedly asked Seagreen and Angus Council why it makes any sense for the cable to be brought 19Km across country, with all the disruption and infrastructure development that entails. The only reply we consistently get is “that Seagreen has no choice in the matter because the National Grid decided where the energy willb e processed and simply tells them so”. We are led to believe that this was the case too with the original application and both the developer and the council had no choice but to accept, and work with, that decision.

We have reflected carefully and find this situation completely unacceptable. We feel strongly that whoever is suggesting that our local community should accommodate such a large scale development in a quiet rural area, MUST be held fully accountable for making that choice and properly explain all of the alternatives, including the cost/benefit analysis of all the options.

Although the current Seagreen application is extensively detailed on other aspects of the renewal application, it barely mentions this aspect of the development and in our view that is NOT acceptable.

Nor can we understand why the planning department has not challenged the necessity to transport and covert the energy so far inland. The National Grid has many other sites nearer the coast that could and should have also been considered. Surely the issue here is not just what is easiest for the National Grid operators, but also what is right for the environment and communities throughout Angus likely to be affected.

We just cannot see that the case has been made for bringing the energy 19 Km inland all the way to our small village. The Tealing community has hosted and lived with the existing large substation for decades and we have more than done our bit working around it and being a source of energy processing in order to supply Dundee and the surrounding area. The case has NOT satisfactorily been made for increasing that processing capacity on an industrial scale in our small rural community, with all the disruption and changes that would entail. There are other industrial sites nearer the coast with roads and infrastructure that should have been considered.

This expansion of the Tealing sub-station, should it go ahead, will involve both massive temporary disruption in our small rural community during almost 2 years of construction, on top of the permanent and significant change to the landscape and the lives of those living close to the substation. We do not accept that the application properly makes the case for that development to be in Tealing and therefore submit this strong objection for consideration.

Please advise how our objection will proceed and what the next steps are in the decision making process.

Transport Scotland

With reference to your recent correspondence on the above development, we acknowledge receipt of the Scoping Report Round 3: Firth of Forth prepared by Seagreen Wind Energy Limited (Seagreen) in support of the above development.

This information has been passed to SYSTRA Limited for review in their capacity as Term Consultant to Transport Scotland – Trunk Road and Bus Operations (TRBO). Based on the review undertaken, Transport Scotland would provide the following comments.

We understand that Seagreen received consents for the Seagreen Alpha and Seagreen Bravo offshore wind farms and the associated Offshore Transmission works from Marine Scotland Licensing Operations Team (MS-LOT) in October 2014. This consent decision was challenged through a Judicial Review process raised by the Royal Society for the Protection of Birds ("RSPB") in 2015. The Judicial Review decision was subsequently appealed by Scottish Ministers in 2016 and we understand that the original consent decisions now stand. The Seagreen Offshore Transmission works consent was not challenged and remains in place.

Proposed Development

Seagreen intends to make a new application for consent for a revised wind farm design for offshore wind farm project for projects within the Phase 1 area of the Firth of Forth Offshore Wind Zone to enable use of the advances in wind turbine design since the original consent application was submitted.

The site lies approximately 27 km offshore, east of the Angus coastline. The nearest trunk road to the site is the A90(T), which lies approximately 15km inland. The number of turbines is likely to be from 70 to 120, with a maximum tip height of 280m. This is a reduction in turbines from 150 in the consented scheme, but an increase in height from the previous values of between 148m and 210m.

Assessment of Environment Effects

The Scoping Report makes no mention of how the turbine components will arrive on site. In the event that components are to arrive by road, Transport Scotland would request that potential trunk road related environmental impacts (associated with increased traffic) such as driver delay, severance, pedestrian amenity, safety etc should be considered and assessed where appropriate (i.e. where Institute of Environmental Management and Assessment (IEMA) Guidelines for further

assessment are breached). These specify that road links should be taken forward for assessment if:

- Traffic flows will increase by more than 30%, or
- The number of HGVs will increase by more than 30%, or
- Traffic flows will increase by 10% or more in sensitive areas.

The methods adopted to assess the likely traffic and transportation impacts on traffic flows and transportation infrastructure should comprise:

- Determination of the baseline traffic and transportation conditions, and the sensitivity of the site and the existence of any receptors likely to be affected in proximity of the trunk road network;
- Review of the development proposals to determine the predicted construction and operation requirements; and
- Assessment of the significance of predicted impacts from these transport requirements, taking into account impact magnitude (before and after mitigation) and baseline environmental sensitivity.

Where environmental impacts are fully investigated but found to be of little or no significance, it is sufficient to validate that part of the assessment by stating in the report:

- The work that has been undertaken;
- What this has shown i.e. what impact if any has been identified; and
- Why it is not significant.

It is not necessary to include all the information gathered during the assessment of these impacts, although this information should be available, if requested.

Transport Scotland (Ports and Harbours)

I have no comments on this case.

UK Chamber of Shipping

In compiling the EIA, the effect on shipping and navigational safety needs to be taken fully in to account. Thus, AIS radar and observational data on shipping movements over appropriate periods will need to be recorded and analysed. With

this in mind, the requirements of MGN 542(M+F) will need to be taken into consideration.

Whale and Dolphin Conservation

Thank you for including WDC in the Scoping Opinion for the Seagreen Phase 1 Offshore Wind Farm.

Please note that for bottlenose dolphin there is newer information than what has been included in the document. Monica Arso Civil's PhD thesis (https://research-repository.standrews.ac.uk/bitstream/handle/10023/6543/MonicaArsoCivilPhDThesis.pdf?sequence=6) and SMRU are conducting annual surveys.

White-beaked dolphin and minke whale should be included as key species and included in the noise assessments based on the new noise thresholds (NMFS). We don't agree that underwater noise for white-beaked dolphin is 'not significant and negligible' (Table 6).

We understand from speaking to Nick Brockie that potential population impacts will be analysed using PCOD. Neart na Gaotihe have mentioned using Population Viability Analysis (PVA). We recommend that all the developments within the Firth of Forth (including Inch Cape) use the same methodology (Marine Scotland Science can best advise on which one) in order for the different ES/EIAs to be comparable.

Overall, we agree that only underwater noise needs to be scoped into the ES.

Appendix II: Advice from Marine Scotland Science

Marine Scotland Science has reviewed the submitted scoping consultation and has provided the following comments.

marine fish ecology

The Seagreen scoping report finds that Fish and Shellfish should be scoped in whereby an assessment of the effects resulting from underwater noise on sensitive fish species will be included in the 2017 EIA of the Development. This on the basis of an increase in design envelope to incorporate the inclusion of monopile foundations that have the potential to increase underwater noise effects.

MSS is largely content with the proposed approach relating to marine fish ecology and offers the following comments.

2017 Baseline Characteristics

Summary paragraph 7.12 finds that no change in the fish and shellfish baseline is expected from the fish and shellfish baseline presented in the 2012 ES, due to no known marked changes in environmental conditions and a continuing commercial fisheries presence. Whilst this may be the case, it would be useful if Seagreen could validate this by utilising such information as commercial fisheries landings data and ICES reports such as those produced from the International Herring Larval Surveys (IHLS).

Particle Motion

The topic of particle motion was raised at the meeting on the 21st June 2017. Please note that a separate request for advice in this area has been made by MS-LOT and this should be referred to by MS-LOT once provided.

