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(Email only)

MMO Reference: DCO/2018/00014
Planning Inspectorate Reference: EN010098
MMO Registration Identification Number: 20029896

16 December 2021

Dear Sir or Madam,

Planning Act 2008, Application by Orsted Hornsea Project Four (UK) Limited (“Ltd”) for an Order Granting Development Consent for Hornsea Project Four Offshore Wind Farm

Relevant Representation

On 4 November 2021, the Marine Management Organisation (the “MMO”) received notice under Section 56 of the Planning Act 2008 (the “PA 2008”) that the Planning Inspectorate (“PINS”) had accepted an application made by Orsted Hornsea Project Four (UK) Ltd (the “Applicant”) for a development consent order (the “Application”) (MMO ref: DCO/2018/00014; PINS ref: EN010098).

The Application includes a draft development consent order (the “dDCO”) and an Environmental Statement (the “ES”). The dDCO includes, at Schedules 11 and 12, a draft Deemed Consent under Part 4 (Marine Licensing) of the Marine and Coastal Access Act 2009 (the “Deemed Marine Licence/DML”).

The Application seeks authorisation to construct, operate and maintain Hornsea Project Four offshore wind farm, comprising comprises up to 180 offshore wind turbines together with associated offshore and onshore infrastructure and all associated development (the “Project”).

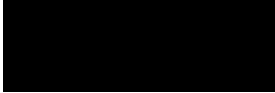
The MMO has reviewed the DCO Application and has utilised advise from our scientific technical advisors at the Centre for Environment, Fisheries and Aquaculture Science (“Cefas”).



This document comprises the MMO's initial comments in respect of the DCO Application in the form of a relevant representation.

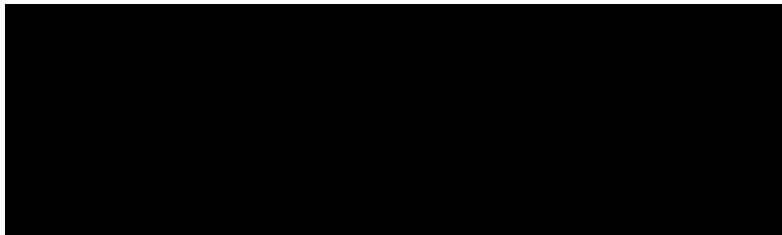
This is without prejudice to any future representation the MMO may make about the DCO Application throughout the examination process. This is also without prejudice to any decision the MMO may make on any associated application for consent, permission, approval or any other type of authorisation submitted to the MMO either for the works in the marine area or for any other authorisation relevant to the proposed development.

Yours faithfully



Rebecca Reed

Marine Licensing Case Officer



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1. General comments on the application

1.1 Major Comments

- 1.1.1 The MMO has concerns about the timeframes for submission of documents. The MMO advise that a 6-month lead period (prior to the commencement of activities) rather than 4-month, would be more appropriate to allow sufficient time to review the submissions and resolve any issues; the submissions may require multiple rounds of consultation and the shorter the lead time, the higher the risk that there will be delays to the Applicant's project delivery timeframe. In addition to this the MMO has requested the removal of a determination timescale. This matters are expanded in sections 2.1.2-2.1.14.
- 1.1.2 The MMO has ongoing concerns in relation to underwater noise and disturbance impacts to fish and marine mammals and so at this stage cannot agree with the seasonal restriction timescale in the current dDCO. This is expanded in sections 2.1.15 and 3.7.32-3.7.36.
- 1.1.3 The MMO has concerns on the use of materiality within the DMLs. This has been expanded in section 2.1.16 to 2.1.20.

1.2 Minor Comments

- 1.2.1 The Applicant should demonstrate that they have considered whether the project adheres to all the relevant marine plans and policies in the area. The MMO recommends that this is presented in a single, coherent document instead of a number of separate references throughout the submission. The relevant marine plan policies that should be met can be identified using the Explore Marine Plans tool and policy information on the following website:

Further comments can be found in section 3.1.

2. dDCO and DMLs

2.1 dDCO Major Comments

Collaboration

- 2.1.1 The dDCO contains 2 DMLs consisting of one for the generation assets (Schedule 11) and one for the transmission assets (Schedule 12). Splitting the assets into two separate DMLs ensures smooth transitions during the transfer of benefit. If a transfer of benefit were to happen, it is unclear what mechanisms would be in place to ensure two different asset holders working in the same area would collaborate together, especially with regard to in-combination effects. This is considered a potential risk to the project by the MMO. The MMO is therefore considering requesting the inclusion of a collaboration condition to go within the DML. The MMO will confirm this within its next written response.

Timescales

- 2.1.2 Timescales - Part 4, Condition 14 refers to a timescale of four months to submit documentation.



14.—(1) *Each programme, statement, plan, protocol or scheme required to be approved under condition 13 (save for that required under condition 13(1)(f)) must be submitted for approval at least four months prior to the intended commencement of the relevant stage of the licensed activities, except where otherwise stated or unless otherwise agreed in writing by the MMO.*

(2) *The pre-construction monitoring surveys, construction monitoring, post-construction monitoring and related reporting required under condition 13(1)(f) must be submitted in accordance with the following, unless otherwise agreed in writing with the MMO—*

(a) *at least four months prior to the first survey of the relevant stage, detail of any pre-construction surveys and an outline of all proposed monitoring;*

(b) *at least four months prior to construction of the relevant stage, detail on construction monitoring; and*

(c) *at least four months prior to commissioning of the relevant stage, detail of postconstruction (and operational) monitoring;*

(3) *The MMO must determine an application for approval made under condition 13 within a period of four months commencing on the date the application is received by the MMO, unless otherwise agreed in writing with the undertaker.*

(4) *The licensed activities for the relevant stage must be carried out in accordance with the approved plans, protocols, statements, schemes and details approved under condition 13, unless otherwise agreed in writing by the MMO.*

2.1.3 The MMO has concerns over these timescales as it is not enough time to fully assess and review documents and therefore request that this is changed to six months. Comments on timescales are below from 2.1.4 to 2.1.20.

2.1.4 Condition 14 sets out the requirements for the Applicant to submit all pre-construction documentation at least four months prior to the commencement of the construction works. The MMO does not agree that a four month timescale provides sufficient time for the post consent documentation to be considered prior to the start of commencement of works. The MMO believes that a four month pre-construction submission date is unrealistic and even counterproductive, as the pre-construction sign-off process is not always straight forward.

2.1.5 The four month timescale was deemed appropriate for round 1 developments, which were smaller, closer to shore and with fewer complex environmental concerns. The documents in question require in depth analysis by both MMO staff and statutory consultees and as such, there needs to be as much time as practically possible to allow this process to take place.

2.1.6 It is very common that documents submitted under these type of conditions require multiple rounds of consultation to address stakeholder concerns. This process alone can be very time consuming and the proposed four month submission time would not account for any additional time that the Applicant may require to update documents throughout the process. The MMO further notes that some documents require additional assessment processes, for example a Southern North Sea (“SNS”) Special Area of Conservation (“SAC”) Site Integrity Plan (“SIP”) may require post consent



Habitats Regulations Assessment (“HRA”) considerations to be made. The MMO appreciates that the Applicant could be working within tight time schedules post consent, and as such, we advise that a more suitable timescale is provided to reduce risks that could lead to project delays.

2.1.7 For example, the timescale of one in depth plan (such as SNS SIP) could potentially follow this path:

- a) Up to 4 weeks to acknowledge and review the document within the MMO.
- b) Up to 6 weeks for external consultation with stakeholders on this documentation.
- c) Up to 4 weeks once consultation is closed to allow for the MMO to review the responses and possibly ask for additional information from the Applicant. At this stage the MMO and the Applicant could be in discussion to agree on an approach to the responses.
- d) Up to four weeks to allow for the Applicant to undertake any actions resulting from any MMO request for further information. Depending on the level of detail, and Applicant resources, this could represent a further significant time period.
- e) Once actions are completed and information is returned to the MMO, the MMO could need to undertake new consultations

2.1.8 It is noted from the above that, even if the discharge of documentation were to follow the current estimated timescales, and no further communication was required from the Applicant (which is highly unlikely) the current estimated turnaround equates to 18 weeks, which is longer than the 16 weeks suggested by the Applicant. It should also be noted that the above timescale applies to only one document, when in reality, the number of in-depth discharge requirements could far exceed 30 in total.

2.1.9 The MMO recognises that the current draft outlines that the 4 month timing could be changed with written agreement of the MMO. The MMO notes that the condition wording implies that it is for the Applicant to request a change and for the MMO to agree. It is far more likely that the Applicant will ask the MMO to reduce timescales for certain documents, as has been the MMO’s experience thus far.

2.1.10 The MMO considers it is important to address the practicalities of these types of sign-off as well as the specific wording held within the consent. If the works are submitted 4 months prior to the construction start date then there is risk that the Applicant will have already begun preparing for construction. If sign off cannot be achieved within the 4 month window then there is a risk that the Applicant will face cost implications of this, for instance the costs from vessels sitting idle and the potential need to resource storage areas for wind farm infrastructure components that should have been installed. By amending the submission timescale to 6 months there is more time to undertake the required process with less risk of needing an extension or the Applicant facing delays.

MMO Determination

2.1.11 Condition 14 (3) includes a specified determination period within which the MMO must determine whether or not to issue consent under this condition. The MMO strongly considers it inappropriate to put timeframes on decisions of such a nature.



The MMO would not willingly seek to constrain our ability to make an appropriate and timely decision on post consent sign-off of plans and documentation.

- 2.1.12 Under such tight restrictions if the evidence obtained does not provide the MMO with confidence that risks have been dealt with robustly, the determination may result in a refusal of the application for discharge. The undertaker would then have to restart the process and provide updated documentation in this instance.
- 2.1.13 The MMO acknowledges that the Applicant may wish to create certainty around when to expect a determine on applications for approvals required under the conditions of a licence, and whilst the MMO acknowledges that delays can be problematic for developers the MMO advises that it does not delay determining whether to grant or refuse such approvals unnecessarily, we make determinations in as timely a manner as is possible.
- 2.1.14 The MMO's view is that it is for the developer to ensure that it applies for any such approval in sufficient time as to allow the MMO to properly determine whether to grant or refuse the approval application. Therefore the provision under condition 14 (3) should be removed from the DML, notwithstanding this the MMO recommends a timescale of 6 months for submission of all discharge documents.

Seasonal Restriction

- 2.1.15 Seasonal restriction – The MMO does not agree with the current seasonal restriction of *'between 1st September to 16 October each year'* in Schedule 12, Part 2, Condition 23 and requests that this is updated to *"between 1st August and 31st October each year"*. The reasoning for this has been set out within sections 3.7.32 to 3.7.36.

DML Materiality

- 2.1.16 The MMO strongly considers that the activities authorised under the dDCO and DML should be limited to those that are assessed within the EIA, and so the statement within the DML *"unlikely to give rise to any materially new or materially greater environmental effects"* should be updated to clarify this.
- 2.1.17 The intention behind EIA is to protect the environment by ensuring that in deciding whether to grant a development consent for a project, and in deciding what conditions to attach to that consent, the decision has full knowledge of what the likely significant environmental effects of the project/development will be. That knowledge then guides the consent process and what conditions, if any, to attach to the consent. Additionally, there is considerable public consultation under the EIA process because the process recognises the importance of local knowledge in environmental decision making.
- 2.1.18 The EIA legislation was designed to apply to those plans/projects which could be sufficiently detailed and particularised at the application stage, to allow the consenting decision to be taken in the full knowledge of what the likely significant effects of that plan or project would be. In such circumstances, it would be unnecessary to create a legal obligation under the order which requires the activities to remain within what was assessed under the EIA, because the consent authorises the detailed and well particularised project, assessed in the EIA to be carried out, and therefore, providing the development is constructed as per the consent, those works would, by default, remain within the parameters of the EIA.



2.1.19 If the Applicant is wanting to retain some flexibility and is proposing that the works that can be carried out should be restricted to those which “do not give rise to materially new or materially different environmental effects” to those assessed in the EIA. The concern with this is that the inclusion of the word “materially” here would allow the undertaker to carry out works whose effects are outside of the likely significant effects assessed in the EIA, providing they do not do so materially, i.e. in any significant way, greatly, or considerably. This is not what the purpose of the EIA process is, and it runs contrary to the purpose of EIA. The other issue with this is that whilst the undertaker is responsible for producing the environmental information and statement on which the EIA decision is based, the appropriate authority is responsible for the EIA consent decision, the inclusion of the word materially essentially means that the undertaker makes the decision as to what is and what is not material. Under EIA it is for the appropriate authority to determine what the likely significant effects will be and how those should be mitigated.

2.1.20 On this basis, the MMO does not consider that it is appropriate to use the word “material” in these circumstances.

2.2 dDCO Interpretations Comments – Part 1 Article 2 & 3

2.2.1 The MMO has provided comments on the interpretations sections– where applicable, these are relevant to the DML interpretations sections as well.

2.2.2 *“box-type gravity base structures” means a structure principally of steel, concrete, or steel and concrete with a square base which rests on the seabed due to its own weight with or without added ballast or additional skirts and associated equipment including J-tubes, corrosion protection systems and access platform(s) and equipment”*

The MMO would like clarity on whether any additional information is required for this interpretation such as: transition piece, fenders and maintenance equipment, boat access systems, access ladders and access and rest platform(s) and equipment.

2.2.3 *“bridge link” means []”*

The MMO maintains a watching brief on this interpretation.

2.2.4 *“buoy” means any floating device used for navigational purposes or measurement purposes”*

The MMO requests clarity as to whether LIDAR buoys and wave buoys will be required and if so it should be clearly stipulated within the DMLs.

2.2.5 *“cable crossings” means a crossing of existing sub-sea cables or pipelines or other existing infrastructure by a cable or, where cables run together in parallel, a set of cables, authorised by this Order together with cable protection”*

2.2.6 The MMO would like to understand whether this is for all cable crossings? In addition, please can the Applicant clarify if cable protection is needed to be included within this interpretation since cable protection is a separate interpretation.

2.2.7 *“commence” means the first carrying out of any licensed marine activities authorised by this marine licence, save for pre-construction surveys and monitoring approved*



under this licence and the activities set out in article 2(d), and “commenced” and “commencement” must be construed accordingly”

The MMO requests that the Applicant clarifies what the intention is by secluding pre-construction surveys, monitoring and the activities set out in article 2(d)?

2.2.8 *““extent of marine licence plans” means the plan or plans certified as the extent of marine licence plans by the Secretary of State for the purposes of this Order under article 38 (certification of plans and documents etc)”*

The MMO notes this is a new interpretation and would like the Applicant to please explain the reasoning behind its inclusion?

2.2.9 *““gravity base structure” means a structure principally of steel, concrete, or steel and concrete with a base which tapers as it rises which rests on the seabed due to its own weight with or without added ballast or additional skirts and associated equipment including J-tubes, corrosion protection systems and access platform(s) and equipment”*

The MMO would like clarity on whether any additional information is required for this interpretation such as: transition piece, fenders and maintenance equipment, boat access systems, access ladders and access and rest platform(s) and equipment.

2.2.10 *““horizontal directional drilling” refers to a boring technique involving drilling in an arc between two points”*

The MMO asks if further information can be set out such as *““horizontal directional drilling” means a trenchless technique for installing an underground duct between two points without the need to excavate vertical shafts”*

2.2.11 *““jacket foundation” means a lattice type structure constructed of steel and additional equipment such as, J-tubes, corrosion protection systems and access platforms attached to the sea bed by means of either a suction bucket or piles”*

The MMO would like clarity on whether any additional information is required for this interpretation such as: transition piece, fenders and maintenance equipment, boat access systems, access ladders and access and rest platform(s) and equipment.

2.2.12 *““LAT” means lowest astronomical tide”*

The MMO understands that LAT was used by Hornsea Project Three. For this Project the MMO requests that this is updated to use “highest astronomical tide” (“HAT”). The MMO believes that especially when discussing ornithological compensation it would be more efficient to use HAT as this can clearly show the minimum clearance rate and amendments to the rate for compensation. The MMO advises that if changed, this would need to be reflected in the following interpretations; “offshore accommodation platform”, “offshore electrical installations”, “offshore HVAC booster station”, “offshore HVDC converter station” and “offshore transformer substation” (HVAC stands for High Voltage Alternating Current).

2.2.13 *““maintain” includes inspect, upkeep, repair, adjust, and alter and further includes remove, reconstruct and replace (including replenishment of cable protection), to the extent assessed in the environmental statement; and “maintenance” must be construed accordingly”*



The MMO requests further information is included within this interpretation and that it should be similar to: *“maintain” includes inspect, upkeep, repair, adjust, and alter, and further includes remove, reconstruct and replace (but only in relation to any of the ancillary works in Part 2 of Schedule 1 (ancillary works), any cable, any component part of any wind turbine generator, offshore electrical substation, offshore accommodation platform, meteorological mast, and the onshore transmission works described in Part 1 of Schedule 1 (authorised development) not including the removal, reconstruction or replacement of foundations and buildings associated with the onshore project substation), to the extent assessed in the environmental statement; and “maintenance” must be construed accordingly”*.

2.2.14 *“monopile foundation” means a steel pile, driven and/or drilled into the seabed and associated equipment including J-tubes, corrosion protection systems and access platforms and equipment”*

The MMO would like clarity on whether any additional information is required for this interpretation such as: transition piece, fenders and maintenance equipment, boat access systems, access ladders and access and rest platform(s) and equipment.

2.2.15 *“mono suction bucket foundation” means a steel cylindrical structure which partially or fully penetrates the seabed and remains in place using its own weight and hydrostatic pressure differential, and may include additional equipment such as J-tubes, corrosion protection systems and access platforms”*

The MMO would like clarity on whether any additional information is required for this interpretation such as: transition piece, fenders and maintenance equipment, boat access systems, access ladders and access and rest platform(s) and equipment.

2.2.16 *“operation” means the undertaking of activities authorised by this Order determined by the undertaker not to be part of either the construction or decommissioning of the authorised development”*

The MMO believes that this interpretation should be clearer. Being determined by the undertaker does not provide confidence at this stage on the difference between construction, decommissioning and operation. The MMO notes that this could be dealt with upon the provision to include an outline operation and maintenance plan.

2.2.17 *“outline site integrity plan” means the document certified as the outline site integrity plan by the Secretary of State for the purposes of this Order under article 38 (certification of plans and documents etc)”*

The MMO requests further detail on this plan such as: *“outline HOW04 Southern North Sea Special Area of Conservation site integrity plan” means the document certified as the outline HOW04 Southern North Sea Special Area of Conservation Site Integrity plan by the Secretary of State for the purposes of this Order under article 38 (certification of plans and documents etc)”*

2.2.18 *“pontoon gravity base type 1 structure” means a structure principally of steel, concrete, or steel and concrete with a base made up of up to two rectangular pontoons which rests on the seabed due to its own weight with or without added ballast or additional skirts and associated equipment including J-tubes, corrosion protection systems and access platform(s) and equipment”*



The MMO would like clarity on whether any additional information is required for this interpretation such as: transition piece, fenders and maintenance equipment, boat access systems, access ladders and access and rest platform(s) and equipment.

- 2.2.19 *“pontoon gravity base type 2 structure” means a structure principally of steel, concrete, or steel and concrete with a base made up of a pontoon arranged in a rectangle around an open centre which rests on the seabed due to its own weight with or without added ballast or additional skirts and associated equipment including J-tubes, corrosion protection systems and access platform(s) and equipment”*

The MMO would like clarity on whether any additional information is required for this interpretation such as: transition piece, fenders and maintenance equipment, boat access systems, access ladders and access and rest platform(s) and equipment.

- 2.2.20 *“(3) All distances, directions, capacities and lengths referred to in this Order are approximate and distances between points on a work comprised in the authorised development shall be taken to be measured along that work”.*

The MMO believes there are some parameters that are not approximate such as disposal volumes and therefore these should be set out with a saving provision similar to this condition from Norfolk Boreas Offshore Wind Farm:

“(3) All distances, directions and lengths referred to in this Order are approximate, save in respect of the parameters referred to in paragraph 1(c) and paragraph 1(e) (disposal volumes in connection with Work Nos. 1 to 4B) in Part 1, Schedule 1 (authorised development) requirements 2 to 11 and requirement 16 in Part 3, Schedule 1 (requirements) and conditions 1-8 in Part 4, Schedules 9 and 10 of the deemed marine licences for the generation assets, conditions 1-3 in Part 4, Schedules 11 and 12 of the deemed marine licences for the transmission assets and condition 2 in Part 4, Schedule 13 of the deemed marine licences for the project interconnector assets.”

2.3 dDCO Articles Comments

- 2.3.1 *Part 2 Article 5 (5) “The Secretary of State shall determine an application for consent made under this article within a period of eight weeks commencing on the date the application is received by the Secretary of State, unless otherwise agreed in writing with the undertaker.”*

The MMO ultimately defers to the Secretary of State, however, believes that eight weeks is too short of a timescale to include full consultation.

- 2.3.2 *Part 2 Article 5 (12) “Sections 72(7) and (8) of the 2009 Act (variation, suspension, revocation and transfer) do not apply to a transfer or grant of the whole or part of the benefit of the provisions of the deemed marine licences to another person by the undertaker pursuant to an agreement under paragraph (1).”*

The MMO does not agree with Article 5 in its current form. The MMO highlights that once a DCO is consented the DMLs become standalone consent to be administered by the MMO and governed by the MCAA 2009.

The MMO requests justification or rationale as to why these provisions and a deviation from the provisions of Marine and Coastal Access Act 2009 (“MCAA 2009”) are required for the purpose of the two DMLs for this project.



2.3.3 Part 7 Article 38 - Certification of plans and documents, etc.

It is the MMO's position that the ES should be updated at the end of Examination. This is because throughout the Examination process further information can be requested and provided by the Applicant that directly links to the conclusions of the ES, including addendums to chapters etc.

The MMO understands that this can be a large undertaking but believes it is paramount so that these updates can be easily identified as part of the Environmental Statement and as a Certified document.

The MMO welcomes Article 38 to reference Schedule 15 for the Certified documents and plans as this would help with clarity at the post consent stage. The MMO will review the updated Schedule 15 once this has been updated further.

2.3.4 Part 7 Article 39.—(1) “Any difference under any provision of this Order, unless otherwise provided for, shall be referred to and settled in arbitration in accordance with the rules at Schedule 14 of this Order, by a single arbitrator to be agreed upon by the parties, within 14 days of receipt of the notice of arbitration, or if the parties fail to agree within the time period stipulated, to be appointed on application of either party (after giving written notice to the other) by the Secretary of State.”

The MMO believes that this condition should be updated to include the following wording at the start: “Subject to article 42 (saving provisions for Trinity House) any difference...”

2.4 dDCO Requirements Comments – Schedule 1

2.4.1 Part 1, Article 1 “Work No. 1 – (a) an offshore wind turbine generating station with a gross electrical output of over 100 megawatts comprising up to 180 wind turbine generators, each fixed to the seabed by one of monopile foundations, mono suction bucket foundations, gravity base structures or jacket foundations”

The MMO is still reviewing this requirement with regards to the wording “over 100 megawatts” and will provide an update at the next deadline.

2.4.2 Part 1, Article 1 “Work No. 9— temporary works as follows —

- (a) temporary vehicular access tracks;
- (b) temporary works area to support the construction activities in Work No.7;
- (c) temporary logistics compounds to support the construction of Work Nos. 5, 6, 7, and 8; and
- (d) temporary construction ramp”

The MMO notes that works 9(a) and 9(d) are below mean high water springs and have been included in Schedule 12 the DML. The MMO requests clarity on why these are within the onshore section of the dDCO. In addition to this the MMO would like to understand how the management and enforcement of these activities will happen if they are both under the Local Planning Authority and MMO’s regulator remit.

2.4.3 Part 1, Article 1 “In connection with such Work Nos. 1 to 5 and to the extent that they do not otherwise form part of any such work, further associated development



comprising such other works as may be necessary or expedient for the purposes of or in connection with the relevant part of the authorised development and which fall within the scope of the work assessed by the environmental statement, including—

(a) scour protection around the foundations of the offshore structures

(b) cable protection measures such as the placement of rock, split pipe system, and/or concrete mattresses;

(c) cable crossings;

(d) the removal of material from the seabed within the Order limits required for the construction of Work Nos. 1 to 5 and the disposal within Work No. 1 of up to 7,300,596 cubic metres of inert material of natural origin and within Work Nos. 2, 3 and 4 up to 4,491,735 cubic metres of inert material of natural origin produced during construction drilling, seabed preparation for foundation works, cable installation preparation works (such as sandwave clearance and boulder clearance) and excavation of horizontal directional drilling pits; and

(e) removal of static fishing equipment;”

For scour protection the MMO highlights that scour protection has been used to stabilise the use of jack-up barges in similar locations on offshore wind farms as the Project and would like clarity on if the Applicant will be including this use within the Project.

In addition to this the MMO would like clarity on where the disposal volumes for drill arisings in connection with any foundation drilling are within the dDCO/DML. The MMO believes that drill arising should be explicitly stated within the dDCO/DML and the following section should be included in the above Article:

(f) disposal of drill arisings in connection with any foundation drilling up to a total of XX cubic metres.

2.4.4 *Part 3, Requirement 2 (6) “The total combined seabed footprint area for wind turbine generator foundations must not exceed—*

(a) 330,645 square metres excluding scour protection; and

(b) 1,056,471 square metres including scour protection.

(7) The wind turbine generators comprised in the authorised project must be constructed in accordance with the parameters set out in the pro-rata annex.”

The MMO requests that the maximum footprint area per turbine is presented within the dDCO and DML as well as the total. The MMO notes there is reference to the pro-rata annex which may cover this request. However, until this document is provided the MMO position remains that maximum footprints per individual structure and as a total need to be clearly stipulated within the dDCO.

2.4.5 *Part 3, Requirement 2 (10) “No offshore electrical installation or offshore accommodation platform—*

(a) jacket foundation employing pin piles forming part of the authorised project may—

(i) have a pin pile diameter of greater than four metres; and



(ii) employ more than 16 pin piles per jacket foundation; and”

The MMO notes that in Chapter 4 Project Description in Table 4.9 Maximum design parameters for piled jacket foundations states that for small and large substations the maximum number of piles would be 16. However it also states:

‘If a single very large substation jacket were required, this could have more than 16 piles, however the total number of piles across the windfarm would remain within the Project Envelope as this would result in overall fewer large substations.’