Cumulative Impact Assessment

When considering Cumulative Impact Assessment (CIA) MSS note that there are proposed changes to the ICOL design envelope, as per the ICOL Scoping Report, 2017. These changes are not yet modelled or available and therefore unavailable for consideration. Should they have been, MSS would have recommended that this be considered in the CIA.

New information

There are some updated spawning maps for cod and haddock that may be of interest. These are not online as yet but can be provided if requested. The maps are produced on the basis of the following publications:

González-Irusta, J. M., & Wright, P. J. (2015). Spawning grounds of Atlantic cod (Gadus morhua) in the North Sea. *ICES Journal of Marine Science*, *73*(2), 304-315.

González-Irusta, J. M., & Wright, P. J. (2016). Spawning grounds of haddock (Melanogrammus aeglefinus) in the North Sea and West of Scotland. *Fisheries Research*, *183*, 180-191.

Scoping Questions

1. Does MS-LOT agree that the assessment on fish and shellfish resource should only consider effects from underwater noise?

MSS is content with this approach.

2. Does MS-LOT agree that, with the exception of the changes to the underwater noise modelling, the assessment methodology for fish and shellfish resources can remain the same as used for the 2012 EIA?

MSS is content with this approach when considering sound pressure.

commercial fisheries

MSS joined a MS-LOT meeting with the developers and commercial fisheries representatives on the 27th of June 2017. All comments have been provided verbally to the developers. It is expected that all comments will be reflected in written in the meeting minutes due in 2 weeks.

socio economics

Hopefully these comments are helpful to you. If you wish to discuss any matters further contact the MSS Renewables in-box MS_Renewables@gov.scot.

COMMENTS ON DIADROMOUS FISH

Diadromous fish advice received 10 July 2017. The advice refers to Inch Cape but the MSS adviser has confirmed this advice is the same for all three Forth and Tay developments.

Thank you for seeking advice from MSS on specific matters in relation to diadromous fish. We have noted that MS-LOT accepts the advice provided by SNH in relation to HRA not applying to this development and that only comments from MSS in relation to EIA have been requested.

Q1. *Do you agree with the conclusions in the 2013 ES that there was no significant effect on any diadromous species in relation to EIA based on the information available at the time the assessment was carried out? (If no please provide reasons)*

Yes

Q2. *If the answer to Q1. is "yes" what information is available* ***now****, which was not*

available in 2013, that could change the outcome of the assessment to show significant effects in relation to EIA? (The Inch Cape scoping report mentions some recent research e.g. Harding et al 2016 and Armstrong et al 2015)

The Research Updates section in the scoping report is useful. However, there is other new information now available which should also be considered.

- Re the likelihood that diadromous fish may be in the development area, there is now some published information based on satellite tagging returning adult salmon caught on the north coast (Godfrey et al, 2014 a,b) which indicates that returning adult salmon which have reached the coast, do not necessarily then follow the coast, but may move offshore before coming back in again. There is also older published information, which indicates that under some conditions acoustically tagged salmon may indeed follow the coast. The developing picture is quite complicated and the statement in the scoping report that it is unlikely that salmon would enter the Development Area on route to the coast during migration may not be correct.

- Various studies have also been carried out recently on coastal migration of salmon smolts at various Scottish locations mainly. These generally used acoustically tagged salmon smolts and acoustic receiver arrays and one study used a specially designed surface trawl with video capability. Although mainly not formally published yet, there is some information available from these studies which would in general support the tentative smolt migration picture given in the 2013 ES.

- There is now published information for Pacific salmon (various Putman et al papers), which is also likely to be relevant to Atlantic salmon, of the importance of geomagnetic navigation both by post-smolts in migrating to sea feeding grounds and by returning adult salmon in homing to their natal rivers. Such navigation must make use of small differences in the ambient magnetic fields which should be considered in relation to the magnetic fields associated with cables.

- Information on the timing of salmon smolt movement across Scotland has also now been published which may be useful in considering possible mitigation.

- There has been recently been focus in some published papers on the potential importance of particle motion, in relation to sound, to some fish species such as salmon. Although particle motion is mentioned in the 2013 ES, there may be a need to consider it in more detail and this is the subject of a separate advice request to MSS.

- Although there is now more up to date information on the state of salmon and sea trout populations, MSS has now given this consideration and is not suggesting that this needs to be reviewed at this stage.

Q3. *Does any of the new information change the baseline, considering that Inch Cape assumed the species passed through the site?*

There is an increased probability that wording in the 2013 ES may understate the likelihood that salmon will be present in the development area. In that connection, MSS would also note that the absence of salmon and sea trout in the conventional trawl surveys which had been carried out in survey work commissioned by ICOL for the 2013 ES should not be taken as evidence for absence of these species as they are now known to spend most of their time very close to the surface where they would not be caught in conventional trawls.

Q4*. If an updated assessment is advised how should any new information be used by Inch Cape to inform an assessment under EIA?*

Relevant new information now available needs to be reviewed somewhere. It is more that there is a need to review the new information than that the outcome will necessarily change.

Q5. *If an updated assessment is advised which species should be included?*

Only salmon, there is insufficient new information for the other species.

FURTHER REFERENCES FOR DIADROMOUS FISH –received 17 July 2017

In relation to Q2 please provide clarity as follows:

1st bullet – please give full references for Godfrey et al papers.

Godfrey, J. D., Stewart, D. C., Middlemas, S. J., and Armstrong, J. D. Depth use and migratory behaviour of homing Atlantic salmon (*Salmo salar*) in Scottish coastal waters. ICES Journal of Marine Science, 72: 568–575.
http://icesjms.oxfordjournals.org/content/early/2014/07/16/icesjms.fsu118.full.pdf?keytype=ref&ijkey=y9lmPDRLdC04n7B

Godfrey, JD, Stewart, DC, Middlemas SJ and Armstrong JD (2014) Depth use and movements of homing Atlantic salmon (*Salmo salar*) in Scottish coastal waters in relation to
marine renewable energy development. Scottish Marine and Freshwater Science. Volume 5 Number 18
http://www.gov.scot/Resource/0046/00466487.pdf

2nd bullet – please provide references for the information which is publically available from the studies which you refer to.

Acoustic curtain tracking studies of salmon smolts took place in 2016 at two sites on the Scottish west coast, one site in the Cromarty and inner Moray Firth and at the mouth of the River Deveron and are taking place this year at two sites on the Scottish west coast, a site in the inner Moray Firth, and at the mouth of the

Aberdeenshire Dee. Surface trawling with a specially designed net which also had video and PIT tag detection capability was carried out this year in the Moray Firth area. Although there have been various presentations on various aspects of these studies at meetings open to the public, the only formally published paper to date is Lothian *et al* (2017) which includes information for smolts emigrating from the River Deveron

Lothian AJ, Newton M, Barry, J, Walters M, Miller RC and Adams CE (2017) Migration pathways, speed and mortality of Atlantic salmon (Salmo salar) smolts in a Scottish river and the near-shore coastal marine environment. Ecology of Freshwater Fish.
On line via http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1600-0633/earlyview as an early view paper

3rd bullet – please provide references for Putman et al papers

Putman,NF, Lohmann, KJ, Putman, EM, Quinn,TP, Klimley, AP and Noakes, DLG (2013) Evidence for Geomagnetic Imprinting as a Homing Mechanism in Pacific Salmon. Current Biology 23, 312–316
http://www.cell.com/current-biology/pdf/S0960-9822(13)00003-1.pdf

Putman,NF,Scanlan,MM, Billman,EJ, O'Neil, JP, Couture, RB, Quinn, TP, Lohmann,KJ and Noakes, DLG (2014) An Inherited Magnetic Map Guides Ocean Navigation in Juvenile Pacific Salmon. Current Biology 24, 446–450
http://www.cell.com/current-biology/pdf/S0960-9822(14)00018-9.pdf

MSS would note that the 2013 ES did examine and use useful material which was available at the time – including Lohmann *et al*. (2008) and Yano *et al*. (1997), and information on swimming depth of salmon.

4th bullet – please provide publication details for the information relating to movement of salmon smolts in Scotland

This bullet was in connection with the timing of salmon smolt movement across Scotland and particularly referred to

Malcolm, IA, Millar CP and Millidine KJ (2015). Spatio-temporal variability in Scottish smolt emigration times and sizes. Scottish Marine and Freshwater Science. Volume 6 Number 2
http://www.gov.scot/Resource/0047/00472202.pdf. However more detailed information for some rivers is coming out of the various studies referred to in the 2nd bullet response above.

5th bullet – please provide full references for information on particle motion when responding to the particle motion request for info

Has been attended to in the particle motion request

With regards Q3, please could you clarify where in the 2013 ES that the likelihood of salmon being present in the development area is understated, considering that the assessment assumed salmon were present.

Statements in the 2013 ES Chapter 13 of the type

"conservative assumption that these species will be present in the Development Area and/or Offshore Export Cable Corridor."
"As no definitive migratory routes exist for Scottish east coast Atlantic salmon it must be assumed that some individuals migrate through the Project area enroute from or to their natal rivers."
"As the migration routes of these three species are not fully established, the precautionary assumption must therefore be that they may pass through the Offshore Export Cable Corridor during migrations to and from natal rivers"

understate the likelihood that salmon will be present. It is not that they may be present, it is that they are very likely to be present.

However, the 2013 ES did correctly note that

"No Atlantic salmon or sea lamprey were recorded during site specific surveys, however as these species are rarely captured at sea through trawling, this is not an indication that they do not migrate through the Development Area."

and usefully refer to Malcolm *et al* (2010) with reference to likely behaviour of emigrating smolts and returning adults (see below).

There was an attempt in the 2017 Scoping Report to update on the likely presence of salmon.
"281. The research on the migratory routes of Atlantic salmon (Malcolm et al., 2010), also presented in the original ES, concluded that during migration of Atlantic salmon, fish followed the coastline to reach their migratory point. The Development Area is located at a minimum of 15 km from the coastline, and the location relative to the SACs designated for salmon makes it unlikely therefore that salmon would enter the Development Area on route to the coast during migration. Although it is difficult to conclude where smolt migrate, ongoing research and the general consensus within the scientific community is that they also migrate along coastal waters."

This has shortcomings. It is likely in this part of Scotland that there is an offshore

movement south of adult salmon returning to rivers, prior to fish following the coastline north to reach their natal rivers. Contrary to what is said, it is not unlikely that salmon will enter the Development Area on route to the coast during migration. And regarding smolt movement, it is not the case that there is a general consensus within the scientific community is that the smolts also migrate along coastal waters. The 2013 ES usefully referred to Malcolm et al (2010) which noted smolts had been recorded moving quickly to deeper more offshore waters with no evidence for coastal migration. The not yet published information from the various studies referred to in the 2nd bullet response would generally support this too.

COMMENTS ON FISH AND SHELLFISH

MS-LOT used advice provided previously for the Moray East development on the effect of sediment on scallops (see below) and requested further advice regarding nephrops. Confirmation was received from MSS that the Moray East advice was relevant to the nephrops as well as scallops.

Advice received previously (09 May 2017) in relation to Moray East

Thank you for your question. MSS would suggest that, should an assessment be required of the impact of sediment suspension and smothering of the different life stages of scallops, the following two pieces of work be undertaken:

- A review of literature on effects of suspended sediments to scallops (including different life stages); and
- Physical process modelling of likely spatial extent of suspended sediments from activities of concern.

These could be used to provide a comparison with the spatial extent of the scallop fishery, identified from commercial fisheries data (e.g. VMS data as described by Kafas *et al* (2012) and found online at Kafas *et al* (2013) . This would allow an understanding of the spatial extent of effects, if any, to scallops and provide a context within which to consider them.

<u>References</u>

Kafas, A., Jones, G., Watret, R., Davies, I., Scott, B., 2012. Representation of the use of marine space by commercial fisheries in marine spatial planning. ICES CM I:23.

Kafas, A., Jones, G., Watret, R., Davies, I., Scott, B., 2013.2009 - 2013 amalgamated VMS intensity layers, GIS Data. Marine Scotland, Scottish Government. doi: 10.7489/1706-1

COMMENTS ON PARTICLE MOTION – received 28 July 2017

MSS have provided this advice for the Inch Cape development but have confirmed it is relevant for all three Forth and Tay developments.

Particle motion
Since the original Environmental Statement for the Inch Cape development was produced there has been a considerable increase in the relevant literature which suggests that there is potential for impacts from acoustic particle motion on fish and invertebrates. An issue that has been raised by MSS at the scoping meetings is the need to consider potential impact of acoustic particle motion on sensitive receptors in addition to the effects of sound pressure on fish species that are sensitive to this.

There is acknowledgement that understanding of the effects from particle motion, and extent of these effects, is currently an area for further development, and there are various initiatives being progressed. MSS considers that the currently available evidence suggests that particle motion could be an important mechanism of effect on fishes and invertebrates. As 2017 EIA Regulations require the Scottish Ministers to come to a reasoned conclusion on the significant effects on the environment of the development, based on up to date information, this information needs to be taken into account. MSS has provided a list of references, which may be useful, which is appended (Appendix V).

MSS suggests that ICOL takes the following approach:

- Provide an overview of currently available information on particle motion within the vicinity of noise producing construction and operational activities, including, for example, pile driving, dredging and explosions – both within the water column and the sea bed. This should include consideration of the likely distances at which elevated levels of particle motion may be detected.
- Provide an overview of the published information on sensitive species and potential physiological and behavioural effects of particle motion.
- Give consideration to the potential effects of particle motion on species known to occur around the development site, making use of information on species distribution from the original ES and information which has become available since then. Particular attention should be given to potential effects on species of commercial or conservation concern.
- Provide information on opportunities that the development may present to investigate effects of particle motion on fish and invertebrates.

COMMENTS ON ORNITHOLOGY AND OUTPUT FROM THE MEETING ON 19 JULY 2017

Table of questions provided in advance of the meeting on 19 July 2017 to focus discussion on key points. The table was prepared by MS-LOT and MSS and provided to SNH and RSPB.