In the above condition and Schedule 11 and 12 Conditions for the Design Parameters the maximum number of piles is 16. The MMO requests that the dDCO/DML is updated to include the maximum total number of piles that could be used.

2.4.6 Part 3, Requirement 2 (12) & (14) *“The total seabed footprint area for offshore electrical installation foundations must not exceed—*

(a) 101,250 square metres excluding scour protection; and

(b) 371,250 square metres including scour protection.

(14) The offshore electrical installations and offshore accommodation comprised in the authorised project must be constructed in accordance with parameters set out in the pro-rata annex.”

The MMO requests that the maximum footprint area per electrical installation is presented within the dDCO and DML as well as the total. The MMO notes there is reference to the pro-rata annex which may cover this request. However, until this document is provided the MMO position remains that maximum footprints and volumes per individual structure and as a total need to be clearly stipulated within the dDCO.

2.4.7 Part 3, Requirement 4. *“The total volume of scour protection for wind turbine generators, offshore accommodation platforms and offshore electrical installations may not exceed 2,241,221 cubic metres and must be in accordance with the pro-rata annex.”*

The MMO requests that the maximum volume of scour protection per turbine and per each structure is presented within the dDCO and DML as well as the total. The MMO notes there is reference to the pro-rata annex which may cover this request. However, until this document is provided the MMO position remains that maximum footprints and volumes per individual structure need to be included on the dDCO.

2.4.8 Part 3, Requirement 5.— (5) *“The total number of the cable crossings must not exceed—*

(a) 32 within the area of Work Nos. 1 and 2(d); and

(b) 54 within the area utilised for Work No. 2(e);

unless otherwise agreed with the MMO.”

The MMO notes the inclusion of *“unless otherwise agreed with the MMO”* and reference to unless otherwise agreed with the MMO needs to include *“in writing”* at the end to ensure an audit trail is kept and maintain transparency.



In addition to this the MMO requests further clarity on what the intention is behind this provision.

The MMO also highlights that Schedule 12, Part 2, Condition 1 (11) states that “cable crossings must not exceed 92”. The MMO requests further clarity which works the remaining six cable crossings will be part of and why these are not specifically set out within the dDCO/DML.

2.4.9 *Part 3, Requirement 5.— (6) “The total volume of cable protection must not exceed 2,042,000 cubic metres with a maximum footprint of 2,058,000 square metres.*

(7) The cables and cable circuits comprised in the authorised development must be constructed in accordance with the parameters set out in the pro-rata annex.”

The MMO requests that the volume of cable protection per works is presented within the dDCO and DML as well as the total. The MMO notes there is reference to the pro-rata annex which may cover this request. However, until this document is provided the MMO position remains that maximum footprints and volumes per individual structure need to be included on the dDCO.

2.4.10 The MMO requests that the following requirement is included within the dDCO:

“Offshore decommissioning

XX. No offshore works may commence until a written decommissioning programme in compliance with any notice served upon the undertaker by the Secretary of State pursuant to section 105(2) of the 2004 Act(a) has been submitted to the Secretary of State for approval.”

2.5 Deemed Marine Licence (DML) Comments – Schedule 11 & Schedule 12

2.5.1 Please note that all comments set out below refer to both Schedule 11 and 12 unless otherwise stated.

2.5.2 The MMO requests that the number continues going into Part 2 of Schedule 11 and 12. The MMO believes this will make it easier to read as ordinarily the provisions referred to under Part 1 would be referred to as Articles and Part 2 would provisions would be referred to as Conditions, as these are the conditions of the licence, but the numbering would run throughout the entire Schedule without restarting at any point.

2.5.3 Interpretations “*“cable protection replenishment” means []*”

The MMO maintains a watching brief on this interpretation.

2.5.4 The MMO notes that if “LAT” remains then this should be swapped around with “large offshore transformer substation” to be alphabetical.

2.5.5 The MMO requests that the statutory nature conservation body is defined within the DMLs.

2.5.6 Part 1 Article 4 (a) – (g)

The MMO believes it would be more helpful if this Article was in alphabetical order.

The MMO requests that the MMO Local Office Is updated to the Beverley Office rather than Lowestoft and that the email address is included as below:

“Marine Management Organisation (local office)



[REDACTED]

Email: [REDACTED]

Tel: 0208 026 0519;”

The MMO notes Condition 10 mentions that a document should be submit to the Civil Aviation Authority (“CAA”). The MMO requests that the CAA address and information is added to this section.

In addition to this the MMO believes there needs to be some reference to the marine consents mailbox and the MCMS system with the addition of wording similar to:

“(XX) Unless otherwise advised in writing by the MMO, the address for electronic communication with the MMO for the purposes of this licence is marine.consents@marinemanagement.org.uk or where contact to the local MMO office is required is marinemanagement.org.uk.”

“(XX) Unless otherwise advised in writing by the MMO, MCMS must be used for all licence returns or applications to vary this licence. The MCMS address is: https://marinelicensing.marinemanagement.org.uk/mmofox5/fox/live/MMO_LOGIN/login.”

2.5.7 Part 1, Article 2 “(a) the deposit at sea within the Order limits seaward of MHWS of the substances and articles specified in paragraph 4 below and within Work No.1 when combined with the disposal authorised within the array area disposal site by the deemed marine licence granted under Schedule 12 of the Order of up to 7,300,596 cubic metres of inert material of natural origin produced during construction drilling or seabed preparation for foundation works and cable installation preparation works within the array area disposal site”

The MMO believes that this condition needs to be updated to include reference to the disposal sites and also to separate the volumes per disposal activity. In addition to this, boulder clearance needs to be included within the description. The MMO suggests similar wording to:

“(a) the deposit at sea within the Order limits seaward of MHWS of the substances and articles specified in paragraph 4 below and within Work No.1 when combined with the disposal authorised within the array area disposal site by the deemed marine licence granted under Schedule 12 of the Order of up to 7,300,596 cubic metres of inert material of natural origin produced during construction drilling or seabed preparation for foundation works and cable installation preparation works, including sandwave clearance and boulder clearance within the array area disposal site reference [XX] comprising- ;

(i) XX m3 for cable installation;



- (ii) XX m3 for the wind turbine generators; and*
- (iii) XX m3 for the offshore accommodation platform”*

2.5.8 Part 1, Article 2 - The MMO believes that drill arisings should be included within this section and include the following section:

“(h) the disposal of drill arisings in connection with any foundation drilling up to a total of 399,776 cubic metres”

If this is not included, then it needs to be clear in Article 2 (a) on the volumes of drill arisings.

2.5.9 Part 1, Article 5 – the MMO has reviewed the coordinates and would like clarity that these are the correct coordinates and in the correct order as upon review these did not match the work plans.

2.5.10 *Part 1, Article 6 “This licence remains in force until the authorised project has been decommissioned in accordance with a programme approved by the Secretary of State under section 106 (approval of decommissioning programmes) of the 2004 Act, including any modification to the programme under section 108, and the completion of such programme has been confirmed by the Secretary of State in writing.”*

The MMO requests a slight amendments to this section as below:

“This licence remains in force until the authorised scheme has been decommissioned in accordance with a programme approved by the Secretary of State under section 106 (approval of decommissioning programmes) of the 2004 Act, including any modification to the programme under section 108 (reviews and revisions of decommissioning programmes), and the completion of such programme has been confirmed by the Secretary of State in writing. ”

2.5.11 *Part 1, 7 “The provisions of section 72 (variation, suspension, revocation and transfer) of the 2009 Act apply to this licence except that the provisions of section 72(7) and (8) relating to the transfer of the licence only apply to a transfer not falling within article 5 (benefit of the Order).”*

2.5.12 As set out in section 2.3.2 the MMO does not agree with Article 5 in its current form. The MMO highlights that once a DCO is consented the DMLs become standalone consent to be administered by the MMO and governed by the MCAA 2009.

2.5.13 The MMO requests justification or rationale as to why these provisions and a deviation from the provisions of Marine and Coastal Access Act 2009 (“MCAA 2009”) are required for the purpose of the two DMLs for this project.

2.5.14 *Part 1, 9 “Any amendments to or variations from the approved details must be in accordance with the principles and assessments set out in the environmental statement. Such agreement may only be given in relation to immaterial changes where it has been demonstrated to the satisfaction of the MMO that it is unlikely to give rise to any materially new or materially greater environmental effects from those assessed in the environmental statement.”*

The MMO would like clarity on what “approved details” is and requests that this is defined within Part 1(1).



The MMO notes that *“Any amendments to or variations from the approved details must be in accordance with the principles and assessments set out in the environmental statement”* does not provide for the MMO to approve any amendments or variations. It needs to be clear how this will take place.

In relation to *“any materially new or materially greater environmental effects from those assessed in the environmental statement.”*

The MMO has set out its position in dDCO major issues in sections 2.1.16 to 2.1.20.

2.5.15 Part 2 Design Parameters – as per sections 2.4.7 & 2.4.9, the MMO requires individual structures areas and volumes and footprint areas of scour and cable protection to be presented within the dDCO and DML.

2.5.16 Part 2, Maintenance of the authorised development – the MMO does not agree that maintenance can take place prior to approval of an operation and maintenance plan regardless of activities being assessed within the ES. The MMO believes that an additional condition to provide an Operation and Maintenance plan to be submitted to the MMO six months prior to any maintenance works taking place should be included within the DML.

2.5.17 Part 2, Condition 4 *“(2) No maintenance works whose likely effects are not assessed in the environmental statement may be carried out, unless otherwise approved by the MMO.”*

Please add *“in writing”* after *“the MMO”*.

2.5.18 Part 2, Condition 4 *“(3)(f) cable protection replenishment”*

The MMO maintains a watching brief on the addition of an interpretation for this condition.

2.5.19 Part 2, Condition 4 *“(4) Where the MMO’s approval is required under paragraph (2), approval may be given only where it has been demonstrated to the satisfaction of the MMO that the approval sought is unlikely to give rise to any materially new or materially greater environmental effects from those assessed in the environmental statement.”*

Please see comments in section 2.1.16 to 2.1.20 on the concerns the MMO has relation to materiality in the DMLs.

2.5.20 Part 2, Condition 4 *“(5) In undertaking activities under condition 4(3)(f), the undertaker must not reduce water depth by more than 5% unless agreed with the MMO.”*

Please add *“in writing”* after *“the MMO”*.

2.5.21 Part 2, Condition 5 *“(1) The undertaker must issue to operators of vessels under its control operating within the Order limits a code of conduct to prevent collision risk or injury to marine mammals.”*

The MMO requests that *“order limits”* is defined within Article 1(1) of the DMLs.

2.5.22 Part 2, Condition 7 *“(1)(a)(ii) the masters and transport managers responsible for the vessels notified to the MMO in accordance with condition 16.”*



The MMO requests clarity on what “ *transport managers*” are.

2.5.23 *Part 2, Condition 7 “(3)(c) on board each vessel or at the office of any transport manager with responsibility for vessels from which authorised deposits or removals are to be made.”*

The MMO believes that there should be a copy of the licence “*on board each vessel **and** at the office of any transport manager*” and requests that this is updated.

2.5.24 *Part 2, Condition 7 “(7) The undertaker must inform the MMO Local Office in writing at least five days prior to the commencement of the licensed activities and within five days of the completion of the licensed activity.”*

The MMO requests that this condition is updated to “*14 days prior to the commencement of the licensed activities*”, this is to ensure there is enough time to organise compliance inspections.

2.5.25 *Part 2, Condition 7 “(8)... Confirmation of notification must be provided to the MMO within five days.”*

Please add “*in writing*” after “*the MMO*”.

2.5.26 *Part 2, Condition 7 (9) & (10) should state “UK Hydrographic Office” rather than UKHO as this is what is defined.*

2.5.27 *Part 2, Condition 7 “(10) The notices to mariners must be updated and reissued at weekly intervals during construction activities and at least five days before any planned operations and maintenance works (including, for the avoidance of doubt, each instance of major component exchange, ladder replacement or cable related works) and supplemented with VHF radio broadcasts agreed with the MCA in accordance with the construction programme approved under condition 13(1)(b) and monitoring plan approved under condition 13(1)(f). Copies of all notices must be provided to the MMO and UKHO within five days of issue, save for in the case of a notice relating to operations and maintenance, which must be provided within 24 hours of issue.”*

Please update this condition to state “*Copies of all notices **to mariners** must be provided to the MMO*”.

2.5.28 *Part 2, Condition 7 “(11) The undertaker must notify the UK Hydrographic Office and the Defence Geographic Centre both of the commencement (within fourteen days), progress and completion of construction (within fourteen days) of the licensed activities in order that all necessary amendments to nautical and aeronautical charts are made and the undertaker must send a copy of such notifications to the MMO.*

The MMO believes “*the Defence Geographic Centre*” should be defined in Article 1(1) of the DML.

2.5.29 *Part 2, Condition 7 “(15) The undertaker must ensure that the MMO, the MMO Coastal Office, local mariners, local fishermen's organisations and the Source Data Receipt Team at the UK Hydrographic Office (UKHO), Taunton, Somerset, TA1 2DN (sdr@ukho.gov.uk) are notified within five working days of completion of each instance of cable repair, replacement or protection replenishment activity.”*



Please update “the MMO Coastal Office” to “the MMO Local Office” and the MMO believes “(UKHO)” should be replaced with “UK Hydrographic Office” as this acronym has not been used and is not within Article 1(1).

- 2.5.30 *Part 2, Condition 8 “(4) The undertaker must during the whole period from commencement of the licensed activities to completion of decommissioning of the authorised project seaward of MHWS notify Trinity House and the MMO of any failure of the aids to navigation and the timescales and plans for remedying such failures, as soon as possible and no later than 24 hours following the undertaker becoming aware of any such failure.”*

Please add “in writing” after “the MMO”.

- 2.5.31 *Part 2, Condition 11 “(6) The undertaker must ensure that any rock material used in the construction of the authorised project is from a recognised source, free from contaminants and containing minimal fines.”*

The MMO requests that this condition is updated to similar wording of the below:

“(6) (1) No gravel or rock may be placed in the marine environment until detail of its source has been submitted to and approved by the MMO in writing.

(2) Unless a shorter period is agreed with the MMO in writing, the undertaker must use reasonable endeavours to submit the details at least 3 months prior to the proposed placing of the gravel or rock.”

- 2.5.32 *Part 2, Condition 11 “(7) In the event that any rock material used in the construction of the authorised project is misplaced or lost below MHWS, the undertaker must report the loss to the MMO Local Office within 48 hours of becoming aware of it and if the MMO, in consultation with the MCA and Trinity House, reasonably considers such material to constitute a navigation or environmental hazard (dependent on the size and nature of the material) the undertaker must endeavour to locate the material and recover it.”*

The MMO believes that “rock material” should be defined in Article 1(1), In addition to this the MMO requests this condition should be updated to the following wording:

“(7) In the event that any rock material used in carrying out any licensed activity is misplaced or lost below MHWS, the undertaker must report the loss to the MMO Local Office within 24 hours of becoming aware of the Incident. If the MMO, in consultation with the MCA and Trinity House, reasonably considers such material to constitute a navigation or environmental hazard, the MMO must notify the undertaker and the undertaker must use reasonable endeavours to locate the material and recover it. In the event that undertaker is unable to locate and recover the material, the undertaker must demonstrate to the MMO that reasonable attempts have been made to locate, remove or move any such material.”

- 2.5.33 *Part 2, Condition 11 “(8) The undertaker must ensure that no waste concrete slurry or wash water from concrete or cement works are discharged into the marine environment. Concrete and cement mixing and washing areas should be contained to prevent run off entering the water through the freeing ports.”*

Please update “entering the water through” with “entering the marine environment through”.



2.5.34 *Part 2, Condition 11 “(10) All dropped objects within the Order limits must be reported to the MMO using the Dropped Object Procedure Form as soon as reasonably practicable and in any event within 48 hours of the undertaker becoming aware of an incident. On receipt of the Dropped Object Procedure Form, the MMO may require relevant surveys to be carried out by the undertaker (such as side scan sonar) if reasonable to do so and the MMO may require obstructions to be removed from the seabed at the undertaker’s expense if reasonable to do so.”*

The MMO requests this condition should be updated to the wording “*within 48 hours*” with “*within 24 hours*”:

2.5.35 *Part 2, Condition 12 - Force majeure - the MMO is currently reviewing this condition and will provide further comments in the next written representation.*

2.5.36 *Part 2, Condition 13.—(1) “The licensed activities for each stage of construction of the project must not commence until the following (insofar as relevant to that activity or stage of activity) has been submitted to and approved in writing by the MMO, in consultation with, where relevant, Trinity House and the MCA—”*

The MMO requests clarity on what the Project is defining “stages” are at this stage.

2.5.37 *Part 2, Condition 13. (1) “...to ensure conformity with the description of Work No. 1 and compliance with conditions 1 and 2 above”*

The MMO believes that this provision should also include condition 3.

2.5.38 *Part 2, Condition 13 (1) “(c) (iii) cable installation”*

The MMO notes that Chapter 5 Project Description states fibre optic cables may be buried. As such the MMO requests that this is updated to state this: “*cable (including fibre optic cable) installation*”

2.5.39 *Part 2, Condition 13 (1) “(h) (i) technical specification of offshore cables below MHWS within that stage”*

The MMO advises that this wording is updated to:

“technical specification of offshore cables (including fibre optic cable) below MHWS, including a desk-based assessment of attenuation of electro-magnetic field strengths, shielding and cable burial depth in accordance with industry good practice”

In addition to this the MMO would like to be included and receive information on the connection at landfall, and we request that this is highlighted within this document.

2.5.40 *Part 2, Condition 13 (1) “(j) In the event that driven or part-driven pile foundations are proposed to be used, the licensed activities, or any stage of those activities must not commence until a site integrity plan for that stage which accords with the principles set out in the outline site integrity plan has been submitted to the MMO and the MMO is satisfied that the plan provides such mitigation as is necessary to avoid adversely affecting the integrity (within the meaning of the 2017 Regulations) of a relevant site, to the extent that harbour porpoise are a protected feature of that site”*

The MMO has updated the standard condition in relation to designated sites for harbour porpoise. This is due to the outcome of the Review of Consents undertaken by the Secretary of State, the MMO advise that, like any new application, it will need



to be in line with the Review of Consents condition. The MMO would like condition 13 (1)(j) to be removed and replaced with the new standalone condition outlined below.

When the standalone condition is added, the Interpretations section will need to be updated to include:

““JNCC Guidance” means the statutory nature conservation body ‘Guidance for assessing the significance of noise disturbance against Conservation Objectives of harbour porpoise SACs’ Joint Nature Conservation Committee Report No.654, May 2020 published in June 2020 as amended, updated or superseded from time to time”.

The MMO propose the following wording for the new SIP condition:

“Southern North Sea Special Area of Conservation Site Integrity Plan

25- (1) No piling activities can take place until a Site Integrity Plan (SIP), which accords with the principles set out in the in principle XX Project Southern North Sea SAC Site Integrity Plan, has been submitted to, and approved in writing, by the MMO in consultation with the relevant statutory nature conservation body.

(2) The SIP submitted for approval must contain a description of the conservation objectives for the Southern North Sea Special Area of Conservation (SNS SAC) as well as any relevant management measures and it must set out the key statutory nature conservation body advice on activities within the SNS SAC relating to piling as set out within the JNCC Guidance and how this has been considered in the context of the authorised scheme.

(3) The SIP must be submitted to the MMO no later than six months prior to the commencement of the piling activities.

(4) In approving the SIP the MMO must be satisfied that the authorised scheme at the pre-construction stage, in-combination with other plans and projects, is in line with the JNCC Guidance.

(5) The approved SIP may be amended with the prior written approval of the MMO, in consultation with the relevant statutory nature conservation body, where the MMO remains satisfied that the Project, in-combination with other plans or projects at the pre-construction stage, is in line with the JNCC Guidance. “

2.5.41 Part 2, Condition 13 *“(2) Subject to condition 13(3), the licensed activities or any relevant stage of those activities must not commence unless no later than four months prior to the commencement of the relevant stage a marine written scheme of archaeological investigation for the stage in construction has been submitted to and approved by the MMO, in accordance with the outline marine written scheme of investigation, and in accordance with industry good practice, in consultation with the statutory historic body to include—”*

Please update *“submitted to and approved by the MMO”* to *“submitted to and approved by the MMO in writing”* and *“with the outline marine written scheme of investigation”* to *“with the outline marine written scheme of archaeological investigation”*.



2.5.42 *Part 2, Condition 13 “(4) In the event that driven or part-driven pile foundations are proposed to be used, the hammer energy used to drive or part-drive the pile foundations must not exceed 5,000kJ.”*

The MMO would like the maximum pin pile hammer energy to be defined within this condition so it is clear the maximum for each type of foundation.

2.5.43 *Part 2, Condition 13 “(7) The licensed activities or any part of those activities must not commence until a fisheries coexistence and liaison plan in accordance with the outline fisheries coexistence and liaison plan has been submitted to and approved by the MMO.”*

Please add “in writing” after “the MMO”.

2.5.44 *Part 2, Condition 14.—(1) “Each programme, statement, plan, protocol or scheme required to be approved under condition 13 (save for that required under condition 13(1)(f)) must be submitted for approval at least four months prior to the intended commencement of the relevant stage of the licensed activities, except where otherwise stated or unless otherwise agreed in writing by the MMO.*

(2) The pre-construction monitoring surveys, construction monitoring, post-construction monitoring and related reporting required under condition 13(1)(f) must be submitted in accordance with the following, unless otherwise agreed in writing with the MMO—

(a) at least four months prior to the first survey of the relevant stage, detail of any pre-construction surveys and an outline of all proposed monitoring;

(b) at least four months prior to construction of the relevant stage, detail on construction monitoring; and

(c) at least four months prior to commissioning of the relevant stage, detail of postconstruction (and operational) monitoring”

As set out in sections 2.1.2 to 2.1.10, the MMO requests that this is updated to six months.

2.5.45 *Part 2, Condition 14 (3) “The MMO must determine an application for approval made under condition 13 within a period of four months commencing on the date the application is received by the MMO, unless otherwise agreed in writing with the undertaker.”*

As set out in sections 2.1.11 to 2.1.14, the MMO requests that this is removed. The MMO’s position remains that it is inappropriate to apply a strict timeframe to approvals under the conditions of the DML given this would create disparity between licences issued under the DCO process and those issued directly by the MMO, as marine licences issued by the MMO are not subject to set determination periods. The MMO’s view is that it is for the developer to ensure that it applies for any such approval in sufficient time as to allow the MMO to properly determine whether to grant or refuse the approval application.

2.5.46 *Part 2, Condition 16 “(1) The undertaker must provide the following information to the MMO—*



(a) the name and function of any agent or contractor appointed to engage in the licensed activities not less than ten working days prior to such agent or contractor commencing any licensed activity; and

(b) each week during the construction of the authorised project a list of the vessels currently and to be used in relation to the licensed activities.”

The MMO requests this condition should be updated to the following wording:

“(1) The undertaker must provide the following information to the MMO—

(a) the name, company number, address and function of any agent, contractor or subcontractor appointed to engage in the licensed activities not less than ten working days prior to such agent or contractor commencing any licensed activity; and

(b) each week during the construction of the authorised project a list of the vessels currently and proposed to be used in relation to the licensed activities, including the master's name, vessel type, vessel IMO number and vessel owner or operating company”

2.5.47 *Part 2, Condition 17 (2)...“(a) a full sea floor coverage swath–bathymetry survey that meets the requirements of IHO S44ed5 Order 1a, of the Order limits and a buffer outside to—”*

The MMO believes IHO S44ed5 Order 12a should be defined in Article 1(1).

2.5.48 *Part 2, Condition 18 (2) “Subject to receipt from the undertaker of specific proposals pursuant to this condition the construction monitoring plan must include, in outline—*

(a) where piled foundations are to be employed, unless otherwise agreed by the MMO in writing, details of proposed monitoring of the noise generated by the installation of the first four monopile foundations to be constructed collectively under this licence and the licence granted under schedule 12 of the Order”

The MMO requests that this is updated to include *“the first four monopile foundations of each piled foundation type to be constructed”*.

2.5.49 *Part 2, Condition 18 (2) “(b) vessel traffic monitoring by automatic identification system for the duration of the construction period, including annual reporting to the MMO and MCA”*

The MMO advises that construction monitoring must include traffic monitoring in accordance with the outline navigation monitoring strategy. Once this is provided, it should include the provision of reports on the results of that monitoring periodically as requested by the MMO in consultation with Trinity House and the MCA.

2.5.50 *Part 2, Condition 18 (3) “The results of the initial noise measurements generated in accordance with condition 18(2)(a) must be provided to the MMO within six weeks of the completion of installation of the fourth foundation of each foundation type for the MMO to determine whether any further noise monitoring will be required.”*

The MMO requests that this condition is updated to the following wording:

“The results of the initial noise measurements monitored in accordance with subparagraph (1) must be provided in writing to the MMO within six weeks of the



installation of the first four piled foundations of each piled foundation type. The assessment of this report by the MMO will determine whether any further noise monitoring is required. If, in the opinion of the MMO in consultation with the statutory nature conservation body, the assessment shows significantly different impacts to those assessed in the environmental statement or failures in mitigation, all piling activity must cease until an update to the marine mammal mitigation protocol and further monitoring requirements have been agreed."

2.5.51 Part 2, Condition 19 *"(4) Within 12 weeks of completion of any cable repair or replacement works, the undertaker must undertake a post installation survey along the section of cable that has undergone repair or replacement to demonstrate the successful burial of the cable, and submit a report to the MMO on its findings."*

Please add *"in writing"* after *"the MMO"*.

2.5.52 Part 2, Condition 20 *"Any monitoring report compiled in accordance with the monitoring plans provided under conditions 17, 18 and 19 must be provided to the MMO no later than four months following receipt by the undertaker of the results of monitoring to which it relates, unless otherwise agreed with the MMO."*

Please add *"in writing"* after *"the MMO"*.