Advice Required		Response- with justification/s
SPAs		
1.	Which SPAs/ pSPA need to be included in the assessment?	
2.	Which qualifying features of the SPAs/ pSPAs should be included in the assessment?	
3.	What reference populations should be used for each SPA/ pSPA qualifying feature?	
4.	Which conservation objectives are most relevant for the SPAs/pSPAs/ species to be considered in the assessment?	
Displacement		
5.	Which species should be included in the assessment of displacement effects?	
6.	What are the breeding season months?	
7.	Which density estimate should be used for assessments (e.g. mean seasonal max)?	
8.	Should the density estimates be based on all birds or birds on the water?	
9.	Should sabbatical birds within the population be accounted for, and if so what rate should be used for each species, and how should it be accounted for in the assessment?	
10.	How should displacement effects be estimated for the assessment?	
11.	What displacement rate should be	

	assumed for each species?	
12.	How are displacement rates effected by WTG density/ spacing?	
13.	Should barrier effects be estimated and if so, for whish species/ SPAs and how?	
14.	Should displacement effects be expressed as reductions to adult survival and/or productivity?	
15.	Should displacement effects in the non-breeding season be considered qualitatively, qualitatively or not at all?	
16.	If quantitatively, how?	
17.	If qualitatively, how?	
18.	If yes, do new runs of the model need to be carried out?	
19.	If available, should the MSS commissioned displacement modelling tool being produced by CEH be used?	
20.	If the SNCB 'matrix' method should be used, what mortality rate and/or reduced productivity rate should be assumed for the PVA wind farm effect scenarios?	
Apportioning		
21.	Which method should be used to apportion effects to SPA/ non SPA colonies?	
22.	Which colony population counts should be used for apportioning?	
23.	Should estimated effects from the non-breeding season be apportioned to SPAs, and if so how?	
24.	Should estimated effects to non-adult age classes be apportioned to SPAs, and if so how?	
25.	If available, should the CEH apportioning tool be used?	
Cumulative Impacts		

26.	Which other projects should be included in the cumulative assessment?	
27.	Should non-breeding season effects be included in the cumulative assessment, if so how?	
28.	If non-breeding season effects are included in the assessment, how does this influence the other projects to be included in the cumulative assessment?	
29.	How should effects from the different projects be combined?	
Collision Assessment		
30.	Which species should have Collision Risk Models produced?	
31.	What nocturnal activity score should be used for each species?	
32.	What bird parameters should be used for each species?	
33.	Which density estimate to be used?	
34.	Which flight height distribution should be used, or what should be considered when deciding which to use?	
35.	Which Band CRM option/s should be used?	
36.	Which avoidance rates should be used for each species/ Band version?	
37.	Should a range of avoidance rates be presented, and if so which ones?	
38.	Which Band CRM option and avoidance rate should be assumed for the PVA wind farm effect scenarios?	
39.	Should uncertainty in collision estimates be considered or presented, and if so how	
40.	Should boat based bias i.e. from large scale attraction to survey vessels, be accounted for in density estimates and if so how	

41.	What are the breeding season months	
42.	Should non breeding season effects be included	
43.	If yes, how would collisions be attributed to the SPA (as opposed to 'regional' population	
44.	If yes, what non-breeding season reference population/s should be used for each species	
45.	Should sabbatical birds within the population be accounted for, and if so how.	
46.	How should the proportion of adult birds be estimated?	
47.	Should collision of non-adult aged birds be included in the assessment?	
48.	If yes, how would the proportion of non-adults be determined	
49.	If yes, how would collisions be attributed to the SPA (as opposed to birds from the 'regional' breeding season population)?	
50.	If yes, how would collisions be attributed to the SPA (as opposed to birds from the 'regional' non-breeding season population)?	
51.	Which (if any) species and SPAs are PVAs required for?	
52.	What type of PVA is required (stochastic, deterministic, or doesn't matter)?	
53.	Do the PVAs need to include effects on non-adult age classes, and if so which species and SPAs?	
54.	Do the PVAs need to include effects from during the non-breeding season, and if so which species and SPAs?	
55.	At what point in time should estimated wind farm effects be incorporated into PVA (year of application, year of proposed completion, etc)?	

56.	Over what time period should the PVAs be run?	
57.	Which 'baseline' demographic rates should the PVAs use?	
58.	How should estimated displacement, barrier, and collision effects be combined for the PVAs?	
59.	What combination of productivity and adult survival effects on adults (and immature?) in the breeding (and non-breeding?) season should be assumed in the wind farm effect scenarios?	
60.	Which PVA metrics should be presented?	
61.	Can the original PVAs produced by CEH be relied upon (will depend upon answers above)?	
62.	What other information is required to help inform advice on adverse impact on site integrity?	

Follow on questions from MS-LOT after the meeting on the 19 July 2017 and MSS response.

MS-LOT have now had the scoping advice from SNH and RSPB for all Forth and Tay developers. We have also had the ornithology wash up meeting which you attended. During that meeting the SNH and RSPB positions in relation to the ornithology table of questions was recorded. This has been sent to SNH and RSPB for refinement and to ensure that it accurately reflects discussions at the meeting. I have attached the draft table at present but will send on the final version once SNH and RSPB have reviewed it. MS-LOT request advice where there are differing views between SNH and RSPB on certain points. The question numbers relate to the numbers in the table.

My questions are:

2. RSPB suggested GBBG and LBBG should be included in an EIA assessment, however the ES submitted by Inch Cape assessed effects to be negligible therefore I would propose to scope these species out, do you agree?

MSS agree that the assessed effects are negligible and that this provides a good reason to scope out GBBG and LBBG.

2. For the pSPA species SNH advised that displacement should be assessed, RSPB advised that displacement and collision should be assessed. Please provide MSS advice on this point with justification.

Where proposed WTG locations are within the pSPA boundary, it would seem sensible for collision effects to also be included within the assessment. This is because the potential windfarm effects are occurring within the pSPA, which evidence indicates is a particularly important foraging area for the species potentially affected.

4. Which Conservation objectives do you consider to be most relevant?

For all four wind farms, the Conservation Objective “Population of the species as a viable component of the site” captures all of the other COs for the existing colony SPAs, and this should be the focus of the assessment. For NNG only, the conservation objectives of the pSPA relating to deterioration of habitats should also be considered due to its overlap with the pSPA .

5. Should displacement be assessed for kittiwake?

Yes, it should be included in the assessment. Macro avoidance/ displacement has been observed at some wind farms, and whilst displacement and collision effects may be mutually exclusive for individuals, this may not be the case at the population level. Also, the CEH displacement report (Searle *et al*., 2014) indicated that displacement/ barrier effects have the potential to effect individuals and impact populations.

10. Do MSS advise a qualitative or quantitative assessment for pSPA species for NnG, SNH advised qualitative, RSPB advised matrix. Please provide justification.

Where a species’ reference population is an existing breeding colony SPA, quantitative. Where this is not the case, effects should be quantified but due to the lack of an appropriate reference population for these species the matrix approach is not possible and the assessment of the population consequences will need to be qualitative.

11. If your answer to Q5 is that a displacement assessment should be completed for kittiwake, what displacement rate would you advise (RSPB advise 50%)?

The displacement rate should be 30%. This value takes into account the advice from SNH, the advice from the RSPB, the approach taken in the original assessments for

the Forth and Tay, and the lower number of WTG (necessitating either a greater WTG spacing or reduced overall wind farm footprint) in the new applications. If the matrix approach is used, the mortality rates should match those advised by SNH for the other (auk) species.

24. For non-breeding gannet and kittiwake would you advise site survey age structure or stable age structure to determine age structure?

The age structure of the non-breeding season effects should be based on the age structure derived from the at-sea survey data at this time of year. If this is not available then the stable age structure will provide the best available evidence and should be used.

26. For the breeding season which other projects do you consider should be included in CIA. Of these which should be included in the PVAs for the CIA?

For the breeding season, the CIA should consider effects from projects within mean max foraging range of the colony SPA under consideration. If available, the MS commissioned Apportioning Tool provides an output that ranks colonies by likelihood of a bird at a windfarm origination from that colony. For the CIA, effects should be considered quantitatively for the windfarm in isolation and in combination with the other three F&T wind farms. Effects from other windfarms should be considered within the CIA qualitatively.

PVA should be produced for the estimated effects from:

- the windfarm in isolation (effects throughout the year and on all age classes),
- the wind farm in combination with the other three F&T windfarms (effects throughout the year and on all age classes)
- for gannet and kittiwake the breeding season effects from the F&T wind farms combined with the non-breeding season effects from the offshore wind farms in UK waters (but see MSS advice in points 1-4 below)

27. For non-breeding season SNH advised for kittiwake and gannet all North Sea UK windfarms should be included in CIA. RSPB advise also include a qualitative assessment of North Sea European sites. Please provide MSS advice on this point.

At the meeting we discussed contacting PINS which I have done. P141 of East Anglia 3 ES includes A UK NS CIA, please consider and provide views.

See 26 above and final row of MSS advice below. Note that it is assumed that the SNH and RSPB advice relates to collision effects only.

31. Please provide MSS advice on most appropriate nocturnal activity scores with justification.

MSS advice is to use the scores advised by SNH. RSPB advise using a score of 2 for gannet but the justification for this appears to conflate nocturnal activity with colony attendance, foraging activity and timing of at-sea surveys without an adequate empirical basis.

51. Do you consider that PVAs should be provided for Buchan Ness to Collieston Coast and St. Abbs to Fast Castle SPAs?

Yes, unless the estimated cumulative effects from the F&T projects are less than a reduction in annual adult survival of 0.2%.

52. Please provide MSS view on whether deterministic or stochastic models should be used.

Stochastic models should be used as these have been found to be precautionary (Lande, R., Engen, S. & Sæther, B.-E. (2003) Stochastic populated dynamics in ecology and conservation. Oxford University Press, Oxford), are able to provide a greater range of potentially informative outputs, and constitute are the best available information. The PVAs should be density independent.

Please provide detail of any concerns you have with the advice provided by SNH or RSPB.

1. SNH advise that the displacement rates for guillemot, razorbill and puffin should be assumed to be 60%. This is higher than the rates that they advised for the previous assessments of ICOL, SGA and SGB, which SNH advised would have lower displacement rates due to the lower turbine density/ higher turbine spacing on these windfarms. If the number of WTG is even lower for the new applications for ICOL, SGA and SGB (and indeed NNG) then either the WTG density within the windfarm will also be lower, or the dimensions of the windfarm will be smaller. The displacement rate should reflect this, and MSS advise a displacement rate of 50% be used. This is the higher end of the range of 40-50% advised by SNH in the original F&T windfarms with reduced WTG density.

2. Both SNH and the RSPB advise the monthly maximum at-sea survey estimates should be used to inform the collision risk assessment rather than the mean values. This is a change to advice provided for other windfarms, and the rationale is unclear from the SNH advice. The suggestion appears to be that it is in order to account for uncertainty, but the approach advised ignores uncertainty/ variability and instead appears to be aimed at being as precautionary as possible. Defaulting to the most precautionary approach available is not in itself a justification,

and runs the very high risk of producing an estimated effect that is highly likely to be unreasonable and unrealistically high. It also lacks robustness because with each year of survey undertaken, the likelihood of a higher value being identified would increase, and the representativeness of the high value would become increasingly questionable. The RSPB suggest that a reason for them advising this approach is due to the Regulator wishing to see a single effects estimate modelled in the PVA, but it was the RSPB that indicated at the meeting on 19.07.17 and in their subsequent email on 21.07.17 that they wished to see a single effects estimate (though this was not what they advised previously). Neither SNH nor the RSPB mention presentation of uncertainty around the monthly maximum values, which further undermines their "to account for uncertainty" justification. MSS would advise that the mean monthly estimates are presented alongside confidence limits, and that the mean values are those assumed in the effects scenarios incorporated into the PVAs because this is the most robust approach, is consistent with previous assessments, and will provide information on the uncertainty around the mean value in order to account for uncertainty.

3. SNH appear to be advising that alongside the baseline, PVAs should be run for the estimated WCS effects only. The RSPB indicated on 19.07.17 that they were in two minds over whether single effect scenarios should or should not be presented by the developer. MSS advise that PVAs are also run for estimated effects that are 10% higher and 10% lower than those estimated for the WCS. This should be for the windfarm combinations identified under 26 above. This is advised as MSS believe that it is important for the assessment to be able to consider the sensitivity of population consequences (as estimated by the PVAs) of windfarm effects that may be higher or lower than those estimated for the WCS, as this may have some bearing on the conclusions reached in the assessment.

4. It will be challenging to identify collision estimates from the other offshore wind farms in the UK that have been estimated and/or reported in a consistent manner (see 26 and 27 above). Many will have been estimated using approaches that are no longer deemed to be the best available approach. The cumulative totals obtained should therefore be treated with extreme caution, as should the outputs from PVAs should these cumulative effect totals be modelled.

Further advice requested by MS-LOT and provided by MSS on the most appropriate mortality rate from displacement.

We have had further advice from SNH on the most appropriate mortality rate from displacement (related to Q20 of the table) SNH now advise 2% for puffin and 1% for other auk species (both during the breeding and non-breeding season). RSPB suggest 2% during both seasons. Please could you provide the MSS view on this point with reasons, also please advise value for kittiwake.

In response to your questions below:

- Assuming a reduction in adult mortality rate of 2% for displaced puffin during the breeding season seems appropriate considering the results of the CEH displacement model (Searle et al 2014) suggested that this species may be more susceptible to displacement effects than the other two auk species (guillemot and razorbill considered. It should be noted both that the tracking data available to that study were limited, and also that the update to the 2014 model (the "Fate of Displaced Birds" model) being produced by CEH aims to include puffin (as well as guillemot, razorbill and kittiwake).
- Assuming a reduction in adult mortality rate of 1% for displaced guillemot and razorbill during the breeding season is appropriate considering the results of the CEH displacement model (Searle et al 2014) that suggested these species were not particularly susceptible to displacement effects from the F&T wind farms.
- Assuming a reduction in adult mortality rate of 1% for displaced guillemot and razorbill during the non-breeding season is appropriate considering that they are no longer central-place foragers tied to the breeding colony at this time of year, but also taking into consideration that they do not disperse as widely as e.g. puffin during the non-breeding season.
- For kittiwake, the assessment of displacement during the breeding season using the SNCB guidance (the 'matrix' approach) should assume a reduction in adult mortality rate for displaced individuals of 2%. This takes into consideration the results from the CEH displacement model (Searle et al 2014) that indicated that displacement from the Forth and Tay windfarms had the potential to impact the SPA populations considered.

COMMENTS ON MARINE MAMMALS – provided for Inch Cape and used as basis of advice for all three Forth and Tay developments.