2.5.53 Part 2, Condition 21 *"(2) The undertaker must notify the MMO of the successful submission of Forward Look or Close Out data pursuant to paragraph (1) above within 7 days of the submission."*

Please add *"in writing"* after *"the MMO"*.

2.5.54 Part 2, Condition 21 *"(3)(a) "Marine Noise Registry" means the database developed and maintained by JNCC on behalf of Defra to record the spatial and temporal distribution of impulsive noise generating activities in UK seas"*

The MMO believes that this should be part of the interpretations in Article 1(1) and JNCC and Defra also need to be defined.

2.5.55 Part 2, Condition 21 *"(3)(b) "Forward Look" and "Close Out" requirements are as set out in the UK Marine Noise Registry Information."*

Please update this condition to expand on the interpretations further:

"Forward Look" means the requirements as set out in the UK Marine Noise Registry Information Document Version 1 (July 2015) as amended, updated or superseded from time to time;

"Close Out" means the requirements as set out in the UK Marine Noise Registry Information Document Version 1 (July 2015) as amended, updated or superseded from time to time;

2.5.56 Part 2, Condition 22 *"(1) An annual maintenance report must be submitted to the MMO within one month following the first anniversary of the date of commencement of operations, and every year thereafter."*

Please add *"in writing"* after *"the MMO"*.

2.5.57 Part 2, Condition 22 *"(3) Every fifth year, the undertaker must submit to the MMO, within one month of that date, a consolidated maintenance report, which will..."*



Please add “in writing” after “the MMO”.

2.5.58 *Part 2, Condition 23 “(1) The licenced activities may not be commenced until a written scheme setting out the stages of construction of the authorised development seaward of MHWS has been submitted to and approved by the MMO.”*

2.5.59 Please update “may” to “must” and add “in writing” after “the MMO”. In addition to this the MMO requests a timescale is included within this condition and requests six months prior to the pre-construction surveys.

2.5.60 *Part 2, Condition 24 (Schedule 11) and Condition 26 (Schedule 12).—(1) “The undertaker must submit a close out report to the MMO and the relevant statutory nature conservation body within three months of the date of completion of construction. The close out report must confirm the date of completion of construction and must include the following details—*

(2) the final number of installed wind turbine generators; and

(3) as built plans.”

The MMO requests that this condition is updated to the following conditions:

24/26.—(1) “The undertaker must submit a close out report to the MMO in writing and the relevant statutory nature conservation body within three months of the date of completion of construction. The close out report must confirm the date of completion of construction and must include the following details—

(a) the final number of installed wind turbine generators; and

(b) the installed wind turbine generator parameters relevant for ornithological collision risk modelling.

(2) Following completion of construction, no further construction activities can be undertaken under this licence.”

2.5.61 *Schedule 12, Part 2, Condition 1 “(11) The total number of cable crossings when combined with the deemed marine licence granted under Schedule 11 of the Order must not exceed 92, unless otherwise agreed between the undertaker and the MMO.”*

The MMO would like clarity on why this condition is not in Schedule 11. Please add “in writing” after “the MMO”.

2.5.62 *Schedule 12, Part 2, Condition 23.- “In the event that driven or part driven pile foundations are to be used to install Work No. 3, no impact piling may be undertaken between 1st September and 16th October each year within the area of Work No. 3 as shown on the offshore works plans unless otherwise agreed in writing by the MMO after consultation with the relevant statutory nature conservation body.”*

The MMO requests that the date period is updated from “between 1st September and 16th October each year” to “between 1st August and 31st October each year”. The reasoning for this has been set out within sections 3.7.32 to 3.7.36.



3. Environmental Statement (ES)

3.1 EN010098-000698-A1.2 ES Volume A1 Chapter 2 Planning and Policy Context

- 3.1.1 The MMO has reviewed Chapter 2 and requests further information in relation to the East Inshore and Offshore Marine Plans and the North East Offshore Marine Plan where the Project overlaps with these plans.
- 3.1.2 The Applicant fails to explain how the project complies with the above marine plans and which policies have been scoped in or out along with justification.
- 3.1.3 The MMO understands that some specific policies have been included within specific ES chapters, however, there should be a section within this chapter that sets out how the project complies with all the marine plan policies.
- 3.1.4 The MMO has attached an example template to use when considering the Marine Plans (See Appendix A). The MMO requests that you use the following website to prepare this document: [REDACTED]

Once this is completed the MMO will review this further and provide comments.

3.2 Marine Geology Oceanography and Physical Processes

- 3.2.1 In providing this response the MMO has reviewed the following documents, unless otherwise stated all comments relate to Chapter 1 Marine Geology Oceanography and Physical Processes:
- a) EN010098-000697-A1.1 ES Volume A1 Chapter 1 Introduction
 - b) EN010098-000700-A1.4 ES Volume A1 Chapter 4 Project Description
 - c) EN010098-000701-A1.5 ES Volume A1 Chapter 5 Environmental Impact Assessment Methodology
 - d) EN010098-000703-A2.1 ES Volume A2 Chapter 1 Marine Geology Oceanography and Physical Processes
 - e) EN010098-000755-A5.1.1 ES Volume A5 Annex 1.1 Marine Processes Technical Report
 - f) EN010098-000729-A4.4.1 ES Volume A4 Annex 4.1 Offshore Crossing Schedule
 - g) EN010098-000732-A4.4.4 ES Volume A4 Annex 4.4 Dredging and Disposal Site Characterisation
 - h) EN010098-000714-A2.12 ES Volume 2 Chapter 12 Cumulative and Transboundary Effects Offshore Summary
 - i) EN010098-000743-A4.5.3 ES Volume A4 Annex 5.3 Offshore Cumulative Effects
- 3.2.2 There is extensive documentation regarding coastal processes in this chapter along with ES Volume A5 Annex 1.1 Marine Processes Technical Report and the subsidiary documentation. Existing physical monitoring surveys have been used from the area supplemented by swath bathymetry surveys along the proposed Export Cable Corridor (“ECC”). Whilst a “high level” overview has been provided by these surveys, detailed interpretation has shown that gaps exist especially in the Smithic bank area.



It is noted that in Table 1.4 Page 16 that Joint Nature Conservation Committee (“JNCC”) have identified Smithic Bank as a potential Annex I feature.

- 3.2.3 The MMO believes that further information should be provided to provide enough evidence on the baseline. As well as offshore physical surveys for wave and tidal currents, a number of swath bathymetry and geotechnical surveys have been undertaken. Supplementing this is a numerical modelling exercise that allows different scenarios to be explored e.g. turbidity plumes from cable excavation or seabed preparation. Whilst this gives a good overall evidence base, there are a number of areas where the evidence base is either patchy or non-existent. These include the cable route around Smithic bank and the coastline. The MMO would expect to see additional Swath Bathymetry and geotechnical surveys from just offshore of the cable crossing with Dogger Bank A+B area and the Holderness coastline.
- 3.2.4 The Maximum Design Scenario (“MDS”) has correctly used the use of GBS as its worst realistic scenario as this involves large structures (conical concrete structures) and significant amounts of seabed preparation. In the offshore GBS/Monopile/jacket zone the MMO agrees with the conclusion except for those associated with the potential changes to Flamborough Front please see comment 3.2.11.
- 3.2.5 Two key issues that were raised during the Evidence Plan Process are still outstanding; the cable crossing and the impacts on Flamborough Front.
- 3.2.6 Firstly, whilst further modelling of the cable crossings has been undertaken in regard to waves and currents, this has not been taken further to determine changes to sediment transports, especially cumulatively for the 54 crossings. The MMO would welcome this determination to fully assess the impacts.
- 3.2.7 Secondly, the impact on Flamborough front, especially any changes (positively and negatively) to primary productivity (and subsequently secondary productivity) has not yet been fully addressed. Whilst it is noted that Natural Environment Research Council (“NERC”) EcoWinds (Ecological consequences of offshore wind) research project may assess this potential impact, any outcomes not likely to be within the consenting period, which is potentially three years away. Therefore, taking a pragmatic approach, all the information available should be provided and the Applicant should:
- take a full part in the research project; and
 - use satellite thermal imagery to determine if cold water thermal plumes exist when the front is present (spring to autumn)
- 3.2.8 Except for the Smithic Holderness export cable area with Dogger Bank A+B export cables there is not an adequate description of the potential cumulative and inter-related impacts and effects on the physical and biological environment. For instance, whilst Figure B17 from the ABPmer modelling report shows the changes in velocity around one cable crossing, this in the MDS could be multiplied by 54 (section 3.3.3.19). Furthermore, these changes in the waves/current regime should be taken to the next stage of sediment transport and long term erosion/deposition.
- 3.2.9 Adverse effects, in terms of coastal processes, are identified and then linked via a pathway to a sensitive receptor (the SPR (Source-Pathway-Receptor) methodology).



Therefore, whilst there maybe adverse impacts locally around (say) a structure, if no receptor is nearby, no adverse impact is assumed and thus is discounted. In this project many of the impactors are offshore are thus discounted. However, the MMO still has major concerns about the cumulative impact of cables crossing Smithic Bank.

- 3.2.10 The MMO believes the evidence that has been supplied is appropriate with surveys within the offshore license area and along the export cable route. However, the coverage and intensity of surveys around the Smithic Bank and Holderness coast zone is sparse and further information is required.
- 3.2.11 No unbiased statistical accuracy assessment has been carried out, but a calibration and validation exercise was undertaken which is industry standard practise. It should be noted that the resolution of the model does not allow predictions of turbidity levels from for example a cable excavation at distances less than 50m.
- 3.2.12 The MMO believes that not all species/features of concern have been correctly identified. The importance of Smithic bank is not put into a sub-region context. It provides shelter for the Holderness coast from easterly waves and controls the “sediment divide” actually on the coast. It should be noted that this is not an actual sediment divide but rather a statistical construct where when averaged over many years the sediment in neither moving north or south. Thus, at any one time, sediment along the whole frontage maybe moving north or south. It’s only when this is averaged that the divide is revealed.

The importance here is that Smithic Bank is a “reservoir” of sediments that feeds the Holderness coast (a receptor) and the Marine Conservation Zone (MCZ), as well as the wider regional sediment transport pathways (to the Humber and Wash). An additional review is required for a realistic worst case scenario on sediment transport patterns and pathways (and magnitudes) where all the exports cables (six from Hornsea 4 and four from Dogger Bank A+B) have been constructed with excavations to the design depth of 2m and subsequent cable protection (rock dumping).

- 3.2.13 As identified above, the region between off just offshore of the export cable crossing with Dogger Bank A+B and the Holderness coastline is both particularly sensitive to changes in the regional sediment transport pathways due to the cumulative nature of the cable burial and cable protection and the distance to the receptors. After the sediment transport assessment, it is suggested that annual swath bathymetry surveys (with recording of the backscatter for sediment composition) would identify sediment transport features (sand waves, ripples) and differences between years could form the basis of a monitoring plan. This would have both engineering (ensuring cables are covered) and environmental benefits, and the MMO welcomes this.
- 3.2.14 The MMO has identified minor technical and presentational comments that affect the overall confidence in the conclusions and would like amendments or further information on:
- 3.2.15 Referring to Volume A2 Chapter 1 – Marine Geology, Oceanography and Physical Processes
- a) Section 1.7.5.2 – Whilst the present day shoreline profile has been produced, cliff and beach recession rates are significant along the Holderness coastline. What



is the projected profile at the end of 35 years? How will the export cable be managed over this lifetime?

- b) Section 1.7.62. (Bridlington Harbour dredging) does not align with that in Section 1.7.3.7.
- c) Section 1.7.8.7 Is the use of 70m long pin piles now standard practice? Will these be driven or drilled? How will these interact with Chalk layer (Fig 1.14)?
- d) Section 1.11.1.43 What contingency has been made for extra dredging due to new sand waves etc (from say a more recent survey)?
- e) Section 1.11.1.169 – If Bridlington Harbour experiences significant extra dredging that cannot be attributed to other causes, will Orsted support dredging operations as this was identified as a receptor?
- f) Section 1.11.1.101 – “The depth of scour could be limited by underlying immobile sediment layers” – Surely the Sub bottom Profiler should have identified these layers. If not, why not?

3.2.16 Referring to ES Volume A5 Annex 1.1

- g) Section 3.3.2.17 shows the profiles of the seabed with sediment transport indicators. As part of the regional assessment (see paragraph 23), these vectors should be assembled to form a map of sediment transport vectors.
- h) Section 4.3.5.1 indicates that boulders will be removed – where will these be deposited and will they form an artificial reef?
- i) Section 4.5.3.16 – Whilst the diagram of scour at F3 GBS is useful, does this represent the same oceanographic and substrate types and hence scour that prevails at Hornsea 4?

3.3 Dredge and Disposal

3.3.1 In providing this response the MMO has reviewed the following documents, unless otherwise stated all comments relate to Annex 4.4 Dredging and Disposal Site Characterisation:

- a) EN010098-000697-A1.1 ES Volume A1 Chapter 1 Introduction
- b) EN010098-000700-A1.4 ES Volume A1 Chapter 4 Project Description
- c) EN010098-000701-A1.5 ES Volume A1 Chapter 5 Environmental Impact Assessment Methodology
- d) EN010098-000703-A2.1 ES Volume A2 Chapter 1 Marine Geology Oceanography and Physical Processes
- e) EN010098-000755-A5.1.1 ES Volume A5 Annex 1.1 Marine Processes Technical Report
- f) EN010098-000729-A4.4.1 ES Volume A4 Annex 4.1 Offshore Crossing Schedule
- g) EN010098-000732-A4.4.4 ES Volume A4 Annex 4.4 Dredging and Disposal Site Characterisation



h) EN010098-000714-A2.12 ES Volume 2 Chapter 12 Cumulative and Transboundary Effects Offshore Summary

i) EN010098-000743-A4.5.3 ES Volume A4 Annex 5.3 Offshore Cumulative Effects

3.3.2 The environment surrounding the proposed dredge area has been thoroughly characterised in terms of both physical and chemical composition, based on a sampling regime conducted in 2019, which is appropriate.

3.3.3 However, aside from the descriptions provided within the dredge and disposal site characterisation report, the MMO has been unable to locate the results of the sampling regime. The MMO would expect these to be provided, preferably within the MMO results table as set out within the pre-application stage. This would allow the MMO to accurately judge the suitability of material for disposal at sea, and also allow for easy submission for the annual returns for OSPAR (Oslo/Paris convention (for the Protection of the Marine Environment of the North-East Atlantic)) and London Convention/ London Protocol, which is an obligation on the MMO.

3.3.4 The dredge and disposal site characterisation report correctly highlights that dredging may lead to sediment plumes, which could create indirect effects on other receptors as a result of increased suspended sediment concentration, deposition and potential release of contaminants (noting these will be discussed in the relevant chapters for individual receptors). The report also highlights that the material to be dredged is predominantly coarse sand, and therefore the likelihood of persistent plumes is low. The MMO believes that this is an accurate conclusion.

3.3.5 In addition, the Marine Geology, Oceanography, and Physical Processes chapter highlights that the dredging / disposal activities have the potential to impact licenced disposal site HU015 in terms of altering dispersion characteristics. It also notes that this site has the potential to act cumulatively if disposal events aligned with the cable-laying activities in the nearshore region.

3.3.6 The evidence base used with relation to dredge and disposal operations is the results of a ground-investigation undertaken within the Array and ECC areas in 2019.

3.3.7 However, as stated above the sampling locations for the chemical analysis have not been provided within the ES. Nor have any details regarding the sampling and/or analysis methods (beyond descriptions within the dredge and disposal site characterisation report highlighting that hydrocarbons and metals were examined). These details should be included in the ES. The MMO believes that the results have been produced using appropriate methods from MMO approved laboratories but would like confirmation on this.

3.3.8 The ES concludes that potential impacts related to dredging and disposal operations are negligible. The MMO agrees with this conclusion, based on the information provided, which suggests that material is likely to be comprised mostly of coarse sand with low levels of observed contamination.

3.3.9 For dredge and disposal the main cumulative and inter-related impacts concern the active disposal site HU015. This is identified and discussed in the Marine Geology, Oceanography, and Physical Processes chapter, which concludes that impacts are not likely to be significant given that disposal at the HU015 site occurs predominantly on an ebb tide, therefore moving sediment away from the shoreline, and also that



such disposal is sporadic, with small relatively small volumes being deposited in comparison to those disposed by the Hornsea Four project.

- 3.3.10 The ES has addressed previous comments regarding the inclusion of a table clearly highlighting the total dredge volume for the Array and ECC areas. In addition, figures have been included showing the location of particle size analysis (“PSA”) samples from both the Array and ECC areas, as recommended in the pre-application stage.
- 3.3.11 However, comments are still outstanding regarding the inclusion of details relating to the sampling and analysis of marine sediment from within the proposed dredge area and these are set out below.
- 3.3.12 The Applicant has stated that 21 samples have been analysed for chemical composition in the array area and further sample collection is due in 2019 for the ECC. These need to be represented on a map, and preferably, the coordinates provided.
- 3.3.13 The MMO has not been able to determine if the chemical analyses were carried out in line with MMO guidance. However, the results appear low which is not unexpected due to the coarse nature of the material and offshore location of majority of samples.
- 3.3.14 As outlined previously, all results should be submitted in the MMO template to allow for easy submission for the annual returns for OSPAR and London Convention/ London Protocol which is an obligation on the MMO.
- 3.3.15 The MMO is unable to designate or allow any dredge and disposal activities until this information has been provided.
- 3.3.16 In addition to this, the MMO understands the Applicant would like to designate the full ECC as a disposal site. Figure 3 within ES Volume A4 Annex 4.4 Dredging and Disposal Site Characterisation shows that there is overlap with the Dogger Bank A&B ECC. The MMO cannot designate overlapping disposal sites. The Applicant will need to include use of this disposal site or the preferred option of splitting the disposal sites to either side of the Dogger Bank A&B ECC (intertidal and offshore) and update the documents to show this.
- 3.3.17 Pending verification, quality assurance and the additional information requested above being provided, it is likely that the disposal sites will be the following:
- a) Array Disposal Site – HU223
 - b) ECC Disposal Site 1 – HU224
 - c) ECC Disposal Site 2 – HU225
- 3.3.18 **Please note:** The MMO will confirm when these can be included within the Deemed Marine Licences.

3.4 Benthic and Intertidal Ecology

- 3.4.1 In providing this response the MMO has reviewed the following documents, unless otherwise stated all comments relate to Chapter 2 Benthic and Intertidal Ecology:
- a) EN010098-000697-A1.1 ES Volume A1 Chapter 1 Introduction
 - b) EN010098-000700-A1.4 ES Volume A1 Chapter 4 Project Description



- c) EN010098-000701-A1.5 ES Volume A1 Chapter 5 Environmental Impact Assessment Methodology
- d) EN010098-000704-A2.2 ES Volume A2 Chapter 2 Benthic and Intertidal Ecology
- e) EN010098-000756-A5.2.1 ES Volume A5 Annex 2.1 Benthic and Intertidal Ecology Technical Report
- f) EN010098-000739-A4.5.1 ES Volume A4 Annex 5.1 Impacts Register
- g) EN010098-000741-A4.5.2 ES Volume A4 Annex 5.2 Commitments Register
- h) EN010098-000714-A2.12 ES Volume 2 Chapter 12 Cumulative and Transboundary Effects Offshore Summary
- i) EN010098-000743-A4.5.3 ES Volume A4 Annex 5.3 Offshore Cumulative Effects

3.4.2 The MMO believes that the intertidal survey and subsequent characterisation are appropriate.

3.4.3 The Array and export cable corridor have been characterised using a combination of historical data, geophysical data, drop down video (“DDV”) (for fauna and sediments at all stations and Annex I stony reef under a separate survey design) and grab (for fauna and sediment composition). Each of the locations sampled by grab (and DDV) have been assigned a European nature information system (“EUNIS”) biotope and corresponding JNCC Marine Nature Conservation Review (“MNCR”) biotope classification. All information has been used to develop predictive habitat distributions across the Project area. Whilst this is a sensible approach, which has been alluded to in previous consultations, the MMO has major concerns regarding some of the classifications and model outputs following review of the raw data. The MMO also believes that further information should be brought through into the ES chapter to provide evidence for the classifications and model outputs.

3.4.4 While some of the biotope classifications reflect the dominant species present in the samples, many of the biotope classifications are only loosely based on the species present. This information has been provided in the appendices of the technical document but should be highlighted in the main technical document and ES Chapter e.g. in terms of biotope confidence, especially as biotopes have been taken forward for impact assessment.

3.4.5 Following on from the previous point, the echinoderm species, *Amphiura filiformis* (*A. filiformis*), is one of the dominant species in terms of abundance and distribution across the Array area but none of the biotopes account for this. This is similar for the polychaete, *Sabellaria spinulosa* (*S. spinulosa*), which was dominant at several stations along the ECC. Whilst the dominance of these species is recognised in the Appendices of Volume 5, Annex 2.1: Benthic and Intertidal Ecology Technical Report this information does not come through into the ES chapter. This is extremely important in relation to *S. spinulosa*, where the biotope that has been assigned to stations EEC17-ECC21 is an epifaunal biotope that does not mention *S. spinulosa* in the list of species. The MMO recommends revising the biotopes for ECC17-ECC21 to SS.SBR.PoR.SspiMx (*Sabellaria spinulosa* on stable circalittoral mixed sediment) as it matches better with the species composition found at these stations.



- 3.4.6 The MMO believes that maps showing distribution of dominant species along with maps of species richness, abundance and diversity should be included. This would align with information provided in other offshore wind farms ES's and provide transparency within the ES.
- 3.4.7 Species composition of each of the multivariate groups identified in Figure 8 of the Annex 2.1 Benthic and Intertidal Ecology Technical Report (Annex 2.1 Benthic Report) should also be provided and transferred through to the ES chapter. The absence of this information in the ES chapter and main text of the technical report makes it extremely difficult to have confidence in the assessments.
- 3.4.8 Some biotope classifications do not reflect the sediment types or species present; this has resulted in the species distribution modelling to over-estimate the distribution of certain biotopes. For example, Figure 19 of Annex 2.1 Benthic Report above shows that SS.SCS.CCS.MedLumVen is predicted to occur along parts of the ECC and southern part of the Array, despite the biotope not being identified in the most recent sampling campaign. Similarly, although SS.SMx.CMx.MysThyMx was identified (loosely) at a couple of stations, the model predicts it to occur across the majority of the Project area despite the sediment across the area being classified as sands. The MMO requests that the model outputs are sense checked against the other data that has been collected across the Project area and for the confidence in these distribution models to be clearly articulated in the ES.
- 3.4.9 The Valued Ecological Receptors ("VER's") (Table 2.9 of Chapter 2: Benthic Ecology) should subsequently be revised to reflect any changed in biotope classifications.
- 3.4.10 As certain information has been omitted from the ES chapter (species richness, abundance, diversity) it is difficult to assess Table 2.9 with confidence.
- 3.4.11 Although the brittlestar dominated, biotope SS.SMu.CSaMu.AfilMysAnit was not identified using the data gathered, the Array was dominated by *A. filiformis*, therefore this needs to be recognised in the VERs: Table 2.9. This is also relevant for *S. spinulosa* along the cable route.
- 3.4.12 The potential impacts identified in Table 2.12 of Chapter 2 appear accurate for each stage of the development (construction, operation and decommissioning). However, the MMO has also reviewed the Impacts Register and note that although Electric Magnetic Field ("EMF") has been scoped out of benthic ecology, shellfish and fisheries early on in the scoping phase, further research has been conducted in this field and needs to be considered within the ES. The MMO believes that this should be updated.
- 3.4.13 Although the evidence gathered appears appropriate, the evidence presented is insufficient to allow a decision on the project to be made. As indicated above, the MMO has major concerns about some of the biotope allocations, absence of key species from some of the biotopes and some of the biotope models. A review of information needs to be undertaken and information brought into the ES chapter to enable an accurate characterisation. Currently important information is buried within the technical appendices which does not allow this.
- 3.4.14 The impact assessments have compared biotopes identified within the Project area to the sensitivities assessed by Marine Evidence based Sensitivity Assessment



("MarSEA"). This is appropriate for those biotopes that have been confirmed within the area and have species composition which reflects those characterising the biotopes. However the MMO has some further major comments on the conclusions on biotopes.

- 3.4.15 Some of the biotopes modelled using data from other developments close by have not been identified within the Hornsea 4 Project area. This has been highlighted for a sandy mud biotope characterised by *A. filiformis*, *Kurtiella bidentata* and *Abra nitida* and an impact assessment has not been carried out on that biotope (please refer to comments above regarding the absence of a biotope characterised by the most dominant species in the Array; *A. filiformis*), however others that were also not identified in the most recent sampling campaign have been taken forward for impact assessment. This is inconsistent.
- 3.4.16 Table 2.16 and Table 2.18 of Chapter 2 highlight low confidence in the assessments for some biotopes but still assesses the overall significance of effect as slight rather than moderate. Confidence needs to be considered in the final assessments. If there is low confidence in the sensitivity assessments, then the final assessment should err on the side of caution.
- 3.4.17 Based on the comments above, the impact assessments will need to be included for some of the additional biotopes e.g. the suggested addition of SS.SBR.PoR.SspiMx, the inclusion of *A. filiformis* within the assessments.
- 3.4.18 The assessment for spread of non-native invasive species ("NIS") has predicted the magnitude as negligible based on the current scientific knowledge. The absence of information on species colonising the turbines makes predicting the presence and spread of NIS extremely difficult. This suggests that monitoring of the foundations should be undertaken to increase the knowledge base and to help provide more accurate assessments.
- 3.4.19 In relation to decommissioning it is not clear whether any gravel laid during seabed preparations will also be removed upon decommissioning. The removal of this substrate will determine the extent of seabed recovery as the majority of the Array area and cable route is sand. If removal is not possible then the benthic communities colonising the area will not be the same as found in the baseline environment. Please include the likelihood of removal of these base layers, and any consequences if removal is not possible, in the assessments.
- 3.4.20 The surveys undertaken to characterise the benthic environment do not cover the entirety of the Array and ECC e.g. the acoustic survey was not 100% coverage and the benthic survey was not extensive. However, the MMO believes that the geophysical survey covered the areas where Wind Turbine Generators ("WTGs") will be placed, and the benthic survey characterised those sediments that are dominant across the Project area.
- 3.4.21 The biotope modelling was undertaken to fill in gaps where sampling was not undertaken, however some of the biotopes are unlikely to be as extensive in the Project area as predicted due to the sediment types present. The MMO advises another review of the models using the most recent data collected as this new information does not appear to have affected the outcomes of the models.