Marine Scotland Science
Inch Cape Scoping
Marine Mammals
31st July 2017

MSS have had the opportunity to review the scoping document provided by Inch Cape, to attend a meeting with the developer and their consultants, and to review the advice provided by SNH on the scoping report. MSS also had the opportunity to attend a workshop organised be Inch Cape, which took place on 27th July 2017, during which several important technical points were discussed, and which will also influence some of the details provided in the scoping opinion.

SNH have covered most of the issues that MSS would consider to be important and so our advice covers whether we agree with SNH's position, as well as raising other points for consideration, and drawing upon the discussions at the workshop on 27th July.

Species to be included in EIA and HRA

We agree with SNH that bottlenose dolphin, harbour seal, grey seal, harbour porpoise, minke whale and white beaked dolphin should be included in the EIA.

We also agree that there is connectivity between the project and the Moray Firth SAC for bottlenose dolphins, the Firth of Tay and Eden Estuary SAC for harbour seals and the Isle of May SAC for grey seals. These species and sites should be included in the HRA.

Management units, population sizes and distribution information

Bottlenose dolphin (*Tursiops truncatus*)

We agree with the management unit and population size recommended by SNH for bottlenose dolphin. During the workshop on 27th July there was discussion regarding distribution for bottlenose dolphin. An approach was agreed which provided an updated version of the distribution used in the original ES and MSS support this. The text of the notes from the workshop states:

> "*Agreement reached to assume, as per the assessment for the Original Development, the reference bottlenose dolphin population (195 individuals) should be split 50:50 between the east coast and the Moray Firth, and that 98 dolphins would be present at the time of piling activities off the east coast.*
> *Agreement reached that the 98 individuals assumed to be present off the east coast should be spread evenly across the area inside the 20 m depth contour as defined in the Original Development EIA, excluding areas in the Forth and Inner Tay where bottlenose dolphin are known not to be present (shaded red in Figure 1). These 98 animals will be spread evenly across the remaining grid cells (thereby increasing the density per grid cell)."*

Harbour seal (*Phoca vitulina*) and grey seal (*Halichoerus grypus*)

We agree with SNH that the Scottish seal management areas should be used for grey and harbour seals, and advise that the 2016 population sizes will be available in the SCOS 2017 report (which will be available in draft in September 2017). Until that report is published, we recommend using the 2015 population sizes which are published in the SCOS 2016 report. SCOS reports are available from http://www.smru.st-andrews.ac.uk/research-policy/scos/

We advise that the seal usage maps produced by SMRU should be used for distribution data on both species. These are currently available directly from SMRU, but will be updated and made available on NMPI in the next few months.

Harbour porpoise (*Phocoena phocoena*)
We agree with SNH regarding the management unit for harbour porpoise, which is based on the IAMMWG (2015) guidance. The relevant unit is the North Sea.
For an abundance estimate for this management unit, we advise that the SCANS-III surveys are the most up to date and that could usefully be used. Should this not be available, we agree with SNH that the estimate from the IAMMWG (2015) guidance can be used. We also agree with SNH that the SCANS-III survey results for block R can be used to provide a regional abundance estimate for use within the assessment. Should further information from SCANS-III become available in time to be used in the ES, we would recommend making reference to this.

Distribution data on harbour porpoise can be taken from the original ES, unless other more recently published data are available.

Minke whale (*Balaenoptera acutorostrata*)
We agree with SNH that the management unit is the Celtic and Greater North Seas as noted in IAMMWG (2015). We also agree with SNH regarding abundance estimates for minke whale, although, as with harbour porpoise, we advise that it may be feasible to incorporate information from the SCANS-III surveys.

Distribution data on minke whale can be taken from the original ES, unless other more recently published data are available.

White beaked dolphin (*Lagenorhynchus albirostris*)
We agree with SNH that the management unit is the Celtic and Greater North Seas as noted in IAMMWG (2015). We also agree with SNH regarding abundance estimates for minke whale, although, as with harbour porpoise, we advise that it may be feasible to incorporate information from the SCANS-III surveys.

Distribution data on white-beaked dolphin can be taken from the original ES, unless other more recently published data are available.

Impacts for assessment
MSS agree with the developer and SNH that the assessment will need to cover the impact of increasing the power of the hammer used to install the piled foundations. We also agree that since the other potential impacts to marine mammals are the same, or reduced, compared with the original ES, that this is the only area that will require consideration. This will involve updating assessments from the previous ES and we would advise that refining the design envelope to account for smaller number of turbines that the developer now intends to install, and the reduction in construction time as a result, will be likely to decrease the overall impact. This is likely to be of benefit to the developer.

MSS understands that the developer may seek to include geophysical surveys in the ES. We agree with SNH that this would be helpful, and consider that it will allow for better consideration of the whole project. However, we consider that it may be necessary on occasion for the developer to undertake geophysical surveys prior to a licence or consent being granted (for example, to inform consideration of such a licence or consent). We would therefore recommend that MS-LOT does not rule out the potential for geophysical surveys to be licensed through a stand-alone process.

Assessments to be undertaken

Underwater noise modelling and assessment

The maximum hammer energy proposed to be used has increased since the previous ES. We therefore advise that it will be necessary to update the noise propagation modelling to account for this. We agree with SNH that both instantaneous and cumulative PTS thresholds should be presented, modelled for each of the species noted above. We also agree with SNH that the developer should provide the total number of individuals from each species that may suffer PTS and the number that may be displaced through disturbance.

During the workshop there was discussion about including the period in which ADDs are utilised to move mammals away from the piling site, in the calculations of cumulative PTS. MSS would like to clarify that since ADDs are a mitigation tool, it may be more appropriate to undertake the assessment process without them, then include them as a mitigation at a later stage (as would commonly be undertaken in an EIA). Such an assessment would also provide good evidence regarding the efficacy of the proposed mitigation.

Thresholds for PTS are an area which has developed since the original ES. MSS recommend that the developer presents PTS thresholds from the Southall et al. (2007) review, since these were used in the original ES, to allow comparability. We also advise that the 2016 NOAA criteria are the most up to date scientific information. However, we note that the US Government has decided to review these criteria (refer to http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm for more information). MSS recommend that both sets of thresholds are considered in the ES, to ensure that the best available science is incorporated, and also to allow comparability with the previous ES.

MSS agree that a dose response curve should be used to determine the proportion of animals likely to be disturbed sufficiently to displace them by the piling noise. We note that both SNH and the developer have suggested using the dose response curve used in the original ES, which was based on harbour porpoise responses to pile driving at the Horns Rev II development. MSS advise that this was used in the previous assessment in the absence of any other data, and that there are some potential issues with this limited data set. Our concerns relate to the small sample size and also to the very shallow water depths at the study site which may have an

effect on noise propagation. Other data now exist, from pile driving studies (e.g. Dähne et al., 2013; Brandt et al., 2016), as well as from other impulsive sources (e.g. Thompson et al., 2013), and we would encourage the developer to make use of these where possible. MSS consider that in the absence of similar data for species other than harbour porpoise, that it is acceptable to use the same dose-response function for all species. We would, however, flag that this is an important knowledge gap.

Species impact assessment

For bottlenose dolphin, it will be necessary to assess the impacts of the development alone on the East Scotland management unit population, as well as cumulatively with other developments that may impact on the same population. MSS advice here differs from that of SNH. SNH consider that if the impact of the project alone is the same or less than the impact of the original project, that there is not a requirement for a cumulative assessment. MSS are concerned that this strategy may compromise the Appropriate Assessment that will be conducted in relation to the Moray Firth SAC.