- 3.4.22 The analyses have not been presented as clearly as they should be. Much of the information that is needed to assess the results has not been brought through into the ES chapter which makes assessing the adequacy of the impact assessments extremely difficult. The technical report and ES chapter needs to be reviewed as per previous comments and further information brought through into the main text.
- 3.4.23 No significant adverse effects were identified; therefore, no mitigation is proposed. This is appropriate based on the benthic habitats present.
- 3.4.24 The methodology used to obtain and gather the data is appropriate in most cases and standard practices have been used.
- 3.4.25 The MMO previously raised the potential issue of obtaining contaminant samples from a Hamon grab as this gear mixes the sediment. The MMO is not aware of any studies being undertaken to compare the results of using this gear type compared with those obtained using the standard gear type (Day grab) used for this purpose, nor know of the consequences of using this gear type on the concentrations of the contaminants. It would be beneficial to compare results with any other data nearby that has been collected using the correct gear, to provide confidence in the results.
- 3.4.26 The use of models to fill gaps in data collection is appropriate and has been employed for other OWF developments when data is scarce, however it is not clear how the physical data collected has been used to refine the model outputs. Some of the biotopes predicted to be present do not fit well with the sediment recorded along the ECC and Array. Further validation of the models is required.
- 3.4.27 Data was collected specifically for the project due to absence of historical data across much of the site. The models of predicted biotopes (based on historical data) were produced due to the absence of data at Preliminary Environmental Impact Report ("PEIR"). It is unclear how these have been updated using the site-specific data collected across the Project area as some of the model outputs predicts the likelihood of some habitats being present where the sediment collected from the recent surveys does not corroborate. Section 7.2.2 of Annex 2 Benthic Report sets out how the recent survey data was applied to the model and states that the most recent data was prioritised over older data. However, this does not appear to come through in some of the model outputs.
- 3.4.28 It is not clear from the text in the reports whether an unbiased statistical accuracy assessment has been undertaken. The models use a combination of computational analysis and expert judgement; however, it would be beneficial to have a confidence element to the models due to the poor match, in some cases, to the physical data.
- 3.4.29 *S. spinulosa* was identified at stations ECC17-21 in high numbers being the dominant species at these stations, however the biotope assigned did not include *S. spinulosa* as a characterising species and therefore does not reflect the faunal composition of those stations. Whilst the species was identified in high numbers, no reef was identified in the grab samples. However, the presence of this species and dominance at these stations should be mentioned in the ES chapter. It is not clear whether the geophysical data was interrogated at the stations to determine whether any reef signatures were apparent. The MMO requires clarification on this matter.



3.4.30 A number of embedded mitigation commitments have been detailed in the commitments register and in Table 2.12 of Chapter 2 which are appropriate. There are two commitments (Co48 and Co84) to avoid any habitats of principle importance under the NERC Act 2006. The location of these will be informed through pre-construction surveys including micro siting where possible. The absence of *S. spinulosa* reef from the locations identified as containing high abundances of the species must therefore be confirmed.

3.4.31 The MMO has raised a number of issues in relation to monitoring and these have been set out within Section 4.5

3.5 Shellfish Ecology

3.5.1 In providing this response the MMO has reviewed the following documents unless otherwise stated all comments relate to Chapter 3 Fish and Shellfish Ecology:

- a) EN010098-000697-A1.1 ES Volume A1 Chapter 1 Introduction
- b) EN010098-000700-A1.4 ES Volume A1 Chapter 4 Project Description
- c) EN010098-000701-A1.5 ES Volume A1 Chapter 5 Environmental Impact Assessment Methodology
- d) EN010098-000705-A2.3 ES Volume A2 Chapter 3 Fish and Shellfish Ecology
- e) EN010098-000759-A5.3.1 ES Volume A5 Annex 3.1 Fish and Shellfish Ecology Technical Report
- f) EN010098-000708-A2.6 ES Volume A2 Chapter 6 Commercial Fisheries
- g) EN010098-000647-A5.6.1 ES Volume 5 Annex 6.1 Commercial Fisheries Technical Report
- h) EN010098-000714-A2.12 ES Volume 2 Chapter 12 Cumulative and Transboundary Effects Offshore Summary
- i) EN010098-000743-A4.5.3 ES Volume A4 Annex 5.3 Offshore Cumulative Effects

3.5.2 The MMO believes that the existing environment been characterised appropriately. As such, shellfish of commercial importance to the region has been found to include brown crab *Cancer pagurus*, prawn/langoustine/scampi *Nephrops norvegicus*, European lobster *Homarus gammarus*, velvet swimming crab *Necora puber*, common whelk *Buccinum undatum*, brown and pink shrimp *Crangon crangon* and *Pandulus montagui*, and king scallop *Pecten maximus*. European common squid *Alloteuthis subulata* were identified as the most common cephalopod in the region. Please note however that this has squid's species name has been given as 'subulate' throughout the text, rather than 'subulata'.

3.5.3 The MMO would like to understand which data source(s) was/were used to inform of *A. subulata* presence? Squids *Loligo vulgaris*, *Loligo forbesii*, *Illex coindetii*, and *Todaropsis eblanae* also exist in the area and the MMO would like to understand why these weren't represented.

3.5.4 The MMO believes that all the potential impacts have been accurately identified these are set out below.

Construction Phase:



- a) Direct damage (e.g. crushing) and disturbance to mobile demersal and pelagic fish and shellfish species arising from construction activities.
- b) Temporary localised increases in Suspended Sediment Concentration (“SSC”) and smothering.
- c) Direct and indirect seabed disturbances leading to the release of sediment contaminants.
- d) Mortality, injury, behavioural changes and auditory masking arising from noise and vibration.

Operation Phase:

- a) Temporary localised increases in SSC and smothering.
- b) Long-term loss of habitat due to the presence of turbine foundations, scour protection and cable protection.
- c) Increased hard substrate and structural complexity as a result of the introduction of turbine foundations, scour protection and cable protection.
- d) Direct disturbance resulting from maintenance during operation.

Decommissioning phase:

- a) Direct damage (e.g., crushing) and disturbance to mobile demersal and pelagic fish and shellfish species arising from decommissioning activities.
- b) Temporary localised increases in SSC and smothering.
- c) Direct and indirect seabed disturbances leading to the release of sediment contaminants.
- d) Mortality, injury, behavioural changes and auditory masking arising from noise and vibration.

3.5.5 The MMO acknowledges that fishing effort displacement has been considered, though considered not likely significant. Further, the Applicant has contracted a Fishing Industry Representative (“FIR”) and a Commercial Fisheries Advisor (“CFA”) to assist with fisheries liaising to maintain regular communications with the fishing industry via Notices to Mariners (“NtMs”), Kingfisher bulletins, project update emails and meetings with individual fishers and also fisheries’ representatives such as National Federation of Fisherman’s Organisations (“NFFO”), Holderness Fishing Industry Group (“HFIG”) and European fisheries stakeholders. This will continue throughout pre-construction and construction phase of the Project.

3.5.6 In relation to Section 3.11.1.7 of the Fish and Shellfish Ecology report states

“The proposed Hornsea Four ECC also overlaps with a large scallop ground located along the Hornsea coast (Cefas 2019), although it should be noted that key scallop grounds are also located across the English Channel, the Irish Sea and off the coasts of Scotland (Cappell 2018).”

The MMO agrees with this statement on a national scale, though on a local scale, during, for example, the construction phase, fishers would not have the option of fishing in areas such as the English Channel, Irish Sea, and off coasts of Scotland.



The MMO believes these sections should be re-worded for clarity on the scale of the assessments.

3.5.7 The MMO believes the appropriate evidence base has been used to some extent. Table 1 of the Commercial Fisheries Technical Report details the evidence bases used. The MMO considers these to be reputable and comprehensive, though do urge caution around species resolution for some sources. For example, MMO landings data are likely to name squid species simply as 'squids', often without differentiating species.

3.5.8 Further, commercial fishing activity density mapping across the former Hornsea Zone for beam trawl and demersal otter trawl has been conducted using data from 2010. Please could the Applicant explain why these gear types were selected for activity density mapping whilst the potting sector was excluded? The MMO would have expected this sector to have been included in such mapping given the high tonnage of crab, scallop, lobster, and whelk fished from the study area. That being said, the MMO does acknowledge that organisations like the HFIG have been consulted on local shellfish.

3.5.9 Section 3.11.1.16 of the Fish and Shellfish Ecology report states:

“The magnitude of impact on shellfish receptors was assessed as being minor, and the sensitivities of brown crab, scallop, Nephrops and common whelk were all assessed as medium. The medium sensitivities and minor magnitude of the impact could result in either a slight or moderate effect (as per the matrix in Table 3.13). Taking into account the extensive distribution of these species along the coasts of the UK, the small degree of overlap of Hornsea Four with identified shellfish resources and spawning grounds, and the short-term nature of the impact, it is concluded that the impact will be of slight significance, which is not significant in EIA terms.”

Similar to the previous point above, this, reads as though fishers have the option of fishing in grounds much further away which is neither practical nor economically viable for small vessels. In the first instance, the MMO recommends continued liaison with HFIG and the local IFCA to determine exact locations of shellfish vessels in the proposed area.

3.5.10 The MMO is satisfied that the potential cumulative and inter-related impacts and effects on shellfish ecology have been identified and an appropriate assessment has been carried out.

3.5.11 Mitigation measures “beyond existing commitments” are not given for shellfish receptors. The MMO is content with this, given the scale of proposed works versus the area of shellfish grounds, however, the MMO would urge closer liaison with HFIG to determine exact locations of shell fishing activity.

3.6 Fish and Shellfish Ecology

3.6.1 In providing this response the MMO has reviewed the following documents, unless otherwise stated all comments relate to Chapter 3 Fish and Shellfish Ecology:

- a) EN010098-000697-A1.1 ES Volume A1 Chapter 1 Introduction
- b) EN010098-000700-A1.4 ES Volume A1 Chapter 4 Project Description



- c) EN010098-000701-A1.5 ES Volume A1 Chapter 5 Environmental Impact Assessment Methodology
- d) EN010098-000705-A2.3 ES Volume A2 Chapter 3 Fish and Shellfish Ecology
- e) EN010098-000759-A5.3.1 ES Volume A5 Annex 3.1 Fish and Shellfish Ecology Technical Report
- f) EN010098-000708-A2.6 ES Volume A2 Chapter 6 Commercial Fisheries
- g) EN010098-000647-A5.6.1 ES Volume 5 Annex 6.1 Commercial Fisheries Technical Report
- h) EN010098-000741-A4.5.2 ES Volume A4 Annex 5.2 Commitments Register
- i) EN010098-000714-A2.12 ES Volume 2 Chapter 12 Cumulative and Transboundary Effects Offshore Summary
- j) EN010098-000743-A4.5.3 ES Volume A4 Annex 5.3 Offshore Cumulative Effects

3.6.2 A clear and detailed project description has been presented within Chapter 4. There are a number of elements of the infrastructure that have yet to be determined as the project design is still evolving, however, the options for the various infrastructure appear to have been appropriately considered in the EIA process, for example, maximum design scenarios, depending on the different infrastructure or different construction methods being selected for the project.

3.6.3 The MMO notes the Applicant's commitment to using GBS foundations for some of the WTGs. According to Commitment Co201 of the commitments register *"Primary: Gravity Base Structure (GBS) foundations (WTG type) will be utilised at a maximum of 110 of the 180 WTG foundation locations. The location of GBS foundations, if used for WTG, will be confirmed through a construction method statement which will include details of foundation installation methodology."*

There are pros and cons with the use of GBS foundations, with the main advantage being that there will be a reduced number of piles required for WTG installation, and thus the potential to reduce the duration of underwater noise from piling. Conversely, GBS foundations will result in a larger area of long-term habitat loss. The maximum design scenarios for impacts to fish associated with GBS foundations and monopiles have been appropriately considered in the EIA.

3.6.4 The MMO also notes that the requirement for the High Voltage Alternating Current ("HVAC") booster station along the ECC is dependent on the type of transmission technology (HVAC or High Voltage Direct Current ("HVDC")) selected for the project.

3.6.5 The MMO believes an appropriate characterisation of the environment for fisheries and fish ecology has been presented. Fish species found within the project study area have been correctly identified using desk-based resources, and the spawning and nursery grounds of fish that occur within or near to the project study area have been mapped.

3.6.6 The ES has identified herring and sandeel as the key species of concern that require species-specific assessments, owing to their close affiliation with seabed sediments within the project boundary.



- 3.6.7 All other species of conservation importance that are known to be present in the project study area have been correctly identified in Table 9 of the Fish and Shellfish Ecology Technical Report.
- 3.6.8 The impacts associated with the construction, operation and decommissioning phases of the project have been accurately identified for fisheries.
- 3.6.9 The MMO notes that the effects of EMF on fish receptors during the operation phase has been scoped out of further assessment. The MMO agrees with this decision at this stage, as sufficient justification had been provided during the scoping phase, based on the evidence available at the time.
- 3.6.10 The MMO is satisfied that the potential cumulative and inter-related impacts and effects on fisheries and fish ecology have been identified and an appropriate assessment has been carried out. The Applicant has recognised that the activity with the greatest potential for cumulative impact to fisheries and fish ecology is piling due to the far-reaching effects of noise and vibration which may overlap with piling and other construction noise from other offshore developments, particularly other OWFs. The MMO acknowledges cumulative impact assessments for noise are challenging due to the lack of detailed information available on the various piling schedules for all projects in the area.
- 3.6.11 The MMO is currently unable to agree with the conclusions reached on cumulative impacts of noise on fish. This is primarily due to the lack of appropriate modelling to assess the extent of behavioural effects of piling on fish, and because the mitigation currently proposed (a temporal piling restriction for the HVAC booster station) is not considered adequate mitigation to protect spawning herring and their eggs and larvae. Please see detailed comments in sections 3.7.21 to 3.7.24 regarding modelling of behavioural effects and sections 3.7.25 to 3.7.25 regarding the timing of the Banks herring spawning season.
- 3.6.12 Transboundary impacts on fish receptors have been considered in Section 3.13. The MMO supports the potential transboundary impacts that have been scoped into the assessment, namely, direct effects as a result of underwater noise from piling operations, and indirect effects occurring in relation to fish habitat or disturbance to habitat due to increased suspended sediment concentrations and deposition from the placement/removal of foundations and cables in or on the seabed. Effects of increases in SSC are predicted to occur up to 14 km from Hornsea Four and are therefore not predicted to extend into the waters of other EEA states, so the MMO agrees that transboundary impacts arising from this effect will not be significant.
- 3.6.13 Regarding the effects of underwater noise, the report acknowledges that behavioural responses in certain fish species are predicted to extend to several 10s of kilometres beyond the Project and therefore have the potential to affect fish (and shellfish) habitats of the Netherlands during the construction period. However, noise impact range contours for behavioural responses in fish have not been presented in the ES so it is not possible to determine the extent of this transboundary impact or determine whether there will be any spatial overlap of noise with spawning and nursery grounds of fish in the Netherlands or any other neighbouring countries. Please see sections 3.7.21 to 3.7.24 for further comments regarding the requirement for behavioural response impact range noise contours to be mapped.



3.6.14 The MMO does not agree with the conclusions reached for herring relating to the impacts of noise and vibration, the impacts of direct damage and disturbance from construction activities, and the impacts of temporary localised increases in SSC and smothering. Noise impacts have been covered in sections 3.7.21 to 3.7.29.

Impacts of direct damage and disturbance and temporary localised increases in SSC and smothering on herring:

3.6.15 The inshore section of the ECC crosses through the Banks herring spawning ground. Seabed preparation work associated with the ECC installation activities such as sandwave clearance, pre-lay grapnel run, jetting and trenching are likely to result in disturbances to herring spawning grounds by way of direct damage to the gravel beds on which herring lay their eggs, and through temporary localised increases in SSC and smothering of eggs and newly hatched larvae during their development.

3.6.16 Herring require a specific substrate on which to spawn, consisting of gravel and similar habitats where there is a low proportion of fine sediment and well-oxygenated water. Herring eggs and larvae can be put at risk if the spawning beds are smothered e.g., from dredging activity.

3.6.17 If there is a large proportion of fine material (<63 micron) in the sample, then it is unlikely to allow sufficient water circulation and it will not be suitable as a herring spawning ground (Rogers 2000). Accordingly, it is important to manage herring spawning areas by ensuring that the physical properties of the substrate remain the same, and by preventing disturbance to seabed substrates during the period in which eggs are laid, during egg development and during the period of development of newly hatched larvae where the larvae remain close to the seabed.

3.6.18 Herring sensitivity for the effects of direct damage and disturbance and temporary localised increases in SSC and smothering is assessed as “high” in the ES, which is appropriate.

3.6.19 The MMO notes the magnitude of impact has been assessed as “minor” (adverse) for both of these impacts, due to the *“relatively small overlap from the works on this spawning ground, the lack of overlap with the core highest density spawning areas to the north of Flamborough Head, and the localised and short-term nature of the impact”*.

3.6.20 However, the heat maps of The International Herring Larvae Surveys (“IHLS”) data presented in the Fish and Shellfish Ecology Technical Report (Figures 24 – 26) contradict this statement as they demonstrate the inter-annual variation in the location of herring spawning activity and show that high larval densities occurred in the ECC in the years 2011-2012, 2019-2020 and especially in 2020-2021.

3.6.21 Furthermore, at this stage, the duration of seabed preparation and cable installation works is unknown but according to Figure 4.4 *“Indicative construction programme for Hornsea Four”* in the Project Description Chapter, cable installation is expected to take approximately 2 years, though it is unclear if this period covers both seabed preparation and cable installation. This would result in the potential disturbance to herring spawning habitat over two consecutive spawning years so cannot be considered as a short-term impact.



- 3.6.22 The potential requirement for mitigation for increases in SSC and smothering during the herring spawning season was raised by the MMO in response to the PEIR and given the concerns relating to the effects of direct damage and disturbance to herring spawning habitat around the inshore section of the ECC, combined with increases of SSCs and smothering affecting spawning herring and their eggs and larvae, the MMO recommends that a seasonal restriction is applied to ECC works during the Banks herring spawning season. The MMO believes this should be included in the DML and has amended the wording on this condition in sections 3.7.32 to 3.7.36.
- 3.6.23 The MMO believes that there is potential for the duration of the seasonal restriction to be refined temporally, if based on an appropriate 'peak' spawning period, as per sections 3.7.25 to 3.7.29, as well as spatially (e.g., by kilometre point distance along the ECC route), as is the case for Dogger Bank A and B ECC, which has restrictions applied to construction works in the ECC owing to a similar inshore route that transects the Banks herring spawning ground.
- 3.6.24 The MMO would highlight at this stage it's increasing concerns with the outstanding issues that have been raised several times during previous consultations and meetings held between the Applicant, the MMO and our technical advisors the Centre for Environment, Fisheries and Aquaculture Science (Cefas) during the EPP and pre-application stage. Whilst the MMO appreciates that there could be a variety of reasons why the Applicant has been unable to address these issues at ES stage, it has resulted in the MMO recommending piling restrictions for piling within the ECC, array area and the HVAC booster station for the entire duration of the Banks herring spawning season as well as restrictions on construction activities along the ECC. Such restrictions are likely to be onerous for the developer, but in the absence of the evidence requested, uncertainty remains regarding the likely extent of significant impacts to herring and their eggs and larvae, and on this basis, a precautionary approach has been taken in the form of temporal and spatial mitigation.
- 3.6.25 The MMO understands mitigation for underwater noise has been proposed and has commented specifically throughout section 3.7.

3.7 Underwater Noise

- 3.7.1 In providing this response the MMO has reviewed the following documents, unless otherwise stated all comments relate to Subsea Noise Technical Report Part 1 & 2:
- EN010098-000697-A1.1 ES Volume A1 Chapter 1 Introduction
 - EN010098-000700-A1.4 ES Volume A1 Chapter 4 Project Description
 - EN010098-000701-A1.5 ES Volume A1 Chapter 5 Environmental Impact Assessment Methodology
 - EN010098-000706-A2.4 ES Volume A2 Chapter 4 Marine Mammals
 - EN010098-000705-A2.3 ES Volume A2 Chapter 3 Fish and Shellfish Ecology
 - EN010098-000759-A5.3.1 ES Volume A5 Annex 3.1 Fish and Shellfish Ecology Technical Report
 - EN010098-000733/34-A4.4.5 ES Volume A4 Annex 4.5 Subsea Noise Technical Report Part 1 & 2



- h) EN010098-000565-F2.11 AAI Volume F2.11 Outline Southern North Sea Special Area of Conservation Site Integrity Plan
- i) EN010098-000559-F2.5 AAI Volume F2.5 Outline Marine Mammal Mitigation Protocol
- j) EN010098-000714-A2.12 ES Volume 2 Chapter 12 Cumulative and Transboundary Effects Offshore Summary
- k) EN010098-000743-A4.5.3 ES Volume A4 Annex 5.3 Offshore Cumulative Effects

3.7.2 In relation to Chapter 4 Marine Mammals the MMO defers to Natural England on if the existing environment (baseline) has been characterised appropriately. The MMO notes the following species of marine mammals have been identified as most likely to be present within the Project site and as such were the focus of the baseline characterisation and the impact assessment: Harbour porpoise, minke whale, white-beaked dolphin, bottlenose dolphin, harbour seal and grey seal.

3.7.3 In relation to marine mammal sensitivity, the information presented in section 4.10.4 (Chapter 4 Marine Mammals) only demonstrates what is **not** known about the significance of temporary threshold shift (“TTS”), there is no evidence presented to confirm that it isn’t significant, only conjecture. One could equally argue that at lower received sound levels, animals are less likely to flee (see Figure 4.1 on page 47), and so proportionally more likely to induce TTS than this assessment suggests. The TTS/PTS (“Permanent Threshold Shift”) assessment seems to consider only an animal fleeing directly away from the source, whereas Figure 4.1 demonstrates that even at received SELss (single strike sound exposure level) of 160 dB, around 10% of animals will not flee, so there are uncertainties which tend toward underestimation of risk here too.

3.7.4 **Cetacean sensitivity to PTS (Chapter 4 Marine Mammals, Section 4.10.4.4):** The MMO notes that the kind of anthropomorphising within the text is misguided and unhelpful. Marine mammals rely on sound as their primary sensory modality, whereas humans are primarily visual creatures. While audiometric data from humans can be useful to make quantitative extrapolations for marine mammals (since they share a similar inner ear structure), it would be unwise to state that what is considered ‘mild’ hearing loss in humans has any relevance to the severity of consequences of hearing loss in marine mammals. This section should therefore be updated.

3.7.5 **Cetacean sensitivity to PTS (Chapter 4 Marine Mammals, Section 4.10.4.7):** All cetaceans have been assessed as having a **Medium** sensitivity to PTS. The Applicant has not demonstrated that PTS would have merely a medium risk, only that there is uncertainty about how significant PTS may be for individual animals. Until and unless empirical evidence can shed light on whether this opinion is reasonable, the precautionary principle should continue to apply, and MMO believes that cetaceans should be assessed as having a high sensitivity to PTS.

3.7.6 The Subsea Noise Technical Report presents predictions of the underwater noise levels and impact ranges for the percussive piling of monopile and pin pile foundations for marine mammals and fish species. The assessment considers a single monopile or pin pile installed in a 24-hour period (for both maximum hammer energy and initial piling strike), as well as impact ranges for three pin piles installed



consecutively in a single 24-hour period (at the North West location). Additional modelling has also been carried out to investigate the potential impacts of two piling installations occurring simultaneously at separated foundations (North West and East locations) (Section 5.3).

- 3.7.7 Other noise sources such as dredging, cable laying, rock placement and operational WTG noise (Table 73) have been assessed using a simple modelling approach based on measured data from Subacoustech's noise measurement database, using an $N \cdot \log R - \alpha R$ principle, fitted to the data. The MMO agrees that the impacts from percussive piling operations at the Project site pose the greatest risk to marine species.
- 3.7.8 Noise from Unexploded Ordnance clearance is also expected, however, an assessment of this has not been undertaken at this stage. The report confirms that a detailed assessment will be developed for a separate marine licence at a later stage, which the MMO supports.
- 3.7.9 The Subsea Noise Report is informative and provides relevant details on the modelling methodology and parameters input into the model. Reference is made to appropriate noise exposure criteria for marine mammals and fish species. The worst-case scenario (i.e. maximum hammer energy) has been assessed for monopiles and pin piles alongside the most likely scenario. The modelling also considers both a stationary and fleeing receptor for fish (primarily fleeing for marine mammals).
- 3.7.10 The MMO presumes that based on the modelling presented, only a single monopile will be installed in a 24-hour period, although up to three pin piles could be installed in a 24-hour period. The MMO requests that this is clarified and the modelling is updated if more than one monopile is installed. The reason the MMO raises this is that the Fish and Shellfish Chapter refers to sequential piling in the HVAC booster station search area (hammer energy 5,000 kJ), representing the spatial MDS for noise impacts from a single piling event. However, the effect of sequential monopiles has not been assessed in the Subsea Noise Report.
- 3.7.11 The MMO notes that although pilling issues are the greater concern, Section 6 of the Subsea Noise Report considers other continuous sources such as dredging, cable laying, vessel noise etc. As per the report:

"These sources have been assessed using a simple modelling approach based on measured data from Subacoustech Environmental's own underwater noise measurement database, scaled to relevant parameters for the site and specific noise sources to be used at the site. The calculation of underwater noise transmission loss (TL) for the non - impulsive sources is based on an empirical analysis of the noise measurements taken on transects around these sources by Subacoustech...It uses an $N \cdot \log R - \alpha R$ principle, fitted to the data".