MSS agree with the list of projects to be included in a cumulative assessment that is provided in the Scoping Report, but would agree with SNH that Aberdeen Harbour Expansion Project should also be included.

For harbour porpoise, minke whale and white beaked dolphin, discussion at the workshop on 27th July concluded that the developer should assess whether the new parameters of the development result in any greater impact to these species. If the new proposals do not result in increased impact, then no further assessment is required. MSS agree with this strategy, but also consider that there will be a need to put any impacts to these species into a population context, for the purposes of EPS licensing. While the EPS licence will not be part of the EIA process, we recommend that the need for this is recognised through the process, and that information is presented in a manner which will readily translate into the EPS process.

For harbour seal and grey seal, MSS are content to adopt the approach outlined above for harbour porpoise, minke whale and white-beaked dolphin, whereby further assessment is only carried out if the effects are found to be greater than in the previous ES. However, the developer should note that this will not remove the need for information to be provided in an HRA to inform the Appropriate Assessment for the Firth of Tay and Eden Estuary SAC and the Isle of May SAC.

Population level effect assessment

For species where population level impact assessments are undertaken, MSS recommend using the Interim Population Consequences of Disturbance (iPCOD) framework. The software for this model is available on the Marine Scotland website, along with a report which suggests appropriate parameters for each species. MSS

note that a new version of the software will shortly be available (also on the Marine Scotland website), which will allow for the use of a dose-response function for the displacement of animals as a result of exposure to noise.

MSS note the interim nature of the iPCOD framework. This is because there are currently insufficient data on the consequences of disturbance to individual animals, and hence to populations. MSS flag this as an important knowledge gap. The iPCOD framework utilises formal expert elicitation to produce statistical distributions of responses to disturbance, and to estimate the effects on vital rates of individuals (e.g. survival probability, reproductive rate), including the uncertainty in these predictions. An alternative framework, the DEPONS model, is available and uses measured responses of tagged harbour porpoise to impulsive noise sources to understand the effects of disturbance. However, this framework is currently only parameterised for harbour porpoise and so does not represent a viable assessment method for this development.

In the previous ES, a Population Viability Analysis (PVA) was used for population level assessments. This also used expert opinion on the responses to disturbance and their effect to vital rates. However, this was not a formally elicited expert opinion and did not include uncertainty around the responses or impacts to individuals. The framework for developing this model is also unsophisticated and cannot accommodate scenarios with variable numbers of developments in subsequent years (see advice on the Aberdeen Harbour Expansion Project Appropriate Assessment for further details). MSS recommend iPCOD over this PVA for these reasons.

In providing iPCOD outputs, MSS request that the ES (or an appendix) provides a comprehensive list of the parameters input. This should be sufficiently detailed such that MSS staff would be able to replicate the analysis. As a minimum this will include the piling schedule, the demographic parameters, and starting population size. MSS request that the developer provides a copy of the code used to run the model and any QA/QC outputs that the software produces.

References

Brandt et al. (2016) Effects of offshore pile driving on harbour porpoise abundance in the German Bight. Assessment of Noise Effects. Final Report. Prepared for Offshore Forum Windenergie. http://bioconsult-sh.de/site/assets/files/1573/1573.pdf

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Thompson et al. (2013) Short-term disturbance by a commercial two-dimensional seismic survey does not lead to long-term displacement of harbour porpoises. Proc Roy Soc B 280: 20132001. http://dx.doi.org/10.1098/rspb.2013.2001

Appendix III: Note on updating flight height data in the Band collision risk model

Collision risk modelling – flight height data and spreadsheet advice

- Band CRM spreadsheets are available from the SOSS website: https://www.bto.org/science/wetland-and-marine/soss/projects

  However, please be aware that the 'Flightheight' tab is **NOT** up to date with advised flight height data: https://www.bto.org/sites/default/files/u28/downloads/Projects/Final_Report_SOSS02_Band2Tool.xlsm

- To access the most up to date flight height data the Flight Heights Spreadsheet must be downloaded: https://www.bto.org/sites/default/files/u28/downloads/Projects/Final_Report_SOSS02_FlightHeights2014.xls

  This uses the amended Johnston *et al.*. 2014 flight height data.

- Flight height data should be copied from the species-specific tabs in the Flight Heights Spreadsheet – copy the 'Maximum Likelihood' column into column B of the 'Flightheight' tab of the CRM excel spreadsheet. **Or** copy the species-specific column from the '1m_height_bands' in the Flight Heights Spreadsheet – copy the 'speciesname.est' column into column B of the 'Flightheight' tab of the CRM excel spreadsheet.

- Species-specific flight height data can be stored in the 'Flightheight' tab of the CRM excel spreadsheet to the right of column B, and then be copied and pasted into column B as required. However, column B is the only *active* column – only data placed in this column will be used to calculate collision risk.

- It should be checked that cell B7 (called 'Npoints') in the 'Flightheight' tab of the CRM excel spreadsheet has a value of 300. This ensures that all cells containing flight height data are taken into consideration when estimating collisions.

- It is worth naming the flight height columns in the 'Flightheight' tab of the CRM excel spreadsheet with the species the data relates to (as shown in the example spreadsheet) and an indication of the flight height data used (e.g. Gannet - Johnston corrected).

Appendix IV: MSS advice on presentation of outputs from PVA modelling

MSS advice on presentation of outputs from PVA modelling

MSS commissioned a research project undertaken by CEH to review the use of Population Viability Analysis (PVA) metrics in the context of assessing effects of offshore renewable developments on seabirds and to test PVA metric sensitivity to mis-specification of input parameters. The most useful metrics in this context are those that are least sensitive to such mis-specification, enabling more robust assessment of offshore renewable effects.

The report by Jitlal *et al.* (2017) which tested and validated metrics of change produced by PVA models is not yet published but a draft final version is available. The results support previous work undertaken by Cook *et al.* (2016). Jitlal *et al.* identify 3 metrics that MSS advise should be presented:

- median of the ratio of impacted to unimpacted annual growth rate
- median of the ratio of impacted to unimpacted population size
- centile for unimpacted population that matches the 50th centile for impacted population (n.b. Cook *et al.* did not consider this metric in their report)

Jitlal *et al.* found the ratio metric 'median of the ratio of impacted to unimpacted annual growth rate' was least sensitive, followed by the ratio metric 'median of the ratio of impacted to unimpacted population size' and then the probabilistic metric 'centile for unimpacted population which matches the 50th centile for the impacted population'. They recommend that interpretation of outputs should take account of their relative sensitivities.

Jitlal *et al.* also conclude that the probabilistic PVA metric 'probability of a population decline' was much more sensitive and is not recommended for use in the context of assessing impacts of marine renewable development.

Each of the 3 metrics provides information on the change to populations associated with different attributes of the change. The median of the ratio of impacted and unimpacted annual growth rates provides information on how closely related the trends of the impacted and unimpacted scenarios are (n.b. it does not provide information on whether the trend changes from positive to negative). The population size metric provides information on how closely related the median population sizes of the impacted and unimpacted populations are at the end point of the assessment period (rather than the difference in size between the end of the assessment period and the start). The centile metric provides probabilistic information on how closely related the median impacted population is to the median of the unimpacted population, taking into account the distribution of population sizes associated with

the unimpacted population at the end point of the assessment period. By providing information on each of these attributes of the change resulting from the proposed activity the decision maker will be more fully informed than they would be otherwise.