Subsequently, Table 74 shows the approximate TL for each source type. It is recognised by the MMO that the approach is conservative. In fact, in some cases the degree of conservatism seems rather excessive. For example, in the case of the TL for vessel noise, the formula $12 \log R - 0.0021 R$ would predict increasing propagation losses up to a distance of about 3 km from the source, where a maximum of about 35 dB loss is reached, and thereafter the propagation loss drops with increasing range (and becomes negative beyond 25 km). This is obviously unrealistic (and arguably



unduly conservative), to the degree that we wonder if such a formula is even practical for the implied modelled scenarios (which would involve fleeing animals over considerable lengths of time, and thus presumably reaching distances comparable to the ranges exemplified above). The MMO requests further clarity on this matter.

3.7.12 Section 6.3.1.7 states that the cumulative sound exposure level (SELcum) calculations have assumed that the operational WTG noise is present 24-hours a day (which is appropriate). The MMO requests confirmation on what exposure duration has been assumed for the other sources as this is not clear in the report. Nevertheless, the calculations assume a fleeing receptor, and on that basis, we can expect to see small impact ranges.

3.7.13 The Subsea Noise Report concludes that percussive piling of monopiles and pin piles at the Project site is recognised to have the greatest potential underwater noise levels (and therefore presents the greatest risk to marine species), the MMO agrees with this conclusion.

The maximum predicted impact ranges for marine mammals (at the East location) are shown in Table 82. For the monopile scenario, significant PTS and TTS ranges of 11 km and 42 km respectively are predicted for low frequency cetaceans. For the pin pile scenario, significant PTS and TTS ranges of 12 km and 42 km respectively are predicted for very high frequency cetaceans.

3.7.14 For maximum design monopile scenario, TTS SELcum impact ranges of up to 38 km (stationary animal) have been predicted for fish species; 34 km for the maximum pin pile scenario.

3.7.15 Impact ranges (SPLpeak and SELcum) for all the various scenarios are reported in the Subsea Noise Report including ranges for the maximum hammer energy scenarios as well as the initial strike. Significant effects are predicted (which is unsurprising given the sustained high hammer energies (i.e. 5,000 kJ) and anticipated piling profile (over 4 hours of piling)). Furthermore, it appears that the modelling is not overly conservative in terms of the source level estimates*, yet significant ranges are predicted.

*As an example, Subacoustech have previously reported SELss monopile source levels of 223.6 dB for a 5,000 kJ hammer energy and a SELss pin pile source level of 221.3 dB for a 3,000 kJ hammer energy (Norfolk Vanguard OWF in 2018).

On that basis, it will be important to ensure that appropriate mitigation is put in place to reduce the risk of potential impact of underwater noise on marine receptors, and the MMO supports the commitment by the Project to using at-source noise reduction measures.

3.7.16 The MMO notes the maximum design pin pile (3,000 kJ) values in Table 82 for Phocids should be <100 m for PTS not 42 km.

3.7.17 Cumulative effects are considered in Volume 2 Chapter 12 with Annex 5.3 providing the detailed list of projects, plans and activities that have been considered within Hornsea Four offshore Cumulative Effects Assessment. The cumulative impact significance has been assessed as slight for the effects of underwater noise on fish, and slight to moderate for harbour porpoise (slight for other marine mammal species) during construction.



- 3.7.18 Transboundary impacts have been considered in Volume 2 Chapter 12. In terms of underwater noise, the assessment does not identify any significant transboundary effects for fish or marine mammal receptors. The assessment does acknowledge that behavioural disturbance resulting from noise during the construction phase could occur over large ranges, and therefore there is the potential for transboundary effects to occur, where subsea noise arising from the Project could extend into waters of other EEA states (such as the Netherlands whose marine border is located approximately 87 km from the Project). Given these distances, the MMO agree that the risk of significant impact of potential transboundary effects is likely to be low.
- 3.7.19 There were a couple of outstanding comments that were raised during the EPP and PEIR which have not yet been addressed. These are summarised in the comments below:
- For the other (continuous) sources, please could the Applicant confirm the duration of the activity/exposure period, as this is not clear in the report?
 - In relation to the previous point, the effect ranges for these “other noise sources” (based on the SEL_{cum}) are predicted to be <100 m for all marine mammal species, for all activities with one exception. Predicted impact ranges are < 50 m for fish species. Please provide more context to explain these results.
- 3.7.20 The MMO does not agree with the conclusions reached for herring within Chapter 3 Fish and Shellfish Ecology relating to the impacts of noise and vibration and has provided further information regarding these conclusions below.

Impacts of noise and vibration on herring

- 3.7.21 Noise modelling for the impacts of piling noise on fish has been carried out for a variety of different piling scenarios, including pin piles, monopiles and concurrent piling. The maximum design scenarios for pin piles and monopiles, using maximum pile size (15m diameter) and maximum hammer energy (up to 5000kJ) have been included in the modelling, and have been based a stationary (and fleeing) receptor, which is appropriate.
- 3.7.22 The MMO believes the modelling presented in the Fish and Shellfish Ecology Report and Subsea Noise Technical Report is appropriate for determining the likely extent of impact for mortality and potentially mortal injury, recoverable injury and TTS. However, the behavioural effects of piling noise on fish have do not appear to have been modelled or presented in the Fish and Shellfish Ecology Report or Subsea Noise Technical Report.
- 3.7.23 The MMO has previously provided advice in relation to the draft Fish and Shellfish Ecology Chapter and Report and the draft Subsea Noise Technical Report. This advice requested that the Applicant presented noise modelling for the received levels of single strike sound exposure levels (SEL_{ss}) at the herring spawning grounds based on 135dB. This was requested to determine the likely range over which behavioural responses in herring could occur, in order to consider whether spawning herring around Flamborough Head would be disturbed by piling noise, and to consider the likelihood and significance of disturbance from piling on herring migrating in a southerly direction past the Hornsea Four array site.



- 3.7.24 Unfortunately, despite these requests, the 135dB noise contours have not been presented for review in any of the ES reports reviewed. Without this evidence, there are uncertainties regarding the full extent and significance of behavioural impacts on herring, and in the absence of suitable evidence, the MMO requests a precautionary approach to mitigation in the form of a temporal piling restriction for piling in the array area during the Banks herring spawning season (1st August to 31st October).
- 3.7.25 The Applicant's noise modelling for piling at the HVAC booster station on the ECC (Figures 3.10, 3.11, 3.14, 3.15, 3.18 and 3.19 of the Fish and Shellfish Ecology Report) shows that impact ranges for TTS for a fleeing and stationary receptor overlap with areas of high larval densities. The Applicant has therefore acknowledged the likelihood of significant adverse impacts to spawning herring and has proposed temporal mitigation in the form of a season piling restriction between 1st September and 16th October based on a 'peak' of herring spawning activity. However, the dates selected for this 'peak' are not based on any site-specific data in relation to the Hornsea Four project site.
- 3.7.26 The matter of determining the months/weeks in which the 'peak' of herring spawning activity occurs for the project area have been discussed in the EPP and pre-application stage. The MMO has attached comments made to the Applicant during this process in Appendix B. This advice presented clear information on the herring spawning season for the Banks stock and explained why using a peak spawning season of 1st September and 16th October was not appropriate as it was based on a piling restriction used for Triton Knoll OWF which is situated further south in the North Sea, and the evidence used to refine the dates for this restriction were based on data and evidence gathered during the planning and consenting stages for that particular project.
- 3.7.27 Alongside these comments, the MMO provided the Applicant with additional information on how they could explore larval survey data and sea temperature data in order to explore what the 'peak' of herring spawning activity might be for the Hornsea Four project area. Please review Appendix B for the details.
- 3.7.28 Within later discussions on this approach and the Applicant presented a provisional back-calculation estimate of the 'peak' herring spawning season and the MMO provided follow up comments to assist the Applicant with their methods and approach.
- 3.7.29 Unfortunately, the Applicant does not appear to have made any further progress with exploring the 'peak' of spawning activity for the project and no new evidence has been presented in the ES documents which would support the Applicant's proposed restriction dates of 1st September and 16th October. Therefore, in the absence of robust evidence, the MMO requests that the dates of the piling restriction for the HVAC booster station should be consistent with the Banks herring spawning season of 1st August to 31st October.
- 3.7.30 The MMO believes measures to reduce significant adverse effects are clearly presented and justified, although the documents presented at this stage are primarily outline plans and protocols and therefore not final. Final plans will be agreed with the MMO and relevant Statutory Nature Conservation Bodies (SNCB).



3.7.31 For example, the Project has produced an Outline Southern North Sea Special Area of Conservation Site Integrity Plan, setting out the approach for the Project to deliver relevant project mitigation or management measures in relation to the Southern North Sea SAC (designated for harbour porpoise) in the event that driven or part-driven foundations are to be used.

3.7.32 The Applicant will also avoid piling the foundations for the offshore substations located along the offshore export cable corridor during the herring spawning season. This commitment is captured in the DML as follows:

“Piling restriction

DCO Schedule 12, Part 2 - Condition 23.

In the event that driven or part driven pile foundations are to be used to install Work No.3, no impact piling may be undertaken between 1st September and 16th October each year within the area of Work No. 3 as shown on the offshore works plans unless otherwise agreed in writing by the MMO after consultation with the relevant statutory nature conservation body.*

**Work No. 3— in the event that the mode of transmission is HVAC— up to three offshore HVAC booster stations.”*

3.7.33 In principal, the MMO supports the proposed piling restriction as a form of mitigation to protect spawning herring and their eggs and larvae from the impacts of noise and vibration.

3.7.34 However, the MMO does not agree with the proposed dates of the restriction (1st September and 16th October). The MMO provided advice previously highlighting that we did not support the proposed implementation of a seasonal piling restriction for piling of the HVAC booster station during the ‘peak’ herring spawning period as there was no data presented which could reasonably determine what the ‘peak’ weeks/months of spawning are for the Project area.

3.7.35 The proposed dates of 1st September to 16th October are based on a refinement of a seasonal piling restriction that was agreed in the past for a different offshore windfarm development (Triton Knoll) which is located further south, and these refined dates were based on evidence presented at that time, specifically in relation to that development.

3.7.36 The MMO provided advice on this matter in the pre-application stage (Appendix B is an extract of the more detailed comments provided to the Applicant 2 December 2020 on the draft Fish and Shellfish chapter in relation to this matter). This advice also outlined how the Applicant could acquire further data and evidence which could be used to determine more accurately what the ‘peak’ spawning season is likely to be for the Project area. The ES does not appear to have taken these suggestions on board and therefore there is no new evidence to support the proposed restriction dates of 1st September and 16th October. On this basis, the MMO requests the wording for the seasonal piling restriction for the HVAC booster station takes into account the whole Banks herring spawning season and is updated to the below wording:

“Piling restriction



DCO Schedule 12, Part 2 - Condition 23.

In the event that driven or part driven pile foundations are to be used to install Work No.3, no impact piling may be undertaken between 1st August and 31st October each year within the area of Work No. 3 as shown on the offshore works plans unless otherwise agreed in writing by the MMO after consultation with the relevant statutory nature conservation body.*

**Work No. 3— in the event that the mode of transmission is HVAC— up to three offshore HVAC booster stations.”*

- 3.7.37 In order to reduce underwater noise impacts on sensitive marine receptors, the Applicant has committed to installing a maximum of two piles simultaneously. This commitment has been adequately captured in Condition 13 of Schedule 11 and 12 as follows:

“Pre-construction plans and documentation

Schedule 11 & 12 Condition 13

(5) No more than two vessels may be engaged at any time in activities related to piling for the licenced activities.

(6) When combined with the licenced activities permitted under the licence granted under Schedule 11/12 of the Order, no more than two piles in total may be piled simultaneously.”

- 3.7.38 Whilst it appears that the 135db noise contour has been modelled in the Subsea Noise Technical Report, it has not been mapped as a noise contour impact range over the IHLS data in heat map form and the herring spawning grounds (using Coull *et al.* (1998)).
- 3.7.39 The MMO is aware that the potential for additional noise abatement measures has been explored in the Outline Marine Mammal Mitigation Protocol and that additional modelling of underwater noise from impact piling using a bubble curtain and double bubble curtain has been carried out for marine mammals. It is unclear why these forms of noise abatement have not been considered as potential options for reducing the impacts of piling noise on herring.

3.8 Ornithology

- 3.8.1 The MMO defers to Natural England as the SNCB on matters of ornithology. The MMO will continue to be part of the discussions relating to securing any mitigation and monitoring or development of any plans.

3.9 Commercial Fisheries

- 3.9.1 In providing this response the MMO has reviewed the following documents, unless otherwise stated all comments relate to Chapter 6 Commercial Fisheries:
- EN010098-000697-A1.1 ES Volume A1 Chapter 1 Introduction
 - EN010098-000700-A1.4 ES Volume A1 Chapter 4 Project Description
 - EN010098-000701-A1.5 ES Volume A1 Chapter 5 Environmental Impact Assessment Methodology



- d) EN010098-000708-A2.6 ES Volume A2 Chapter 6 Commercial Fisheries
- e) EN010098-000563-F2.9 AAI Volume F2.9 Outline Fisheries Coexistence and Liaison Plan

3.9.2 As highlighted within Chapter 6 proposed works are likely to have an impact on the fish and shellfish stocks within the area through seabed construction disturbance and suspended sediment concentrations. Other than what has been raised in the Shellfish and Fish sections above (3.5 & 3.6) the MMO defers to the NFFO, Eastern IFCA and other local fishing bodies on the impacts identified to commercial fisheries.

3.9.3 However, the MMO does have a few general comments that has been discussed with MMO coastal officers. These have been set out below.

3.9.4 The MMO stresses the importance of consultation with all fishermen, local to this area regarding proposed works, in order to determine whether or not any key fishing grounds are likely to be affected.

3.9.5 Potting for lobster and crab predominantly takes place during summer and autumn seasons, however the potting seasons have been extended year round in the past few years, with vessels continuing to fish during winter months, on days when the weather is good. Inshore vessels north of the Humber will mainly pot for crab and lobster, whereas vessels south of the Humber tend to pot for whelk, crab, and lobster.

At certain times of the year, the removal of fixed fishing gear can take longer due to adverse weather conditions. It is recommended that the Fisheries Liaison Officer (“FLO”) notify fishers of the intended works as early as possible to ensure gear can be moved and does not cause an obstruction to the works or loss / damage to the fishing gear.

3.9.6 In addition to this advice should be sought via the FLO when the timetable of works is known so that the local industry can provide real-time advice.

3.9.7 The MMO recommends routine checks of equipment should take place in order to decrease the potential for equipment failure and a record should be maintained for inspection by the MMO.

3.9.8 The MMO believes that a commitment should be made now to limit the use of rock protection. Alternative cable protection methods e.g. concrete mattresses should be utilised in areas where fishing activity previously took place.

3.9.9 The rock armour size and grade must be specified and approved by the MMO before use in any areas. Maximum recommended size is 200mm. Documentation from the purchase of rock armour, which specifies the size and grade, should be submitted to the MMO.

The MMO believes that this could be included in the cable specification and installation plan as required by Schedule 11 & 12 Condition 13(1)(h). However the MMO would need to review an outline plan at this stage or have this clearly specified within the condition.

3.9.10 The MMO notes there are notice to mariners conditions within the DMLs with a five day turnaround. The MMO recommends that the FLO notify fishers of the intended works as early as possible to ensure gear can be moved and does not cause and



obstruction to the works or loss / damage to the fishing gear, especially during winter when the vessels are more likely to be affected by adverse weather conditions.

- 3.9.11 There are a significant number of under 15m fishing vessels working out of the nearby ports of Hornsea, Withernsea, Grimsby and Bridlington, which do not use the automatic identification system (“AIS”) and may not have been considered during the data assessment. When vessels are working offshore, AIS signals can be sent intermittently and the data gathered can therefore be inaccurate and should not be solely used as a representative survey of vessels fishing within the area.

3.10 Shipping and Navigation

- 3.10.1 The MMO defers to the Maritime and Coastguard Agency and Trinity House on matters of shipping and navigation. The MMO will continue to be part of the discussions relating to securing any mitigation, monitoring or other conditions.

3.11 Marine Archaeology

- 3.11.1 The MMO defers to the Historic England on matters of shipping and navigation. The MMO will continue to be part of the discussions relating to securing any mitigation, monitoring or other conditions.

3.12 Seascape, Landscape and Visual Resources

- 3.12.1 The MMO defers to Natural England as the SNCB on matters of Seascape, Landscape and Visual Resources. The MMO will continue to be part of the discussions relating to securing any mitigation and monitoring or development of any plans/conditions on this matter.

4. Other Application Documents

4.1 General Comments

- 4.1.1 The MMO would like to see an Outline Operation and Maintenance Plan to have all the maintenance activities outlined in one place.

4.2 EN010098-000499-B2.5 RP Volume B2 Chapter 5 Without Prejudice Derogation Case

- 4.2.1 The MMO defers to Natural England on matters relating to the Habitats Regulation Assessment conclusions but highlights that the MMO has been part of some of the discussions on the derogation case and required compensation measures. The MMO will continue to review the documents and provide comments where required.

4.3 EN010098-000559-F2.5 AAI Volume F2.5 Outline Marine Mammal Mitigation Protocol (MMMP)

- 4.3.1 The ES is appropriately supported by an Outline MMMP, the aim of which is to reduce to negligible the risk of PTS for marine mammal species in relation to pile driving for the installation of the Project's foundation structures.
- 4.3.2 The final plan will be agreed with the MMO and relevant SNCBs (and will be determined based on the final confirmed foundation options and hammer energies), but mitigation measures may include pre-piling deployment of Acoustic Deterrent Devices (“ADDs”), marine mammal observation and soft start procedures.



4.3.3 Section 2.1.1.3 states:

“There will be a maximum of four piling vessels on site at the same time (two vessels for WTG foundation installation and two vessels for OSS and HVAC booster station foundation installation) with a maximum of two piling operations at any one time. There will, however, be no concurrent piling operations between the Hornsea Four array area and the HVAC booster stations located in offshore ECC.”

The MMO notes that commitment Co85 sets out that ‘No more than a maximum of two foundations are to be installed simultaneously’ and that this is captured within the DMLs (Schedule 11 & 12, Part 2, Condition 13 (5) and welcomes this. However, the MMO notes that it is not made clear within the commitment/condition that there will be no concurrent piling operations between the Array area and the HVAC booster stations. This should be clearly set out.

4.3.4 Section 4.2.1.3 states:

“It is important to note that this Outline MMMP focuses on mitigating only the “instantaneous” SPLpeak PTS-onset impact ranges”.

The MMO disagrees with this approach. As advised previously during the EPP, the MMMP should focus on mitigating both the predicted SPLpeak and SELcum impact ranges. This is discussed further under comments in relation to Appendix A of the MMMP below. Nevertheless, this same section then states:

“One of the potential mitigation measures that will be considered at this point, will be the use of at-source noise reduction measures in order to reduce the potential for cumulative PTS-onset risk to negligible levels”.

4.3.5 Cumulative PTS is later discussed in more detail specifically in section 4.4.3. The document acknowledges that in order to mitigate the large SELcum PTS ranges (i.e. up to 12 km for harbour porpoise and 11 km for minke whale), this would require extended duration of ADD activation which is likely to cause significant levels of disturbance and is therefore not considered to be a feasible mitigation option, which the MMO agrees. Therefore, the Project will commit to providing at-source noise reduction measures (for example bubble curtains and double bubble curtains) in order to reduce the potential for cumulative PTS risk to negligible levels. The choice of at-source noise reduction method will be confirmed in the final MMMP and the need for any ADD activation periods will be confirmed (see section 4.4.3.3). The MMO fully supports this proposal and welcomes that the Project will commit to providing at source mitigation.

4.3.6 The MMO would expect the commitment to providing at source reduction measures to be included within the Commitment Register but was unable to find this mentioned specifically. The MMO requests that this is updated to reflect this commitment and that this is captured within the DML. The MMO also highlights that such measures will also help to reduce the risk of potential impact on other (non-marine mammal) species.



4.4 EN010098-000760/61-A5.4.1 ES Volume A5 Annex 4.1 Marine Mammal Technical Report Part 1 & 2

4.4.1 The Project highlights the primary reasons why there is much more uncertainty associated with the prediction of levels of cumulative exposure, leading to the resulting predictions being very precautionary and very unlikely to be realised. This was previously discussed during the EPP. The MMO has included the summary of the main points below.

4.4.2 The Applicant highlighted the primary reasons why there is much more uncertainty associated with the prediction of levels of cumulative exposure, leading to the resulting predictions being very precautionary and very unlikely to be realised during the EPP. In summary, the Project provided the following four main points:

- a) **Equal energy hypothesis:** The equal energy hypothesis assumption behind the SEL_{cum} threshold is not valid, and as such, models will overestimate the level of threshold shift experienced from intermittent noise exposures. Intermittent noise allows for some recovery of the threshold shift in between exposures, and therefore recovery can occur in the gaps between individual pile strikes and in the breaks in piling activity, resulting in a lower overall threshold shift compared to continuous exposure at the same SEL.
- b) **Impulsive characteristics:** The SEL thresholds assume the sound keeps its impulsive character, regardless of the distance to the sound source. Therefore, predicted PTS-onset impact ranges based on the impulsive noise thresholds will overestimate the risk of PTS-onset in cases and at ranges where the likelihood increases that an animal is exposed to non-impulsive sound.
- c) **Swimming speed:** Recent studies have demonstrated porpoise and minke whale fleeing swim speeds that are greater than that used in the Hornsea Four fleeing model here, which makes the modelled speeds used in this assessment precautionary.
- d) **Animal depth:** The limitations of modelling exposure using depth averaged sound levels means that the acoustic model can overpredict exposure at the surface. This is important to note since animals may conduct shorter and shallower dives when fleeing.

Although these were acknowledged as valid points and the MMO agrees that there are uncertainties associated with predicting the true levels of sound exposure over long periods of time, as a result of uncertainties about responsive movement, the position of animals in the water column, extent of recovery between pulses or in breaks in piling and the extent to which pulsed sound loses its impulsive characteristics over time.

In general, there are many uncertainties regarding, and in assessing, the potential effects and impacts of underwater noise on marine life, and our recommendation is to utilise the most recent, peer-reviewed literature and guidance available to underpin assessments and assess the potential risks.

The Project noise assessment presents predicted PTS ranges for piling, using the latest Southall *et al.* (2019) thresholds for all species, which is appropriate. As noted in the EPP, *“the thresholds are based on a dual criteria approach whereby both*



should be evaluated and that predicting the largest range of impact, should be considered for the impact assessment". The MMO endorses the application of the dual criteria, as recommended by Southall *et al.* (2019) and National Marine Fisheries Service (NOAA) (2018), since this covers not only instantaneous auditory injury, but also auditory injury from accumulated exposure to noise pollution from pile driving, which tends to present a larger scale risk. Therefore, in the first instance, The MMO questioned the logic to not appropriately apply the criteria (e.g. by proposing only to mitigate one of the criteria, the **smaller** SPL_{peak} ranges).

Regarding the uncertainties, specifically the point about the precautionary swimming speeds, it should be noted that the actual concept of fleeing is not precautionary. Essentially, a fleeing receptor model generally assumes that an animal flees directly and continually away from the source, which may, of course, not reflect reality. Furthermore, assumptions of fleeing animal behaviour in the estimation of effect zones are controversial since animals may be motivated to remain in the affected area (e.g. due to prey availability or mating opportunities) despite harmful noise exposure. However, assuming that animals remain stationary, including close to the source, for extended periods may also be considered unrealistic.

Regarding the point that the SEL thresholds assume the sound keeps its impulsive character regardless of the distance to the sound source, it is indeed recognised that an impulsive sound is likely to lose its impulsive characteristics as a result of propagation, although no explicit guidance has been published on this. However, this is why it is important to consider the SEL_{cum}, and not just the SPL_{peak}, because the impulsive nature of the noise signal is more relevant to the instantaneous injury assessed by the SPL_{peak}. Auditory injury caused by longer (cumulative) exposure and assessed through the SEL_{cum} criteria is less dependent on the impulsive characteristics of the noise.

It is also worth noting that the fact that the noise signal transitions into something less impulsive, does not preclude the injurious effects caused by accumulation of exposure. Auditory injury from cumulative exposure may also be caused from non-impulsive sources.

4.4.3 The MMO notes that despite the arguments put forward by the Project, it does appear that they are committed to reducing the risk of cumulative PTS and this will be appropriately considered within the MMMP. As above the MMO welcomes this.

4.5 EN010098-000561-F2.7 AAI Volume F2.7 Outline Marine Monitoring Plan (OMMP)

4.5.1 The MMO notes the name of this document is different to the standard name used in Development Consent Order applications. The MMO would like to understand why this name is different to the established name "In Principle Monitoring Plan (IPMP)"? The MMO notes that the abbreviation of this document is OMMP and this could potentially be confused with the MMMP ("Marine Mammal Mitigation Plan"), MMMop ("Marine Mammal Monitoring Plan") or the OOMP (Outline Ornithological Monitoring Plan) and the OOOMP ("Outline Offshore Operation and Maintenance Plan").

4.5.2 Section 1.1.1.4 states:

"It is important to note that this OMMP relates to EIA-related monitoring only. Any monitoring related to the potential compensation associated with a Regulation 64



derogation under the provisions of the Habitats Regulations will be considered separately.”

The MMO believes the outline monitoring plan should include all monitoring, and if any monitoring will be captured in a separate plan then it should be referenced within this plan.

Marine Geology, Oceanography and Physical Processes

4.5.3 As set out above in the section 3.2 the region between off just offshore of the export cable crossing with Dogger Bank A+B and the Holderness coastline is both particularly sensitive to changes in the regional sediment transport pathways due to the cumulative nature of the cable burial and cable protection and the distance to the receptors. After the sediment transport assessment, it is suggested that annual swath bathymetry surveys (with recording of the backscatter for sediment composition) would identify sediment transport features (sand waves, ripples) and differences between years which should be included in section 3.3 of the OMMP.

Dredge and Disposal

4.5.4 The MMO notes that no monitoring is proposed for dredge and disposal activities. The MMO recommends that sediment from within the proposed dredge area be sampled and analysed every 5 years in line with OSPAR guidelines, with the first sampling regime to take place in 2024, to ensure material remains suitable for disposal at sea and this should be included within the OMMP. If all dredging and disposal activities have completed by this time, the sampling will not be necessary.

Benthic Subtidal and Intertidal Ecology

4.5.5 The MMO notes Table 4 highlights that there is a commitment to monitor any biogenic or geogenic reef habitats identified via full sea floor coverage swath bathymetry within the areas which construction is to take place. If potential habitats are identified, follow up drop down video surveys will be undertaken. The MMO would like to know if a high resolution side scan sonar survey will also be undertaken. This gear is normally used to determine reef signatures, as opposed to multibeam bathymetry.

4.5.6 The MMO provided previous advice on the draft OMMP advised inclusion of monitoring GBS if included in the design due to the lack of knowledge on the impacts of these in UK waters. The OMMP submitted with the ES has provided further information on monitoring undertaken at Thornton Bank in Belgian waters and a Danish GBS study. The results showed that changes to the sediments and fauna occurred up to 50m from the turbines four years after construction.

4.5.7 The Applicant states that a site-specific assessment at the Project based on evidence-base, expert opinion and project-specific modelling determined that similar amounts of scour would be likely at the Project to that found at Thornton Bank and that benthic communities may exhibit similar effects to those observed at Thornton Bank. However, it is not clear how the size and number of the GBS proposed for Project compare to those of Thornton Bank. Also, it is not clear how similar the sediments and benthic communities are between the sites. The MMO requests the inclusion of benthic monitoring around a selection of GBS foundations to confirm the predictions in the ES, if this foundation type is to be used.



4.5.8 The MMO believes that there should be monitoring of NIS as any management measures put in place would not prevent the colonisation of turbine foundations (and scour protection) by NIS and that this should be updated within the OMMP.

Fish and Shellfish Ecology

4.5.9 Table 5 provides high level information on the pre- and post-construction monitoring proposed for herring and sandeel habitats. The Applicant is proposing to undertake a targeted PSA survey within the export cable corridor along planned cable routes and adjacent areas, focused on cable sections where it is thought that flow tools may be required (e.g. sandwaves or more challenging ground conditions) to provide a baseline of the sediment suitability within the cable corridor for herring and sandeel spawning (as defined by Reach *et al.* (2013) and Latta *et al.* (2013) for herring and sandeel, respectively). The aim of this survey is to provide a baseline of the suitability of the sediment in these areas for herring and sandeel.

4.5.10 Post-construction monitoring is proposed in the form of a targeted PSA survey using the same survey locations as for the pre-construction survey to enable any changes in sediment suitability for spawning for herring and sandeel to be determined. This is to enable identification of any areas where construction activities have altered the sediment characteristics and to allow an assessment of suitability for continued spawning activity.

4.5.11 The MMO supports the proposal to undertake pre- and post-construction PSA monitoring to determine any changes in habitat suitability along the ECC and adjacent areas for herring using the method described by Reach *et al.* (2013). PSA data presented in Figure 28 of the Fish and Shellfish Ecology Technical Report show that sediments in the nearshore/western section of the ECC are comprised of coarse, gravelly sediments that have been classified as 'prime/preferred', 'sub-prime/preferred' and 'suitable/marginal' for herring spawning. The IHLS data supports this further by showing evidence that herring larvae are consistently caught in the ECC area.

4.5.12 The MMO requests the proposed pre- and post-construction monitoring of sandeel habitat, is extended to include the windfarm array and adjacent areas because the PSA data presented in Figure 28 of the Fish and Shellfish Ecology Technical Report show that the offshore section of the ECC and array area are comprised of sandy sediments that have been classified as 'prime/preferred' and 'sub-prime/preferred' sandeel habitat. Further evidence that the array area is a sandeel habitat can also be found in the historic otter and epibenthic beam trawl survey data for the former Hornsea Zone, in which sandeel were caught (despite these methods being unsuitable for targeting sandeel). (Ellis *et al.*, 2012) also shows that the array is situated within broadscale high intensity sandeel spawning ground, and the majority of the ECC is within low intensity spawning grounds.

Marine Mammals

4.5.13 The OMMP confirms that construction noise monitoring will be undertaken to validate the underwater noise modelling predictions made in the ES. Specifically, measurements of noise generated by the installation of the first 4 foundations of each driven or part-driven pile foundations will be obtained. The transects monitored will be informed by the predictions for noise propagation within the ES. This is in keeping



with previous developments, and the MMO supports that transects will be planned to ensure validation of noise over deeper waters (see Table 6 in the OMMP).

4.5.14 Although this monitoring approach is listed under 'marine mammals', it will also validate the ES predictions for fish species and should be highlighted within the fish and shellfish section.

4.5.15 Table 6 also confirms that monitoring by marine mammal observers will be undertaken prior to the commencement of the soft start of piling.

4.5.16 Section 3.6.22 notes that additional monitoring may be required for marine mammals within the Southern North Sea SAC depending on the further assessments provided during the development of the Site Integrity Plan for the Southern North Sea. However, there is no indication as to what this additional monitoring might involve at this stage. The MMO believes that this should be included within Table 6.

4.5.17 The MMO notes that various geophysical surveys may be required to inform engineering and design related studies, as per Table 2 of the OMMP. This would involve various noise generating activities such as Multibeam Echosounders and Sub-bottom profilers, which may also impact marine wildlife and should be appropriately considered within the ES.

Offshore Ornithology

4.5.18 The MMO defers to and supports Natural England on the required ornithological monitoring noting the MMO will be part of any further discussions to secure this monitoring, including that of a strategic nature which may also help to validate the findings of the ES

Commercial fishing

4.5.19 The MMO welcomes the addition of this section and has no comments to add at this time.

Shipping and Navigation

4.5.20 The MMO defers to and supports Maritime and Coastal Agency and Trinity House on the required shipping and navigational monitoring noting the MMO will be part of any further discussions to secure this monitoring.

Marine Archaeology

4.5.21 The MMO defers to and supports Historic England on the required marine archaeology monitoring noting the MMO will be part of any further discussions to secure this monitoring.

4.6 EN010098-000563-F2.9 AAI Volume F2.9 Outline Fisheries Coexistence and Liaison Plan

4.6.1 The MMO notes the Outline Fisheries Liaison and Coexistence Plan will be developed further at the post consent stage, however, the MMO believes the Applicant can provide further detail at this stage.

4.6.2 The MMO believes there is enough information available to include more descriptive roles and responsibilities. A Fisheries Liaison and Co-existence Plan has been used on multiple OWF projects. Therefore, the MMO requests that this section can be



expanded with at least the expected roles and responsibilities – this can be amended at post consent if required.

4.6.3 The MMO believes that this plan should include timescales will be added at the post consent stage. The MMO believes that as a minimum a table should be included to advise when information will be shared at the construction, operation and maintenance stages. The MMO notes this information is readily available similar to the table below:

Activity	Timing
Construction activities	Notices and information distribution not less than 2 weeks prior to the commencement of offshore construction activities.
Pre and post construction surveys	Notices and information distribution not less than 2 weeks prior to the commencement of offshore construction activities.
Operation and Maintenance (O&M) activities	Notices and information distribution not less than 2 weeks prior to the commencement of offshore O&M activities.
Meetings	Consultation meetings as required throughout the project development.
Unscheduled liaison	Additional unscheduled liaison and consultation will be undertaken by either the FLO or the FIR as required to address issues or fishermen's concerns as they arise.

4.6.4 In addition to the above comments the MMO requests it is made clear within the document that *“the MMO will not act as arbitrator and will not be involved in discussions on the need for, or amount of, compensation being issued”*. The MMO believes this should be made clear at this stage to ensure all parties are aware that the MMO will not be part of this process.

4.6.5 The MMO welcomes that a FLO is already appointed and has ongoing communication with the industry. The FLO should be utilised to maximise effective communication between affected parties especially with any trawlers and any activities in this area, could have significantly increased health and safety risks to the crew and the vessels, due to the snagging of nets if rock armour is deposited within areas historical fishing activity.

4.6.6 . At certain times of the year, the removal of fixed fishing gear can take longer due to adverse weather conditions. It is recommended that the FLO notify fishers of the intended works as early as possible to ensure gear can be moved and does not cause and obstruction to the works or loss / damage to the fishing gear.

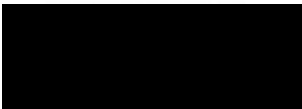
4.6.7 Advice should be sought via the FLO when the timetable of works is known so that the local industry can provide real-time advice.



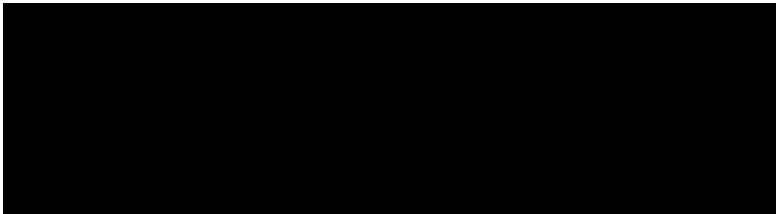
4.7 EN010098-000565-F2.11 AAI Volume F2.11 Outline Southern North Sea (SNS) Special Area of Conservation (SAC) Site Integrity Plan (SIP)

- 4.7.1 The MMO defers to Natural England on mitigation matters in relation to Habitats regulation assessment but has concerns that there is strong reliance on the Site Integrity Plan and that mitigation will be discussed at the pre-construction stage. The MMO believes that the Applicant should be committing to reduce the noise at source as much as possible in the first instance rather than including mitigation in the instance that there is an Adverse Effect on Integrity.
- 4.7.2 Section 1.3.1.1 to be updated to include the updated condition as per the wording as set out in section 2.5.38.
- 4.7.3 The MMO defers to Natural England at this stage on what should be included within the Outline SIP document.
- 4.7.4 However, the MMO highlights that if consented the MMO would require further information within the SIP document to include in-combination management measures. This would include any potential additional requirements the MMO believes are necessary to enable the guidance to be followed and could include additional reporting requirements.

Yours faithfully



Marine Licensing Case Officer



5. References

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Marine Plan Policy Assessment

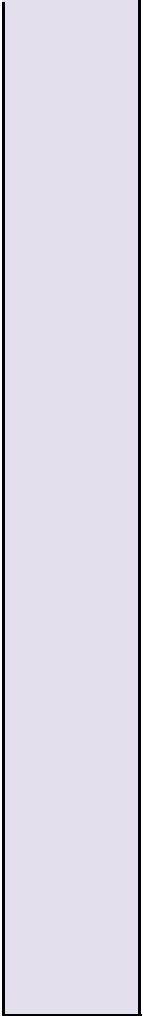
East Marine Plans	Policy Text	Policy Aim/Rationale	Policy screened in or out from EMP assessment	Assessment of plan policy (include why policy screened out)	Relevant page numbers, references and document title where policy has been assessed	Plan policy assessment result
Policy AGG1	<p>Proposals in areas where a licence for extraction of aggregates has been granted or formally applied for should not be authorised unless there are exceptional circumstances.</p>	<p>Plan policy applies to both inshore and offshore plan areas. Links to plan policies OG1, OG2.</p> <p>Licensed areas to which the policy applies in the East Inshore and East Offshore Marine Plan Areas are shown in figure 21 of the East Plans. The exceptional circumstances are: i) where the aggregates company that holds the lease allows another party to use that area either for aggregate extraction or another use; ii) where it is determined that the location should be licensed (by the Department for Energy and Climate Change) for oil or gas development (see also plan policies OG1 and OG2). Changes to the lease would be subject to agreement with the lease holder. See East Plans paras: 393-397.</p>	<p>IN- Policy scoped into assessment through EMP policy search</p>			

<p>Policy AGG2</p>	<p>Proposals within an area subject to an Exploration and Option Agreement with The Crown Estate should not be supported unless it is demonstrated that the other development or activity is compatible with aggregate extraction or there are exceptional circumstances.</p>	<p>Plan policy applies to both inshore and offshore plan areas. Links to policy OG1, OG2.</p> <p>This policy signals to those applying for an authorisation for a new development or activity that prevents future extraction of aggregates in exploration areas that it is likely to be looked on unfavourably once an area is awarded 'rights' by The Crown Estate. It is expected that proponents of new development or activities will consult with the relevant aggregate company and others such as The Crown Estate, to determine compatibility and to satisfy the public authorities that the policy is met. The exceptional circumstances are: i) where the aggregates company that holds the agreement allows another party to use that area either for aggregate extraction or another use; ii) where it is determined that the location should be licensed (by the Department for Energy and Climate Change) for oil or gas development. See East Plan paras 398-402.</p>	<p>IN- Policy scoped into assessment through EMP policy search</p>			
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<p>Policy AGG3</p>	<p>Within defined areas of high potential aggregate resource, proposals should demonstrate in order of preference: a) that they will not, prevent aggregate extraction b) how, if there are adverse impacts on aggregate extraction, they will minimise these c) how, if the adverse impacts cannot be minimised, they will be mitigated d) the case for proceeding with the application if it is not possible to minimise or mitigate the adverse impacts</p>	<p>This policy applies to both inshore and offshore plan areas. Policy AGG3 applies MPS 3.5.6, taking account of the regional and national importance of the East Marine Plan Areas for marine aggregate supply and of the spatially discrete areas in which commercially viable deposits of sand and gravel are found. The policy is intended to enable public authorities to consider how proposals for marine development and activities within areas of high potential aggregate resource, as defined by British Geological Survey, may impact the ability to access commercially viable marine sand and gravel resources in the future. The policy does not apply to other activities that are already licensed including where those activities may exclude new aggregate extraction, e.g. protected cable corridors and existing aggregate licence areas. The requirement under d) is to provide information for consideration by the relevant public authority. <u>It does not indicate that approval of the proposal will follow by default.</u> Ways in which applicants may satisfy a) include providing data that shows the area does not contain aggregates or providing evidence that their operation will be compatible with extraction activity. Circumstances</p>			
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	<p>under which b) might be satisfied could include showing that the footprint of the proposal relative to the available aggregate in that location is de minimis. Circumstances under which c) might be satisfied could include moving the proposal from a more to less favourable area for aggregates, or proposing that prior extraction of aggregates before development is feasible. See East Plans paras: 403-409.</p>				
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<p>Policy AQ1</p>	<p>Within sustainable aquaculture development sites (identified through research), proposals should demonstrate in order of preference:a) that they will avoid adverse impacts on future aquaculture development by altering the sea bed or water column in ways which would cause adverse impacts to aquaculture productivity or potentialb) how, if there are adverse impacts on aquaculture development, they can be minimisedc) how, if the adverse impacts cannot be minimised they will be mitigatedd) the case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts</p>	<p>This policy applies to both inshore and offshore plan areas. Policy AQ1 is an enabling policy for aquaculture, which seeks to protect opportunities for aquaculture, as they are identified through research and evaluation. The Marine Policy Statement (3.9.6 and 3.9.7) highlights the potential benefits of aquaculture, in existing areas, and aspirations for sustainable growth of the industry in possible future locations. Policy AQ1 does not preclude other developments or activities, including current aquaculture. Rather, it applies the intent of the national policy to ensure consideration is given to how other proposals may impact access to and use of areas suitable for future aquaculture development. The policy requires any proposals to demonstrate, using best evidence available, where adverse impacts to aquaculture activities may occur and how these impacts can be avoided. Where avoidance is not possible an explanation as to why the impacts cannot be overcome and possible minimisation, or mitigation, measures should be provided, allowing decision-makers to assess (as part of the application process) the adverse impacts to aquaculture posed by the development. The requirement under</p>				
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d) is to provide information for consideration by the relevant public authority. It does not indicate that approval of a proposal will follow by default. See East Plan paras: 455-462.

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<p>Policy BIO1</p>	<p>Appropriate weight should be attached to biodiversity, reflecting the need to protect biodiversity as a whole, taking account of the best available evidence including on habitats and species that are protected or of conservation concern in the East marine plans and adjacent areas (marine, terrestrial).</p>	<p>This policy applies to both the inshore and offshore plan areas.</p> <p>This plan policy is intended to ensure that all current publicly available evidence relating to biodiversity interest in the East marine plan areas is taken account of by the relevant public authority in the appropriate manner with advice from the Statutory Nature Conservation Bodies. It is important to note that the absence of evidence does not equate to the absence of features that are sensitive or of conservation concern; additional proposal specific evidence may be required. BIO1 also helps to ensure that commitments within the current legislative regime to biodiversity beyond designated sites are clearly understood by stakeholders. See East Plan paras: 213-216.</p>				
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<p>Policy BIO2</p>	<p>Where appropriate, proposals for development should incorporate features that enhance biodiversity and geological interests.</p>	<p>This policy applies to both the inshore and offshore plan areas. This policy adds value by providing a clear direction to public authorities that they should show a preference for proposals that enhance benefits to marine ecology, biodiversity and geological conservation. Such benefits may include the enhancement of resilience of ecosystems (for example to the effects of climate change), and the provision of ecosystem services such as flood protection and water filtration. 'Where appropriate' includes where it is reasonable to expect such features to be included that are consistent with or do not compromise (whether to do with technical constraints, cost or other reasons) the primary purpose for which the development is proposed. Identifying positive impacts of a proposal does not negate the need to assess negative impacts in line with whatever legislation or assessment requirements apply. Enhancement is not a substitute for avoidance, protection or mitigation measures. See East Plan paras: 217-219.</p>				
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<p>Policy CAB1</p>	<p>Preference should be given to proposals for cable installation where the method of installation is burial. Where burial is not achievable, decisions should take account of protection measures for the cable that may be proposed by the applicant.</p>	<p>This policy applies to both inshore and offshore plan areas. Links to policy GOV1, DD1, PS2, TR2.</p> <p>This policy aims to ensure sub-sea cables are properly protected from damage and do not cause a safety issue for vessels, particularly in navigation channels. Burial of cables increases opportunities for co-location and co-existence with other activities. Public authorities should look to ensure that adverse impacts upon cable operations are in the first instance avoided. Where this is not possible, such impacts should be minimised through any mitigation proposals. Mitigation proposals will vary with cable type and purpose, as does any applicable legislation, including any environmental constraints. See East Plan paras: 417-422.</p>				
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<p>Policy CC1</p>	<p>Proposals should take account of: • how they may be impacted upon by, and respond to, climate change over their lifetime and • how they may impact upon any climate change adaptation measures elsewhere during their lifetime Where detrimental impacts on climate change adaptation measures are identified, evidence should be provided as to how the proposal will reduce such impacts.</p>	<p>This policy applies to both inshore and offshore plan areas. The policy aim is that new development should be planned to avoid increased vulnerability to the range of impacts arising from climate change. The MPS (2.6.7.5) sets out that decision-makers and proposers of marine and coastal developments should take account of climate change projections and ensure that the design and operation of a given marine activity and/or proposed management measure (such as a marine protected area designation) are 'adaptation-proofed' as much as is possible to increase their resilience to the effects of climate change such as coastal change and flooding. This policy gives effect to the MPS high level principles for decision-making related to the need to account for the potential impacts of climate change adaptation. Additional considerations are the need to take into account other relevant projects, programmes and plans, and of other relevant matters. See East Plan paras: 236-240.</p>				
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Policy CC2

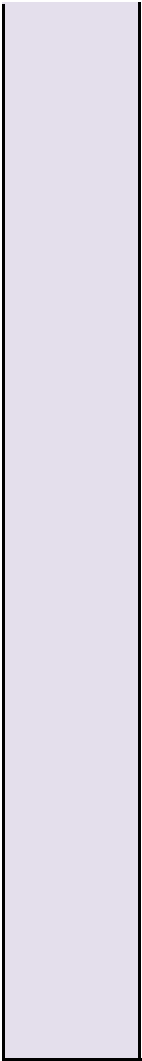
Proposals for development should minimise emissions of greenhouse gases as far as is appropriate. Mitigation measures will also be encouraged where emissions remain following minimising steps. Consideration should also be given to emissions from other activities or users affected by the proposal.

This policy applies to both inshore and offshore plan areas.

The focus of this policy is on those projects that are subject to the requirements of the Environmental Impact Assessment Directive. However, smaller-scale projects may have significant emissions considerations too, for example in relation to co-location of other activities; identification and need for assessment of such projects should be at the discretion of the decision-maker.

The approach taken by this policy to reducing emissions of greenhouse gases should account for the following in relation to the minimising and mitigating steps:

- emissions directly related to the activity proposed (including greenhouse gases directly associated with construction, operation and/or decommissioning where appropriate)
- emissions indirectly related to the activity proposed (for example, increased journey length for vessels arising from development)
- impact the activity may have on measures already in place as part of reducing greenhouse gas emissions (for example, carbon offsetting)



measures or incorporation of
renewable energy generation)

See East Plans paras: 241-244.

<p>Policy CCS1</p>	<p>Within defined areas of potential carbon dioxide storage,(mapped in figure 17)proposals should demonstrate in order of preference:a) that they will not prevent carbon dioxide storageb) how, if there are adverse impacts on carbon dioxide storage, they will minimise themc) how, if the adverse impacts cannot be minimised, they will be mitigatedd) the case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts</p>	<p>This policy applies to both inshore and offshore plan areas.The East marine plan areas represent a significant proportion of England’s storage potential for Carbon Capture and Storage. The policy aims to help ensure that sufficient storage sites are available for Carbon Capture and Storage over the long-term in view of the large number of such sites, on a national and international scale. Ways in which applicants may satisfy a) include providing data that shows the area is not a suitable storage site or providing evidence that their operation will be compatible with storage activity. Circumstances under which b) might be satisfied could include showing that the footprint of the proposal relative to the storage footprint on the seabed is insignificant. Circumstances under which c) might be satisfied could include moving the proposal from a more to less favourable area for Carbon Capture and Storage, or proposing co-ordination that can avoid any conflict, e.g. storage can take place before a new development or vice-versa. Circumstances under which d) might be satisfied could include demonstrating the importance of the proposal to meet other objectives or relevant departmental</p>				
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		<p>policies in the marine plans or other material considerations. <u>The requirement under d) is to provide information for consideration by the relevant public authority; it does not indicate that approval of the proposal will follow by default.</u> See East Plan paras: 328-336.</p>				
<p>Policy CCS2</p>	<p>Carbon Capture and Storage proposals should demonstrate that consideration has been given to the re-use of existing oil and gas infrastructure rather than the installation of new</p>	<p>This policy applies to both inshore and offshore plan areas. Link to policy GOV1, GOV2.</p> <p>This policy promotes MPS 3.3.33, the potential to combine permanent storage of carbon dioxide with the enhanced production of hydrocarbons, and supports</p>				