Median of the ratio of impacted to unimpacted annual growth rate

The value of the assessed impact should be presented both for the project alone and for the cumulative/in-combination assessment. The value should be presented as a ratio e.g. 0.98, and the derived value from the ratio of the median difference in impacted and unimpacted annual growth rates would be 0.02.

Median of the ratio of impacted to unimpacted population size

The value of the assessed impact should be presented both for the project alone and for the cumulative/in-combination assessment. The value should be presented as a ratio i.e. 0.85, and the derived value from the median difference between impacted and unimpacted population size would be 0.15.

Centile for unimpacted population that matches the 50th centile for impacted population

The population size for each of the centiles between 0.01 and 0.99 for the unimpacted population should be provided at 0.01 intervals. For certain types of population modelling this may be computationally demanding to the extent that it could delay the process of assessment. In which case a more limited set of centiles can be agreed.

The centile value of the predicted unimpacted population size that corresponds to the median value of the assessed effects on the impacted population size should also be presented. This should be provided for the project alone and for the cumulative/in-combination assessment.

Tabulation of outputs

scenario	median of the ratio of impacted to unimpacted annual growth rate (and corresponding derived metric)	median of the ratio of impacted to unimpacted population size (and corresponding derived metric)	centile for impacted population that matches the 50th centile for unimpacted population	Adult survival rate (and corresponding derived metric)	Productivity rate (and corresponding derived metric)	End population size (breeding pairs)
unimpacted	1	1	.50	.91	0.40	100,000
cumulative effect	0.98 (0.02)	0.85 (0.15)	0.41	0.88 (0.03)	0.33 (0.07)	85,000
Project alone	0.99	0.96	0.48			96,000

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Appendix V: References in relation to particle motion

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Appendix VI: Licensing Process

Consent Timescale and Application Quality

In December 2007, the Scottish Ministers announced an aspirational target to process new section 36 applications within a 9 month period, provided a Public Local Inquiry ("PLI") is not held. This scoping opinion is specifically designed to improve the quality of advice provided to developers and thus reduce the risk of further information being requested and subject to further publicity and consultation cycles. The Scottish Ministers will complete a processing agreement with Seagreen.

Application

The application letter must detail how many licences are being sought, what marine licensable activities are proposed and what legislation the application is being made under.

Developers should be aware that the ES should also be submitted in a user-friendly PDF format which can be placed on the Scottish Government website. If requested to do so the developer must sent to the Scottish Ministers such further hard copies of the EIA Report as requested. Developers may be asked to issue the EIA report directly to consultees and in which case consultee address lists should be obtained from the Scottish Ministers.

Scottish Natural Heritage ("SNH") has produced a Service Level Statement ("SLS") for renewable energy consultation. This statement provides information regarding the level of input that can be expected from SNH at various stages of the EIA process. Annex A of the SLS details a list of references, which should be fully considered as part of the EIA process. A copy of the SLS and other vital information can be found on the renewable energy section of their website – www.snh.org.uk.

Ordnance Survey ("OS") Mapping Records

Developers are requested at application stage to submit a detailed OS plan showing the site boundary and location of all deposits and onshore supporting infrastructure in a format compatible with The Scottish Government's Spatial Data Management Environment ("SDME"), along with appropriate metadata. The SDME is based around Oracle RDBMS and ESRI ArcSDE and all incoming data should be supplied in ESRI shape file format. The SDME also contains a metadata recording system based on the ISO template within ESRI ArcCatalog (agreed standard used by The Scottish Government); all metadata should be provided in this format.

Gatecheck

The Scottish Ministers undertake a gatecheck prior to formal submission of

applications and advise you to take full advantage of this service. The gatecheck is not designed as an in depth evaluation of the content of an EIA Report. However, it will allow the Scottish Ministers the confidence that minimum legislative requirements have been met prior to formal submission of the EIA Report. This should reduce the risk of the potential requirement for you to submit an addendum to the EIA Report and therefore be subject to re-advertisement and re-consultation. In order to assist the gatecheck process, a thorough gap analysis (Appendix VII) of the issues identified in this Scoping Opinion should be drawn up for submission with the EIA Report. The timeline for the gatecheck will be agreed with Seagreen through the processing agreement.

Advertisement

Where the developer has provided the Scottish Ministers with an EIA Report, the developer must publish their proposals in accordance with Regulation 14 of The Electricity Works 2017 (as amended) and Regulation 16 of The Marine Works 2017 (as amended). Licensing information and guidance, including the specific details of the adverts to be placed in the press, can be obtained from Marine Scotland. In addition, requirements under The Electricity (Applications for Consent) Regulations 1990 must be met .

If additional information is submitted further public notices will be required.

EPS licence

European Protected Species ("EPS") are animals and plants (species listed in Annex IV of the Habitats Directive) that are afforded protection under The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) and The Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended). All cetacean species (whales, dolphins and porpoise) are European Protected Species. If any activity is likely to cause disturbance or injury to a European Protected Species a licence is required to undertake the activity legally.

A licence may be granted to undertake such activities if certain strict criteria are met:

- there is a licensable purpose;
- there are no satisfactory alternatives, and;
- the actions authorised will not be detrimental to the maintenance of the population of the species concerned at favourable conservation status in their natural range.

Applicants must give consideration to the three fundamental tests and may choose to apply for an EPS licence following any grant of consent once construction methods have been finalized, however it is useful to include a shadow EPS assessment within the EIA Report.

Basking sharks are also afforded protection under the Wildlife & Countryside Act 1981 (as Amended by the Nature Conservation (Scotland) Act 2004).

Appendix VII: Gap Analysis

APPLICATION - Consultation Gap Ana

	Project:								Legend:	Closed				
	Date issued:									Ongoing				
										Open				
	APPLICANT TO COMPLETE													
	Consultee								Applicant					
	Consultee	Number/reference	Consultee's response	ES/Addendum	Chapter/paragraph	Objection (yes/no)	Condition requested	Summary of response (Key concern, etc)	Response from applicant	Action required	Evidence	Evidence sent to MS-LOT (date)	Comments	
Example	SNH		*From our review of the supporting information for the application, including both the Environmental Statement (ES) and Habitat Regulations Appraisal (HRA) reports, we conclude that for this proposal alone there is no adverse effect on site integrity for bird interests.*	ES	6 Para 1.19	No	No	Conclusion of no adverse effect on site integrity for bird interests	No response required					
			We have assessed all other natural heritage interests and can confirm that we raise no other issues which could significantly impact on international or national interests.		6 Para 1.20		No	no significantly impact on international or national interests.	No response required		e.g. meeting minutes, emails, agreements, etc.			
			We support the commitment provided in the ES (Chapter 2) to agree and implement a Project Environmental Management Plan (PEMP).		6 Para 1.23		if yes, Copy condition requested by consultee	Need to submit PEMP	PEMP will be developed after/during consent and submitted to MS LOT	Meetings with MS LOT to discuss draft PEMP	Meeting minutes (doc ref numberxxx) *Include further updates regarding meetings, resolution on issues, etc*	Evidence sent to LOT on 01/01/2016 *Include further updates regarding meetings, resolution on issues, etc*		

MS LOT: each individual comment raised by the consultee should be on a separate line.