	<p>infrastructure (either in depleted fields or in active fields via enhanced hydrocarbon recovery).</p>	<p>possibilities to re-use existing infrastructure to provide access to storage sites. See East Plan paras: 337-341.</p>				
<p>Policy DD1</p>	<p>Proposals within or adjacent to licensed dredging and disposal areas should demonstrate, in order of preference</p> <p>a) that they will not adversely impact dredging and disposal activities</p> <p>b) how, if there are adverse impacts on dredging and disposal, they will minimise these</p> <p>c) how, if the adverse impacts cannot be minimised they will be mitigated</p> <p>d) the case for proceeding with the proposal if it is not possible to minimise</p>	<p>This policy applies to the inshore plan area only.</p> <p>This plan policy aims to protect dredging and disposal activities, in or adjacent to licensed dredging and disposal areas, against other new proposals, e.g. cables or built infrastructure, that would compromise the continued access to ports and harbours for the shipping industry. It aims to clarify the application process for decision-makers and licence applicants, for early intervention, in dealing with issues or conflicts which may arise during the application process. The requirement under d) is to provide information for consideration by the relevant public authorities. <u>It does not indicate that approval of the proposal will follow by default.</u> See East Plan paras: 380-384.</p>				

	or mitigate the adverse impacts					
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Policy DEF1	Proposals in or affecting Ministry of Defence Danger and Exercise Areas should not be authorised without agreement from the Ministry of Defence.	Policy applies to both inshore and offshore plan areas. This policy supports the need for defence activities to take place within the East marine plan areas for the purpose of national security. If the Ministry of Defence objects to a proposal then the development or activity will not be authorised. The Ministry of Defence should be consulted in all circumstances to verify whether defence interests will be affected and ensure that national defence capabilities and interests are not compromised (Marine Policy Statement 3.2.9). Any applications which would adversely affect defence activities would need to demonstrate that permission had been granted by the Ministry of Defence, to ensure that the impact of a proposal does not conflict with the military usage. See East Plan paras: 279-281.				
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<p>Policy EC1</p>	<p>Proposals that provide economic productivity benefits which are additional to Gross Value Added currently generated by existing activities should be supported.</p>	<p>Policy applies to both inshore and offshore plan areas. Links to policy SOC1.</p> <p>This policy is intended to promote more than the most economically beneficial developments and activities. It is also about gaining economic benefit from all developments and activities. Therefore where one project provides more economic benefit than a project of the same type, then the former should be supported. This should be the case unless there are other compelling reasons not to support the more economically beneficial project. See East Plan paras: 113-121.</p>				
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<p>Policy EC2</p>	<p>Proposals that provide additional employment benefits should be supported, particularly where these benefits have the potential to meet employment needs in localities close to the marine plan areas.</p>	<p>Policy applies to both inshore and offshore plan areas. Links to policy SOC1.</p> <p>This policy is intended to promote more than solely the most economically beneficial developments and activities. It is also about gaining employment benefit from all developments and activities. Therefore, where one project provides more employment benefit than a project of the same type, then the former should be supported. Unless there are other compelling reasons not to do so, for example it has greater negative social or environmental impacts. This policy should apply to all decisions relating to new proposals, be they for continuation of existing activity or relating to new activity. See East Plan paras: 122-127.</p>				
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Policy EC3	Proposals that will help the East marine plan areas to contribute to offshore wind energy generation should be supported.	Policy applies to both inshore and offshore plan areas and should be used in conjunction with policies WIND1 and WIND2. Optimising the location and methods of deploying offshore wind farms as well as other developments and activities that may affect their delivery, will help minimise the adverse effects on both marine users and the environment. Its main role however, is to make the link between ambitions for economic development and job creation, thereby adding value by highlighting the importance of the East marine plan areas to achieving national policy for economic growth and renewable energy projects. This is more geographically specific than national policy. See East Plan paras: 128-133.				
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<p>Policy ECO1</p>	<p>Cumulative impacts affecting the ecosystem of the East marine plans and adjacent areas (marine, terrestrial) should be addressed in decision-making and plan implementation.</p>	<p>This policy applies to both the inshore and offshore plan areas. Links to policy GOV3.</p> <p>The policy supports the aim of integration across and between different plans, including terrestrial local plans, in referring to the impacts of marine activities on the terrestrial, as well as marine ecosystems and vice-versa. It also draws attention to, and reinforces, the role of authorities in and adjoining the East marine plan areas to work together to identify and manage cumulative impacts, including through other relevant plans or programmes, such as River Basin Plans. This policy should be used alongside existing processes such as Environmental Impact Assessment and Strategic Environmental Assessments which also consider cumulative effects. These processes consider the need to avoid, minimise or mitigate impacts caused by cumulative effects, and this also is reflected in the principles of the National Planning Policy Framework and the Marine Policy Statement (2.6.1.3) on conserving and enhancing the natural environment. See East Plan paras: 196-199 and also para 188.</p>				
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<p>Policy ECO2</p>	<p>The risk of release of hazardous substances as a secondary effect due to any increased collision risk should be taken account of in proposals that require an authorisation.</p>	<p>This policy applies to both the inshore and offshore plan areas. Risks are likely to be identified and addressed through existing mechanisms, such as environmental assessment, navigational risk assessment, safety measures and contingency plans. It is essential that potential indirect effects are fully considered in practice. Public authorities may need to liaise with those with expertise and/or a remit relevant to the policy in making their decisions, and determining unacceptable levels of risk, in addition to consultation of guidance and existing regulations, such as the Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005 (as amended), and the Conservation of Habitats and Species Regulations 2010. See East Plan paras: 200-204.</p>				
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<p>Policy FISH1</p>	<p>Within areas of fishing activity, proposals should demonstrate in order of preference:</p> <p>a) that they will not prevent fishing activities on, or access to, fishing grounds</p> <p>b) how, if there are adverse impacts on the ability to undertake fishing activities or access to fishing grounds, they will minimise them</p> <p>c) how, if the adverse impacts cannot be minimised, they will be mitigated</p> <p>d) the case for proceeding with their proposal if it is not possible to minimise or mitigate the adverse impacts</p>	<p>This policy applies to both inshore and offshore plan areas. Note: 'fishing activity' refers to licensed, commercial fisheries only (para 423 of the East Plan). Link to policy GOV2, GOV3.</p> <p>This plan policy supports fishing activity by avoiding adverse impacts resulting from development and activities in the East marine plan areas. The policy focuses on access to fishing grounds. The requirement under d) in policy FISH1 is to provide information for consideration by the relevant public authority. <u>It does not indicate that approval of the proposal will follow by default.</u> See East Plan paras: 437-441.</p>				
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<p>Policy FISH2</p>	<p>Proposals should demonstrate, in order of preference:</p> <p>a) that they will not have an adverse impact upon spawning and nursery areas and any associated habitat</p> <p>b) how, if there are adverse impacts upon the spawning and nursery areas and any associated habitat, they will minimise them</p> <p>c) how, if the adverse impacts cannot be minimised they will be mitigated</p> <p>d) the case for proceeding with their proposals if it is not possible to minimise or mitigate the adverse impacts</p>	<p>This policy applies to both inshore and offshore plan areas.</p> <p>The aim of this policy is to support the recovery of fish stocks by offering protection against adverse impacts to spawning areas from development or activity. Public authorities will need to ensure that supporting information is submitted, proportionate to any proposal, illustrating any potential impacts (this may include consultation to identify issues at scoping stage) and suggested measures to minimise or mitigate them. The requirement under d) is to provide information for consideration by the relevant public authority. <u>It does not indicate that approval of the proposal will follow by default.</u> See East Plan paras: 442-446.</p>				
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<p>Policy GOV1</p>	<p>Appropriate provision should be made for infrastructure on land which supports activities in the marine area and vice versa.</p>	<p>This policy applies to both inshore and offshore plan areas. Links to policy GOV1 and the Coastal Concordat. Public authorities must assess the potential positive and negative impacts, on both the marine and terrestrial environments, of development proposals in a collective and cumulative manner (e.g. the effects of a cable landfall on flood defences, unstable cliffs, landscape and seascape). Proposals in the marine area that would significantly compromise the delivery of the objectives of terrestrial development plans are unlikely to be approved. Public authorities should also take into account proposals on land that have potential impacts on delivery of marine plan objectives. See East Plan paras: 259-263.</p>				
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<p>Policy GOV2</p>	<p>Opportunities for co-existence should be maximised wherever possible.</p>	<p>This policy applies to both inshore and offshore plan areas. It can be linked to proposals under CCS1 and CCS2.</p> <p>The key aim of this policy is to promote compatibility and reduce conflict (between activities, and also with the environment) in order to manage the use of space within the marine environment in an efficient and effective manner. Marine plans should identify areas of constraint and locations where a range of activities may be accommodated. This reduces real and potential conflict, maximises compatibility between marine activities and encourages co-existence of multiple users. The policy ensures coexistence is considered. It is important for all relevant public authorities to ensure that the feasibility of co-existence is taken into account in formulating plans affecting the marine area (including Local Plans, Local Development Frameworks, Shoreline Management Plans and River Basin Management Plans), and when assessing new development and other activities. See East Plan paras: 264-268.</p>				
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<p>Policy GOV3</p>	<p>Proposals should demonstrate in order of preference:</p> <p>a) that they will avoid displacement of other existing or authorised (but yet to be implemented) activities</p> <p>b) how, if there are adverse impacts resulting in displacement by the proposal, they will minimise them</p> <p>c) how, if the adverse impacts resulting in displacement by the proposal, cannot be minimised, they will be mitigated against or</p> <p>d) the case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts of displacement</p>	<p>This policy applies to both inshore and offshore plan areas. Links to GOV2, SOC2, SOC3, AGG3, TIDE1, PS3, CCS1, DD1, FISH1 and 2, AQ1, TR1 and TR2.</p> <p>Over-development of an area through high levels of co-existence can lead to displacement of certain activities, especially fishing. GOV3 aims to ensure GOV2 is implemented proportionally. The policy aim is to facilitate decisions and effective management measures that avoid, minimise or mitigate negative economic, social and environmental impacts. Please note the requirement under d) is to provide information for consideration by the relevant public authorities. <u>It does not indicate that approval of a proposal will follow by default.</u> See East Plan paras: 269-273.</p>				
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<p>Policy MPA1</p>	<p>Any impacts on the overall Marine Protected Area network must be taken account of in strategic level measures and assessments, with due regard given to any current agreed advice on an ecologically coherent network.</p>	<p>This policy applies to both inshore and offshore plan areas. Plan policy MPA1 adds value to existing policy by clarifying the need for public authorities to not only consider impacts on individual sites, but also impacts on the overall ecological coherence of the Marine Protected Area network. This policy also indicates that this should be done at a strategic level rather than at a project level which is more relevant to individual Marine Protected Areas, and is addressed through assessments such as Environmental Impact Assessments. For example it would be anticipated that factors to be taken into account will be considered in regional environmental assessments, Strategic Environmental Assessments or in assessments and measures brought forward in support of the Marine Strategy Framework Directive. See East Plan paras: 227-229.</p>				
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**Policy
OG1**

Proposals within areas with existing oil and gas production should not be authorised except where compatibility with oil and gas production and infrastructure can be satisfactorily demonstrated.

This policy applies to both onshore and offshore plan areas.

The spatial footprint of individual developments is relatively small, but there is exclusivity over the area occupied by the infrastructure, including statutory safety zones of 500 metres around platforms and certain subsea infrastructure, (e.g. subsea manifolds) and consultation requirements for areas up to nine nautical miles around a platform for any activities that may interfere with helicopter approaches (such as wind turbines). The safety zones are in place for the protection of personnel, the infrastructure and other users of the sea. Plan policy OG1 clarifies that, where existing oil and gas production and infrastructure are in place, the areas should be protected for the activities authorised under the production licence consent until the licence is surrendered, (including completion of any relevant decommissioning activity), or where agreement over co-located use can be negotiated.

<p>Policy OG2</p>	<p>Proposals for new oil and gas activity should be supported over proposals for other development.</p>	<p>This policy applies to both inshore and offshore plan areas.</p> <p>The policy aim is to afford protection of potential sites to prevent incompatible activities taking place. In identified resource areas, oil and gas proposals will be supported over all other proposals. This policy is spatially specific and takes account of the relative importance of gas production in the East marine plan areas to the United Kingdom. See East Plans paras: 295-299.</p>				
<p>Policy PS1</p>	<p>Proposals that require static sea surface infrastructure or that significantly reduce under-keel clearance should not be authorised in International Maritime Organization designated routes.</p>	<p>This policy applies to both inshore and offshore plan areas. PS1 recognises existing designations for navigation whilst acknowledging the ability to co-locate with many sea-bed related and non-permanent activities, provided such activity does not impinge on navigational safety. The policy does not preclude non-permanent static sea-surface infrastructure such as jack-up vessels, subject to prevailing operational requirements including relevant notifications to mariners being issued to ensure safe operation. See East Plan paras: 353-356.</p>				

<p>Policy PS2</p>	<p>Proposals that require static sea surface infrastructure that encroaches upon important navigation routes (see figure 18) should not be authorised unless there are exceptional circumstances. Proposals should:</p> <ul style="list-style-type: none"> a) be compatible with the need to maintain space for safe navigation, avoiding adverse economic impact b) anticipate and provide for future safe navigational requirements where evidence and/or stakeholder input allows and c) account for impacts upon navigation in-combination with other existing and proposed activities 	<p>This policy applies to both the inshore and offshore plan areas.</p> <p>This policy aims to protect important navigation routes for navigational purposes. PS2 provides additional detail to the Marine Policy Statement (3.4.7) on the importance of minimising negative impacts on shipping activity, protecting the economic interests of ports and shipping and the United Kingdom economy overall, and affording protection to the areas used by high intensities of traffic (Marine Policy Statement 3.4.2). Exceptional circumstances could include NSIP's. See East Plan paras: 357-366.</p>				
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<p>Policy PS3</p>	<p>Proposals should demonstrate, in order of preference:</p> <p>a) that they will not interfere with current activity and future opportunity for expansion of ports and harbours</p> <p>b) how, if the proposal may interfere with current activity and future opportunities for expansion, they will minimise this</p> <p>c) how, if the interference cannot be minimised, it will be mitigated</p> <p>d) the case for proceeding if it is not possible to minimise or mitigate the interference</p>	<p>This policy applies to the inshore plan area only.</p> <p>This policy gives effect to the need to minimise negative impacts on shipping activity, freedom of navigation and navigational safety, as well as protecting the efficiency and resilience of continuing port operations, and further port development and complements the NPS for ports. This policy is not intended to influence factors related to competition between ports and should not result in consideration related to competition being factored in to decision-making on the basis of these marine plans. This policy applies to proposals that may alter the prevailing characteristics in Statutory Harbour Authority areas but may apply more widely, so active identification of ports and harbours that may be affected by proposals is encouraged. The requirement under d) to provide information for consideration by the relevant public authority <u>does not indicate that approval of the proposal will follow by default.</u> See East Plan paras: 367-373.</p>				

<p>Policy SOC1</p>	<p>Proposals that provide health and social well-being benefits including through maintaining, or enhancing, access to the coast and marine area should be supported.</p>	<p>Policy applies to both inshore and offshore plan areas. Links to policy SOC3, FISH1.SOC1 provides more detail and prescription than the Marine Policy Statement for considering the benefits for health and social well-being and coastal and marine access in decisions. Development and other activities that bring positive benefits to society (through maintaining the coastal environment, and access to it, in order to promote health and well-being) will be supported (including in preference to any alternatives subject to other plan policies). See paragraph 139 of the East Plan for examples of initiatives which could be supported through this policy. See East Plan paras: 137-140.</p>				
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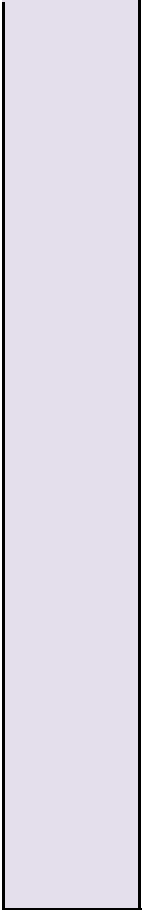
**Policy
SOC2**

Proposals that may affect heritage assets should demonstrate, in order of preference:

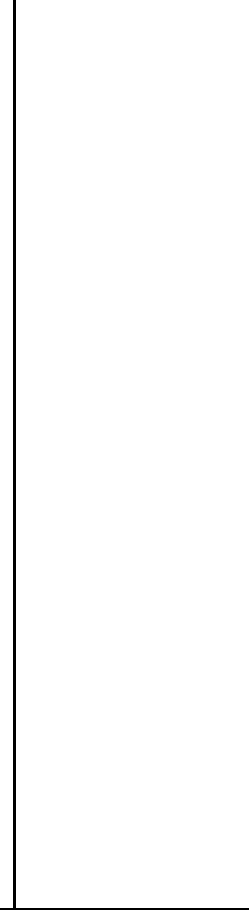
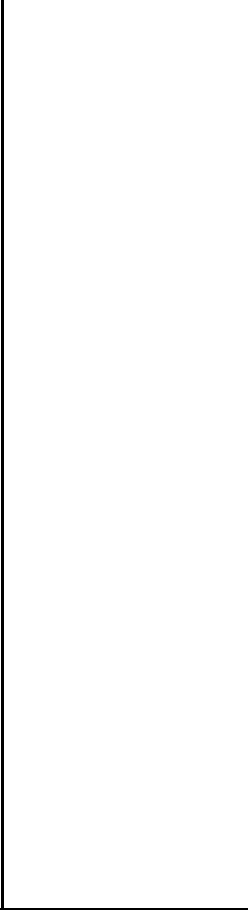
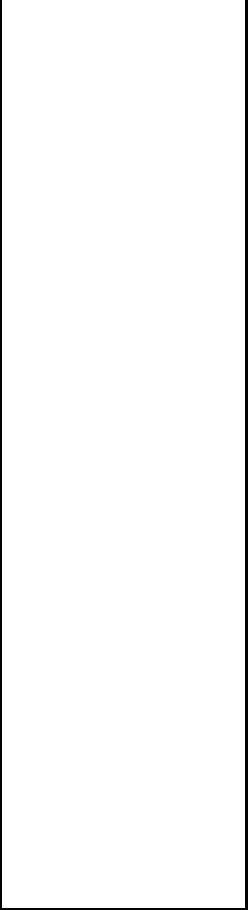
- a) that they will not compromise or harm elements which contribute to the significance of the heritage asset
- b) how, if there is compromise or harm to a heritage asset, this will be minimised
- c) how, where compromise or harm to a heritage asset cannot be minimised it will be mitigated against or
- d) the public benefits for proceeding with the proposal if it is not possible to minimise or mitigate compromise or harm to the heritage asset

Policy applies to both inshore and offshore plan areas and is specific to heritage assets. National Policy Statement EN-1 should also be considered when addressing visual impact on heritage assets in relation to wind energy development.

The aim of this policy is to ensure that existing marine and coastal heritage assets are protected from proposals that may have a detrimental impact upon them. It ensures that all heritage assets (whether formally designated or not), are considered in the decision-making process. The requirement under d) is to provide information for consideration by the relevant public authorities. It does not indicate that approval of the proposal will follow by default. Please note the absence of any official designation for such assets does not necessarily indicate lower significance and MMO Licensing should consider them subject to the same policy principles as designated heritage assets. As heritage assets have cultural and social values and can be a driver for economic growth, this policy ensures that marine plans, proposals and management measures that conserve heritage assets, are supported in



recognition of their value to society.
See East Plan paras: 146-152.



<p>Policy SOC3</p>	<p>Proposals that may affect the terrestrial and marine character of an area should demonstrate, in order of preference: a) that they will not adversely impact the terrestrial and marine character of an area b) how, if there are adverse impacts on the terrestrial and marine character of an area, they will minimise them c) how, where these adverse impacts on the terrestrial and marine character of an area cannot be minimised they will be mitigated against d) the case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts</p>	<p>This policy applies to both the inshore and offshore plan areas and is specific to landscape (seascape) character. This policy adds value to what is described in the Marine Policy Statement by ensuring that the character of specific areas is considered not only in the development of marine plans, but also in all decisions, such as on proposals for development, activities or management measures. This policy adds clarity to existing national policy by identifying where character areas and key elements exist within the East Inshore and East Offshore Plan areas. Decisions should aim to minimise or mitigate possible detrimental effects within the East marine plan areas. The requirement under d) is to provide information for consideration by the relevant public authorities. It does not indicate that approval of the proposal will follow by default. In determining proposals, MMO Licensing will take account of a range of relevant considerations including compliance with legislation and regulations. In determining an area's character, public authorities, such as those determining an application, should consult with relevant bodies including Natural England and English Heritage</p>				
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advisors as well as local authorities.
See East Plan paras: 175-180.

<p>Policy TIDE1</p>	<p>In defined areas of identified tidal stream resource (see figure 16), proposals should demonstrate, in order of preference:</p> <p>a) that they will not compromise potential future development of a tidal stream project</p> <p>b) how, if there are any adverse impacts on potential tidal stream deployment, they will minimise them</p> <p>c) how, if the adverse impacts cannot be minimised, they will be mitigated</p> <p>d) the case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts</p>	<p>This policy applies to both inshore and offshore plan areas. Link to policy GOV2.</p> <p>This policy is spatial and identified areas require protection from other new developments and activities which could prevent the exploitation of tidal stream resources in the future. The requirement under d) is to provide information for consideration by the relevant public authorities, <u>it should not be taken in any way or of itself to indicate that approval of the proposal will follow by default.</u></p> <p>New development or activities that could have potential adverse impacts on tidal stream development in these areas include placement of hard infrastructure at any point through the water column, on or under the seabed and that will be in place for more than five years. Types of infrastructure include breakwaters, quays, jetties, causeways etc. Types of activities that will prevent leasing of areas for tidal stream deployment may include aggregate extraction and establishment of shipping routes. See East Plan paras: 318-323.</p>				
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<p>Policy TR1</p>	<p>Proposals for development should demonstrate that during construction and operation, in order of preference:a) they will not adversely impact tourism and recreation activitiesb) how, if there are adverse impacts on tourism and recreation activities, they will minimise themc) how, if the adverse impacts cannot be minimised, they will be mitigatedd) the case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts</p>	<p>This policy applies for both inshore and offshore plan areas. This policy recognises the importance of tourism and recreation in the East Inshore and East Offshore Marine Plan Areas and seeks to minimise adverse impacts of development on tourism and recreation. This mirrors the terrestrial planning system which provides detailed, local considerations that need to be addressed when planning a new development. This policy will generally be delivered through the EIA process. The requirement under d) is to provide information for consideration by the relevant public authority. <u>It does not indicate that approval of the proposal will follow by default.</u> see East Plan paras: 470-475.</p>				
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<p>Policy TR2</p>	<p>Proposals that require static objects in the East marine plan areas, should demonstrate, in order of preference:</p> <p>a) that they will not adversely impact on recreational boating routes</p> <p>b) how, if there are adverse impacts on recreational boating routes, they will minimise them</p> <p>c) how, if the adverse impacts cannot be minimised, they will be mitigated</p> <p>d) the case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts</p>	<p>This policy applies to both inshore and offshore plan areas. Links to policy PS1, PS2, PS3.</p> <p>The Marine Policy Statement (3.11.1 and 3.11.6) emphasises the estimated economic contribution of recreational boating to the United Kingdom economy as well as highlighting the indirect benefits for coastal towns. Static objects can pose a risk to vessels and may include objects both on and under the water as well as on the seabed. They could also restrict navigation routes for recreational boating. This policy adds clarification to the Marine Policy Statement through highlighting the benefits of early engagement and aims to ensure that any development takes account of the recognised boating areas and most used cruising routes for recreational craft in the East marine plan areas. The requirement under d) is to provide information for consideration by the relevant public authority. <u>It should not be taken in any way or of itself to indicate that approval of the proposal will follow by default.</u> See East Plan paras: 476-485.</p>				
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<p>Policy TR3</p>	<p>Proposals that deliver tourism and/or recreation related benefits in communities adjacent to the East marine plan areas should be supported.</p>	<p>This policy applies to both inshore and offshore plan areas. Links to the Coastal Concordat.</p> <p>The aim of this policy is to promote and support terrestrial planning authority ambitions to deliver sustainable T&R related benefits to the landward side of the East Marine Plans. The Marine Policy Statement (2.3.1.5 and 3.11.1) states that 'marine plans should identify areas of constraint and locations where a range of activities may be accommodated. This will reduce real and potential conflict, maximise compatibility between marine activities and encourage co-existence of multiple uses.' The Marine Policy Statement recognises the changes made by seaside towns to attract visitors all year round, although some marine activities are restricted by weather and many families only visit during school holidays. See East Plan paras: 486-490.</p>				
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<p>Policy WIND1</p>	<p>Developments requiring authorisation, that are in or could affect sites held under a lease or an agreement for lease that has been granted by The Crown Estate for development of an Offshore Wind Farm, should not be authorised unless a) they can clearly demonstrate that they will not compromise the construction, operation, maintenance, or decommissioning of the Offshore Wind Farm b) the lease/agreement for lease has been surrendered back to The Crown Estate and not been re-tendered c) the lease/agreement for lease has been terminated by the Secretary of State d) in</p>	<p>This policy applies to both inshore and offshore plan areas. This policy is spatial and covers lease areas granted by The Crown Estate, and demonstration sites. The policy aims to protect sites identified by TCE from sterilisation by other uses until such time as the site is no longer used, or liable to be reused in the future. Exceptional circumstances include where an Offshore Wind Farm lease holder or agreement for lease holder grants permission for another party to use that area for another (non-Offshore Wind Farm) use. See East Plans paras: 305-309.</p>				
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	other exceptional circumstances					
Policy WIND2	Proposals for Offshore Wind Farms inside Round 3 zones, including relevant supporting projects and infrastructure, should be supported.	<p>This policy applies to both inshore and offshore plan areas. Link to policy WIND1, GOV3 and OG2.</p> <p>This policy aims to ensure that the large potential for Offshore Wind Farms in the East marine plan areas and the ambitions of government for renewable energy are realised by preferring proposals which are compatible with the policy, including supporting infrastructure. See East Plan paras: 310-314.</p>				



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By e-mail only: DAVKI@orsted.co.uk

2 December 2020

Dear David,

Hornsea Project Four Offshore Windfarm

Document 1: A2.3 ES Volume 2 Chapter 3 Fish and Shellfish Ecology (06587747_A)

Document 2: Hornsea Four Stakeholder Comments Log_2.3 Fish and Shellfish Ecology Chapter (06587715_A)

Document 3: A5.3.1 ES Volume 5 Annex 3.1 Fish and Shellfish Ecology Technical Report (06587716_A)

Document 4: Hornsea Four Stakeholder Comments Log_5.3.1 Fish and Shellfish Ecology Technical Report (06577292_A)

On 23 October 2020 Hornsea Project Four (HOW04) submitted the above documents to the Marine Management Organisation (MMO) in regard to the ongoing Evidence Plan Process prior to submission of the Application to the Planning Inspectorate (PINS). The documents were an updated submission further to comments made by the MMO on the Section 42 statutory consultation issued for the Preliminary Environmental Information Report (PEIR) on 12 August 2018.

Following review, the MMO, in consultation with its scientific advisors at the Centre for Environment, Fisheries and Aquaculture Science (Cefas), has the following comments to make on the submission:

Shellfish Ecology

1. The MMO is content that all previous comments in relation to shellfish have been addressed.

Fish Ecology

2. The MMO notes that the updated Subsea Noise Technical Report that supports the underwater noise assessment has not been provided at this stage. Please note responses on this subject, especially in relation to the effects of piling on herring and their eggs and larvae, are limited until this can be reviewed.

3. The MMO highlights that the unexploded ordnance (UXO) clearance will be consented under a separate Marine Licence and will therefore not be consented as part of the DCO,



as such no comments have been made on the impacts of noise on fish in relation to UXO at this stage.

4. The draft Environmental Statement (ES) briefly mentions the use of bubble curtains as potential mitigation for noise impacts from UXO detonations. Given the comments above regarding the assessment of impacts from piling on spawning herring, and the requirement for behavioural noise contours to be modelled and presented, the MMO suspects that it will be necessary to have a seasonal piling restriction to protect herring and their eggs and larvae at the High Voltage Alternating Current (HVAC) booster station and near the array. Additionally, with this in mind, the use of bubble curtains should be explored further by the developer as a potential mitigation option. If the modelled effects of such noise abatement demonstrated a considerable reduction in the extent of piling noise, then there is potential for seasonal piling restrictions at the array area to be avoided.

5. The MMO is also aware that there is currently ongoing industry discussion regarding proposed trials of alternative piling methods. The MMO would encourage HOW04 to investigate this, as these may have the potential to remove the need for seasonal piling restrictions.

General comments

6. The MMO welcomes the inclusion of 2019 Particle Size Analysis (PSA) data in the report to inform the assessments of herring spawning habitat and sandeel habitat which has improved the coverage of sediment data in the array area and export cable corridor (ECC).

7. Cefas Fisheries Advisors agreed during the Technical Panel Meeting 4 on 13 November 2019 that herring and sandeel should be the focus of the assessment for HOW04 and therefore species-specific assessments for the two were needed, this has been set out in Section 3.7.1.5 of Document 1.

8. Sections 3.7.1.4 and 3.7.5.2 of Document 1, acknowledge the limitations of the former Hornsea Zone otter trawl surveys and HOW01, HOW02 and HOW03 epibenthic beam trawl surveys. The MMO agrees that the surveys are sufficient to inform the baseline.

9. The MMO is content that for other finfish species (i.e. excluding herring and sandeel), the magnitude of effect can be classified as 'negligible' and the significance of the impact as 'not significant' due to the wider habitat available to these species and their pelagic spawning habits as set out in Section 3.11.1.8 of Document 1.

Major comments

Sandeel

Direct Damage and Disturbance

10. Section 3.11.1.6 (Document 1) recognises that the HOW04 array and offshore section of the ECC are located within areas of 'preferred' sandeel habitat which also serves as a spawning and nursery ground. However, the section concludes that the significance of impact to sandeel is 'not significant' based on; the size of the area of suitable sandeel habitat within the HOW04 study area compared to available sandeel habitat in the Southern North Sea, and; the short term and localised nature of the impact arising during construction which result in a magnitude of impact of 'negligible' (adverse in Environmental Impact Assessment (EIA) terms).

11. The MMO does not support the conclusion that the magnitude of impact from direct



damage and disturbance is 'negligible' for the following reasons:

- The statement overlooks the fact that many areas of the Southern North Sea are unsuitable as sandeel habitat or are already disturbed by anthropogenic activities such as construction, dredging and fishing.
- The estimated construction period is 3 years. Whilst the MMO recognises that this will not impact the entire site across for the whole three years, the MMO does not consider 3 years of disturbance to sandeel habitat and spawning ground as 'short term'.
- Up to 75,958,389m² of subtidal seabed is predicted to be directly impacted during the construction of Hornsea Four, therefore, the MMO does not agree with impacts being of a 'localised' nature.

12. The MMO believes the magnitude of impact should be considered as 'minor', and the sensitivity of receptor should be considered 'medium' as they are species of local and regional importance with medium vulnerability due to their high dependence on the substrate in which they dwell and spawn. This will equate to a significance of 'slight' to 'moderate'. This should be taken into account when considering the potential for cumulative impacts to sandeel habitat arising from multiple anthropogenic offshore activities occurring in the Southern North Sea. These have been discussed further in the section on cumulative impacts.

Increased SSC and Deposition

13. The MMO recognises that sandeel are not considered particularly sensitive to the secondary effects of suspended sediment concentration (SSC), sediment deposition and smothering (Pérez-Domínguez and Vogel, 2010). Therefore, the MMO agrees that the magnitude of impact from increased SSC from construction within the array area, the HVAC booster station search area and along the ECC on sandeel can be considered as 'minor' (adverse) and that the sensitivity of the receptor is 'low' as set out in sections 3.11.1.23 and 3.11.1.29 of Document 1.

14. The MMO agrees that the significance of effect for increased SSC and deposition can be deemed 'neutral' for sandeel and not significant in EIA terms set in section 3.11.1.38 (Document 1).

Underwater Noise

15. Sections 3.11.1.60 – 65 (Document 1) The MMO believes the assessment of impacts from piling on sandeel is appropriate. We welcome the acknowledgement that whilst sandeel lack a swim bladder they are thought to be affected by vibration through the seabed, particularly when buried in the seabed during hibernation. Accordingly, they are assessed as stationary receptors, due to their burrowing nature, substrate dependence, and demersal spawning behaviours, which could limit capacity to flee the impacted area. Based on a stationary receptor, the maximum predicted range for mortality and potential injury of spawning sandeel is up to 760 m and for recoverable injury up to 1,300 m, from the array piling location (NW location) and HVAC booster station search area (based on the cumulative sound exposure level (SEL_{cum}) (static)). Whilst sandeel mortality, potential injury and recoverable injury during the spawning season is likely to occur as a result of piling, the effects of injury can be considered localised in the context of available sandeel habitat within the HOW04 site boundary of 492km². When compared to the potential impacts to higher sensitivity Group 3 fish with a dependency on spawning substrate within the



HOW04 site (i.e. herring). The MMO agrees that the effect on sandeel is predicted to be of 'slight' significance.

Cumulative Impacts

16. Taking into account the above comments. The MMO recommends that pre- and post-construction monitoring of sediments across the HOW04 site is undertaken to inform the assessment of cumulative impacts to sandeel arising disturbance to, and loss of, 'preferred' sediments for the following reasons:

17. Large areas of the Southern North Sea that are considered to be suitable sandeel habitat are currently in the operational, construction or planning stages for large offshore windfarm developments, such as Hornsea 1, 2, and 3, Dogger Bank Teesside A and B (Sofia), Dogger Bank Creyke Beck A & B; Norfolk Boreas, Norfolk Vanguard, East Anglia One, East Anglia One North, East Anglia Two, East Anglia Three.

18. There is currently very little monitoring being undertaken to investigate the cumulative impacts to sandeel as a result of the construction and operation of offshore windfarms. This makes it difficult to ascertain whether the installation and presence of windfarms is having any effect on sandeel populations. In addition, a lack of post-construction monitoring makes it difficult for windfarm developers to validate ES predictions concerning impacts to sandeel.

19. The current status quo for EIAs is to assume that because the Southern North Sea is a 'large area', impacts such as direct damage and disturbance and permanent loss of sandeel habitat resulting from a particular development are unlikely to be significant. The rationale given is that there are other areas of suitable habitat in the wider Southern North Sea area which sandeel can inhabit. However, the MMO considers that this sort of conclusion overlooks two key issues;

20. There are many areas of the wider Southern North Sea area that are not suitable sandeel habitat, due to incompatible substrate composition, water depth etc.

21. Large areas of the Southern North Sea are already being utilised by marine developments including offshore wind farms (OWFs) and aggregate extraction, which further reduces available sandeel habitat.

22. For the aggregates industry, impacts to, and the continued monitoring of, sandeel habitat, which is affected by aggregate extraction activity, is currently informed through PSA data collected under the Regional Seabed Monitoring Plan (RSMP) (Cooper et al. 2017) and follows the method described by MarineSpace (2013). Collectively, the monitoring of all aggregate sites in this way can provide an indicative overview of impacts to all affected sites across a particular region. The MMO believes that a similar approach should be adopted by other offshore developers including wind farms, so that a collective/cumulative picture of the total habitats lost/affected by development can be achieved.

23. The MMO notes that some of the points outlined above have been provided as early as the scoping stage in October 2018.

Herring

Direct Damage and Disturbance

24. The MMO agrees with the classification of herring sensitivity to direct damage and disturbance during the construction phase is 'high' as set out in section 3.11.1.9. (Document 1).



25. Section 3.11.1.5 (Document 1) acknowledges that the proposed location of the ECC and HVAC booster station overlaps with areas of 'low-medium' intensity of spawning activity. The 'low-medium' intensity is based on the combined 10-year International Herring Larval Survey (IHLS) dataset from 2007-2017. The magnitude of impact from direct disturbance, associated with the construction of HOW04 (export cable installation and HVAC booster installation) on herring spawning grounds is assessed as 'minor' (adverse) based on *'the relatively small overlap from the works on this spawning ground and lack of overlap with the core highest density spawning areas to the north of Flamborough Head, and the localised and short-term nature of the impact'*.

26. Concerning direct damage and disturbance, the MMO does not agree with the magnitude of impact for herring being assessed as 'minor' for the ECC and HVAC booster station. Direct damage and disturbance during the construction phase is described as having a *'short-term and localised effect, within only a small portion of herring spawning habitats being affected in the context of the wider habitats in the area'*.

27. The Flamborough head spawning ground is currently considered the most important spawning site for the Banks stock, and the ECC and HVAC booster station are situated within this location, as is demonstrated by the British Geological Society (BGS) and PSA data in Figure 3.6 (Document 1) and by the IHLS data in Figures 24-26 of the Document 3. The IHLS data provide a visual demonstration of how the location and intensity of spawning varies spatially, year on year, for example, in 2011-2012, the highest larval densities were found within the boundaries of the proposed ECC.

28. In addition to this more recent IHLS data are available for 2018-19 which has not been included in the heat maps. Whilst the MMO recognises that these data may not have been available at the time of writing of the PEIR and Draft ES, the mapped IHLS data for 2018-19 show that high larval densities occurred to the south and east of Flamborough Head rather than north (see Annex 1, Figure 1 of this response).

29. The MMO notes it is not clear how long the ECC and HVAC booster station construction phase will be, but any disturbance to spawning substrate that occurs during the spawning season could be detrimental to the successful aggregation of spawning herring and settlement and development of eggs and hatching larvae. Furthermore, disturbance to herring spawning grounds in the nearshore zone of the ECC will not necessarily result in a 'small portion' of herring spawning habitat being affected because, as already mentioned, the location, size and intensity of spawning varies spatially, year on year.

30. The MMO believes the magnitude of impact should be considered as 'moderate' due to cable preparation and laying works affecting the integrity of the substrate. As the MMO does not support the 'minor' magnitude of impact the MMO does not support the significance of effect being deemed 'slight' for herring. Based on a 'moderate' magnitude of impact, and a 'high' receptor sensitivity, the significance of effect should be classed as 'moderate or large' (significant in EIA terms).

Increased SSC and Deposition

31. Section 3.11.1.23: The MMO does not support the conclusion that the magnitude of impact from an increase in SSC and deposition from construction at the HVAC booster station and along the nearshore ECC on herring will be 'minor' (adverse).

32. Whilst the MMO agrees that the effects of SSC and deposition are likely to be short-



term, intermittent, of localised extent and reversible, if the timing of SSC generating activities (e.g. dredging, sandwave clearance and cable laying activities) coincides with the herring spawning season, this would result in smothering of spawning beds and the eggs. It is well-documented that herring require a specific substrate on which to spawn, consisting of gravel and similar habitats (e.g. coarse sand, maerl, shell) where there is a low proportion of fine sediment and well-oxygenated water (Rogers, 2000). Herring eggs and larvae can be put at risk if the spawning beds are smothered e.g. from dredging activity.

33. If there is a large proportion of fine material (<63 micron) in the sample, then it is unlikely to allow sufficient water circulation and it will not be suitable as a herring spawning ground (Rogers 2000). In the case of offshore disposal sites, the re-deposition of fine sediment from the sediment plumes may smother eggs laid on the bottom (De Groot, 1996).

34. Furthermore, as above, the location, size and intensity of herring spawning activity varies spatially, year on year, and in certain years the focus of spawning activity was well within the proposed ECC route. Therefore, it is not appropriate to assume that the highest intensity of spawning will always be situated to the north of the ECC.

35. In section 3.11.1.27-28 (Document 1), HOW04 acknowledges that *'Relatively high intensity spawning sites for herring occur in the vicinity of the HVAC booster station search area along the ECC'*, and that *'it is likely that some proportion of the herring spawning habitat will be subject to indirect effects as a result of SSC plumes and sediment deposition'*. In section 3.11.1.28 HOW04 has assessed sensitivity of the receptor to increases in SSC and sediment deposition from construction activity as 'medium'. The MMO does not support this conclusion for the following reasons;

- The smothering of eggs by sand deposition has been seen to lead to retardation of larval development and mortality (Griffen et al., 2009).
- Spawning herring may not show avoidance behaviours to increased SSCs due to their biological drive to spawn and lay eggs.
- The reasons outlined in comment 30 above in reference to Rogers (2000) and De Groot (1996).

36. Whilst the duration of increased SSC and smothering may be 'short term' in duration, any overlap of these effects around the nearshore ECC and HVAC booster station, with the timing of the herring spawning and egg development period at the Flamborough Head spawning ground could result in failed spawning and eggs failing to hatch. Given this, and that the Flamborough Head spawning ground is currently considered the 'main' spawning ground for the banks stock, the MMO considers herring and their eggs and larvae to have 'high' sensitivity to increases in SSC and sediment deposition from construction activity.

37. In conclusion, for the HVAC booster station search area and along the ECC, the magnitude of impact for sensitivity of herring to increased SSC and smothering should be assessed as 'moderate' rather than 'minor'. The sensitivity of herring to increased SSC and smothering should be assessed as 'high' rather than 'medium'. This will result in a significance of effect of 'moderate or large' (Significant in EIA terms).

Underwater Noise & Vibration

38. As requested at PEIR stage, HOW04 has presented underwater noise modelling of the maximum design scenario based on concurrent piling using a 5000kJ hammer energy for a stationary receptor for the Array, and single piling using a 5000kJ hammer energy for a



stationary receptor at the HVAC booster station. This MMO believes this is appropriate.

39. For the HVAC booster station, noise contours based on a stationary receptor are shown to overlap the herring spawning grounds based on IHLS data (e.g. Figures 3.11 and 3.18 of Document 1). HOW04 has proposed the implementation of a seasonal piling restriction for piling of the HVAC booster station during the 'peak' herring spawning period. Whilst the MMO agrees that a seasonal piling restriction for this location will be necessary, the duration of the restriction cannot currently be based on a 'peak' of spawning due to a lack of data, please see comments in points 41 - 45 and 49 – 58 for further information.

40. Noise modelling of a stationary receptor for pin piling and monopiling at the array (Figures 3.9, 3.13, 3.16 and 3.21 of Document 1) all show a slight overlap for temporary threshold shift (TTS) (186 dBSELcum) with areas of larval densities between 1500 – 20,500 per m². The mapped data suggest that the risk of mortality and potential mortal injury and recoverable injury is fairly low, but there is a slightly greater risk of TTS/ Hearing Damage to herring from piling.

41. A high level assessment of the behavioural impacts from piling on herring has been presented, however as the noise contours for behavioural responses (based on Popper et al., 2014) have not been mapped/presented for review in the Draft Fish and Shellfish Ecology ES Chapter or Technical Report, and so the MMO cannot provide detailed comments until the Subsea Noise Technical Report can be reviewed.

42. To support the assessment of behavioural impacts on herring, it was requested by the Cefas Noise and Bioacoustics advisor that HOW04 provides the received levels of single pulse Sound Exposure Levels at the herring spawning grounds. This has not been presented in the draft Fish and Shellfish Ecology ES Chapter or Technical Report and therefore the MMO cannot provide detailed comments until the Subsea Noise Technical Report can be reviewed.

43. The MMOs concerns relating to behavioural responses in herring from piling are twofold:

- The behavioural responses of herring from piling which may impede migration from north to south to the spawning grounds.
- The behavioural responses upon gravid and spawning herring at the spawning grounds.

44. The MMO notes it is not exactly known how herring will react to the noise on reaching the spawning grounds, so we cannot conclude with confidence that there will not be any impact. If herring were to exhibit avoidance/fleeing behaviour then they may be unable to reach their spawning grounds potentially resulting in spawning failure that year.

45. Taking into account the above comments, the MMO does not support the conclusion that the magnitude of effect on herring from piling in the array and HVAC booster station will be 'minor' (adverse). HOW04 should present the additional modelled data requested and/or the Subsea Noise Technical Report for review, so that further considerations of behavioural impacts from piling on spawning and migrating herring can be considered.

Spawning Season

46. The MMO notes the herring spawning season for the Banks stock is from August to October inclusive - see Annex 1, Figure 2 of this response and Coull et. al (1998).

47. The MMO notes this is not different to what has been advised at PEIR stage and during



the Technical Panel meeting 13 November 2019. However, the MMO notes that during the meeting it was agreed that the option of a spawning herring impact assessment based on the peak spawning season could be explored. This was borne out of the knowledge that the seasonal piling restriction for Triton Knoll OWF (TKOWF) had been reduced to between 1st September and 16th October.

48. During the Evidence Plan Marine Ecology & Processes meeting, it was noted that a refinement of a seasonal piling restriction had been agreed in the past for an offshore windfarm development (TKOWF), which resulted in a piling restriction of 1st September and 16th October rather than the full spawning period of August to October inclusive. The Cefas fisheries advisor agreed to discuss with colleagues, whether an assessment based on the peak of spawning activity would be appropriate for HOW04. Please find the response to this request below.

Background to the Atlantic Herring ecology in the North Sea and the Banks stock.

49. The Banks stock covers the spawning grounds along the North East coast of England. The spawning period for the Banks stock is considered to be from August to October inclusive (see Annex 1, Figure 2 of this report).

50. Herring migrate through the North Sea in a north - south direction and spawning occurs during this time at suitable spawning grounds. Accordingly, the timing of spawning occurs earlier in the season in the northern spawning grounds and occurs later in the season as the stock migrates south.

51. Hatching of eggs occurs after 7 to 49 days depending on water temperature (the warmer the water the less time hatching takes to occur). The incubation period varies with temperature, about 1-3 weeks in the sea, see Table 1 of this response. After hatching the yolk sac larvae are thought to remain close to the seabed for a period, see Table 2 of this response.

Table 1: Egg development periods		Table 2: Yolk absorption periods	
Average temperature	Days	Average temperature	Days
12 - 13° C	7-9	12.8° C	3 & 9
10 - 11° C	10-12	12.0° C	5 & 14
7 - 8° C	14-18	10.7° C	7 & 16
3 -4° C	49	10.3° C	7 & 20

From Russell 1976.

52. TKOWF is at the southern periphery of the banks spawning ground range, so it was considered that spawning at TKOWF would occur later, compared to spawning grounds further north. On this basis, it was considered acceptable to refine the spawning restriction to 1st September and 16th October. The dates specified for the piling restriction for Triton Knoll were based on what was considered to be the peak of spawning activity based on historic IHLS data, which was then back-calculated to include a period for settlement, egg development, hatching and larval development. Additional larval surveys were also conducted for TKOWF to support the IHLS data, although for various reasons there were

some issues surrounding the usefulness and robustness of the data collected at this time.

53. As Flamborough head is situated further north, spawning at this location is likely to occur earlier than at TKOWF. Looking back at past recommendations for other OWF developments, and notes that for Dogger Bank B OWF, which has an export cable that meets landfall in a broadly similar location to that of HOW04, Cefas Fisheries advisors recommended that construction works associated with the ECC (i.e. non-piling activities) should not take place between mid-August to mid-October.

54. It should be noted that it was not considered necessary to restrict activity during the whole spawning period (1st August to 31st October) because of the limited extent of the effects of habitat disturbance, SSC and smothering. The decision to agree on a restriction of mid-August to mid-October was informed by modelling of plume dispersal and coastal processes along the cable route and took into account the methods being employed for cable route preparation and cable laying for that project.

55. If HOW04 would like the MMO to provide more specific details regarding the Dogger Bank cable route seasonal restriction or take part in a discussion with the MMO and Cefas please request this and this can be arranged.

56. Please note that the extent of impact from piling is much greater than that of cabling preparation and laying activities, so it may not be appropriate to explore this option beyond that of matters concerning ECC cable laying work.

57. The MMO has provided options for HOW04 to determine what the 'peak' of herring spawning activity might be for Flamborough Head spawning ground could include;

- I. Larval surveys: this would require larval surveys that started earlier than the IHLS survey (undertaken between 16th -30th September), in order to establish if there is a 'peak' around Flamborough Head during August or early September. Given the knowledge that the intensity and location of spawning varies year on year, several years of surveys would be needed to provide a useful and robust data set. The MMO anticipates that undertaking such surveys would be too costly and would extend beyond the timeframe of project's planning and construction phase.
- II. Historic IHLS data: A more conservative approach would be to look at the historical IHLS data sets for the original sampling period of 1st September and 15th October to inform on the year by year peaks in larval densities for survey stations within the area likely to be impacted from piling noise for HOW04. Once the timing of peak historical larval densities, in relation to HOW04, have been established, a back-calculation to allow for a period for settlement, egg development, hatching and larval development could then be applied.

58. In summary, there is currently insufficient data to determine the peak of herring spawning activity for Flamborough Head with any accuracy. The options outlined in comment 54 above could be explored by HOW04 and the MMO and Cefas fisheries advisors would be happy to discuss these in more detail with them. The MMO believes a meeting would be the best approach to facilitate these discussions.

General Comments

59. The MMO requests that any changes to project design or chapters, alongside the justification for them, are set out clearly within a document. It is requested that these are supplied alongside future updated documents for our review. The MMO notes the addition



of Gravity Bases as a foundation has increased the worst-case scenario, it would have been beneficial to review the updated project description at the same time as reviewing the specific topic chapters.

60. In addition to this the MMO notes that the Matrices for the Environmental Impact Assessment has been changed. The MMO has major concerns on this change. As outlined above, it is not clear what the changes to the assessments are (both in relation to the PEIR and ES). Furthermore, no justification has been provided for the changes.

The MMO believes that the general direction of the changes increase significance, which is welcomed, however, are concerned that this change so late in the process could undermine the validity of the assessments. The MMO questions the reliability of the results if they are able to be changed throughout the process?

Conclusion

As per the comments above the MMO is not currently satisfied with some of the conclusions within the Environmental Statement chapter. We therefore advise that further work is required by HOW04 prior to the Application being submitted.

The MMO has proposed the potential for further discussions through meetings between HOW04, the MMO and Cefas. The MMO requests that if HOW04 would like to take part in further meetings that this is done as soon as possible to enable all parties to be able to prepare and attend prior to the submission of the Application.

Yours Sincerely

[REDACTED]
Rebecca Reed
Marine Licensing Case Officer
[REDACTED]



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Annex 1– Supporting Figures for herring

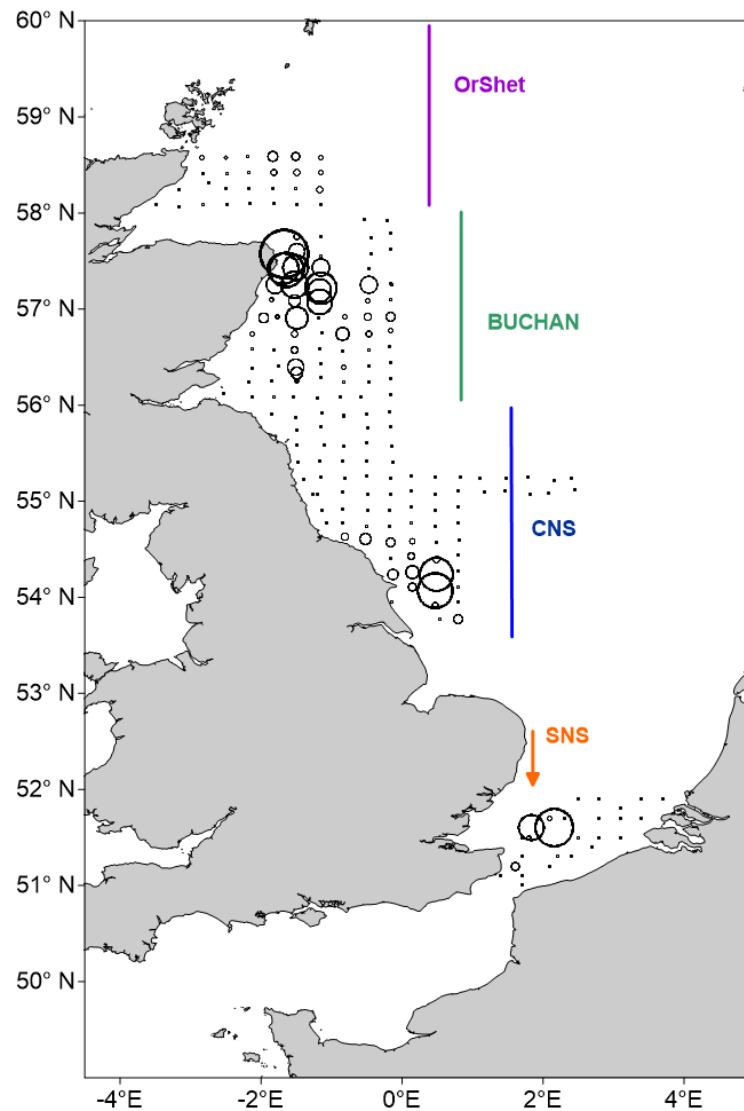


Figure 1. North Sea herring - Abundance of larvae <math>< 10\text{ mm}</math> (n/m^2) in the Buchan, Central (Banks) and Southern North Sea obtained from the IHLS in autumn and winter 2018/2019 (maximum circle size = 3500 n/m^2). (ICES 2019).



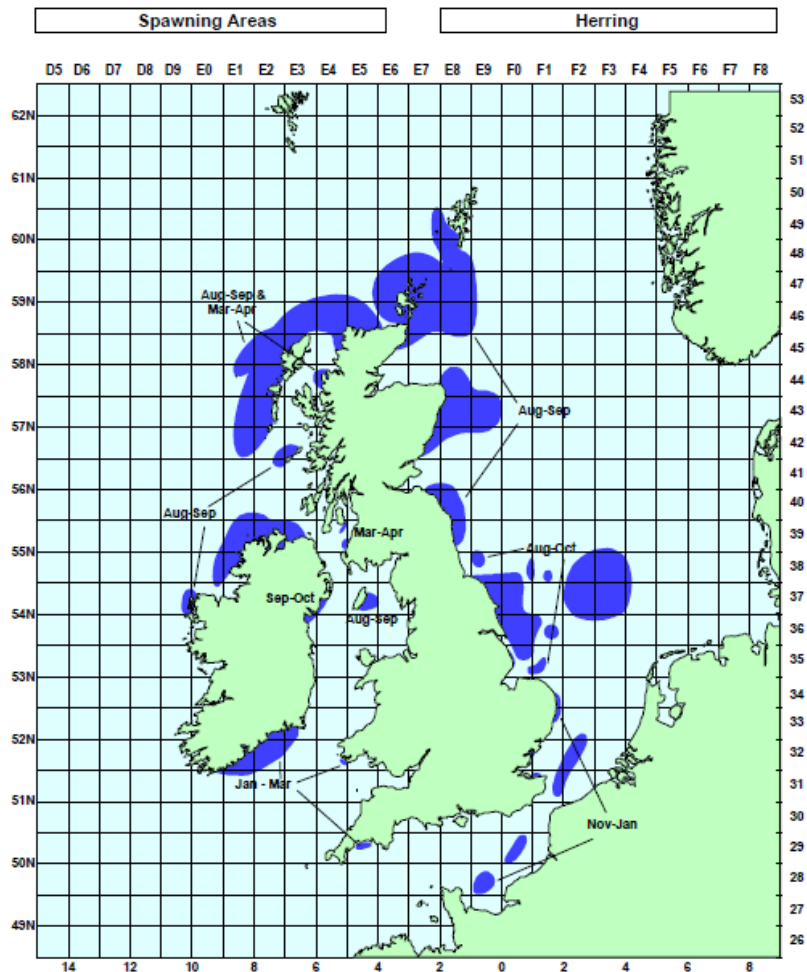


Figure 2. Historical Spawning Grounds taken from Coull *et. al* (1998)

