

**RWE Renewables UK Dogger Bank
South (West) Limited**

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South (East) Limited**

Dogger Bank South Offshore Wind Farms

**In Principle Site Integrity Plan for the Southern North Sea
Special Area of Conservation (Revision 2) (Clean)**

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02	16	3	Update in the timing of the final SIP to be produced prior to the commencement of piling.
02	20-22	4.1	Additional row added to detail document update pre-examination and amendment of timing of Final SIP approval in Table 4-2.
02	23	5	Additional text added for introduction to the SNS SAC
02	24	5	Added in Figure 5-1 (map of the SNS SAC).
02	29	6.1	Added in section 6.1 Project Commitments.
02	31	7.2	Addition of Offshore Export Cable Corridor within text.
02	37-38	8.2	Made changes to the seasonal effects presented in Table 8-1.
02	42-44	9	Additional sections added to section 9 In Principle Management and Mitigation Measures - Measure 6: Scheduling of UXO Clearance - Measure 7: Clustering of UXO devices - Measures Not Applicable - Other Mitigation Measures outside the scope of the SIP

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Glossary

Term	Definition
Array Areas	The DBS East and DBS West offshore Array Areas, where the wind turbines, offshore platforms and array cables would be located. The Array Areas do not include the Offshore Export Cable Corridor or the Inter-Platform Cable Corridor within which no wind turbines are proposed. Each area is referred to separately as an Array Area.
Collision	The act or process of colliding (crashing) between two moving objects.
Concurrent Scenario	A potential construction scenario for the Projects where DBS East and DBS West are both constructed at the same time.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Project (NSIP).
Development Scenario	Description of how the DBS East and / or DBS West Projects would be constructed either in isolation, sequentially or concurrently.
Dogger Bank South (DBS) Offshore Wind Farms	The collective name for the two Projects, DBS East and DBS West.
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the value, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
Electrical Switching Platform (ESP)	The Electrical Switching Platform (ESP), if required would be located either within one of the Array Areas (alongside an Offshore Converter Platform (OCP)) or the Export Cable Platform Search Area.
Evidence Plan Process (EPP)	A voluntary consultation process with specialist stakeholders to agree the approach, and information to support, the Environmental Impact Assessment (EIA) and Habitats Regulations Assessment (HRA) for certain topics.

Term	Definition
Habitats Regulations Assessment (HRA)	The process that determines whether or not a plan or project may have an adverse effect on the integrity of a European Site or European Offshore Marine Site.
In Isolation Scenario	A potential construction scenario for one Project which includes either the DBS East or DBS West array, associated offshore and onshore cabling and only the eastern Onshore Converter Station within the Onshore Substation Zone and only the northern route of the onward cable route to the proposed Birkhill Wood National Grid Substation.
Offshore Export Cable Corridor	This is the area which will contain the Offshore Export Cables (and potentially the ESP) between the Offshore Converter Platforms and Transition Joint Bays at the landfall.
Project Design (or Rochdale) Envelope	A concept that ensures the EIA is based on assessing the realistic worst case scenario where flexibility or a range of options is sought as part of the consent application.
Sequential Scenario	A potential construction scenario for the Projects where DBS East and DBS West are constructed with a lag between the commencement of construction activities. Either Project could be built first.
Special Area of Conservation (SAC)	Strictly protected sites designated pursuant to Article 3 of the Habitats Directive (via the Habitats Regulations) for habitats listed on Annex I and species listed on Annex II of the Directive
The Applicants	The Applicants for the Projects are RWE Renewables UK Dogger Bank South (East) Limited and RWE Renewables UK Dogger Bank South (West) Limited. The Applicants are themselves jointly owned by the RWE Group of companies (51% stake) and Masdar (49% stake).
The Projects	DBS East and DBS West (collectively referred to as the Dogger Bank South Offshore Wind Farms).

Acronyms

Term	Definition
AA	Appropriate Assessment
AEOI	Adverse Effect on Integrity
CI	Confidence Interval
CL	Confidence Level
DBS	Dogger Bank South
DCO	Development Consent Order
DEP	Dudgeon Offshore Wind Farm Extension Project
DEPONS	Disturbance Effects of Noise on the Harbour Porpoise Population in the North Sea
DML	Deemed Marine Licence
EDR	Effective Deterrent Radius
EIA	Environmental Impact Assessment
EPP	Evidence Plan Process
EPS	European Protected Species
ES	Environmental Statement
ESP	Electrical Switching Platform
FCS	Favourable Conservation Status
HRA	Habitats Regulations Assessment
IAMMWG	Inter-Agency Marine Mammal Working Group
JNCC	Joint Nature and Conservation Committee

Term	Definition
km	Kilometre
km ²	Kilometre squared
LWT	Lincolnshire Wildlife Trust
m	Metre
MA	Monitoring Area
MMO	Marine Management Organisation
MMMP	Marine Mammal Mitigation Plan
MU	Management Unit
NAS	Noise Abatement Systems
OECC	Offshore Export Cable Corridor
OWF	Offshore Wind Farm
PCoD	Population Consequences of Disturbance
PEIR	Preliminary Environmental Information Report
RIAA	Report to Inform Appropriate Assessment
SAC	Special Area of Conservation
SCANS	Small Cetaceans in the European Atlantic and North Sea
SEP	Sheringham Shoal Extension Project
SIP	Site Integrity Plan
SNCBs	Statutory Nature Conservation Bodies
SNS	Southern North Sea

Term	Definition
SoS	Secretary of State
SSIP	Strategic Site Integrity Plan
TWT	The Wildlife Trust
UK	United Kingdom
UXO	Unexploded Ordnance
WDC	Whale and Dolphin Conservation

1 Introduction

1. This In Principle Site Integrity Plan (SIP) for the Southern North Sea (SNS) Special Area of Conservation (SAC) is for the proposed Dogger Bank South (DBS) East and DBS West Offshore Wind Farms (collectively referred to as 'the Projects').
2. The In Principle SIP for the SNS SAC sets out the approach to delivering measures for the Projects to ensure the avoidance of significant disturbance, and therefore to ensure no Adverse Effect on Integrity (AEOI) of harbour porpoise *Phocoena phocoena* during piling works, in relation to the SNS SAC Conservation Objectives.
3. The SNS SAC was designated for harbour porpoise in February 2019. Harbour porpoise is the primary and only listed feature of the site.
4. The SNS SAC has been recognised as an area with persistent high densities of harbour porpoise (Joint Nature and Conservation Committee (JNCC), 2017; JNCC & Natural England, 2019) and is the largest designated site for harbour porpoise in United Kingdom (UK) waters at the time of designation.

1.1 Purpose of this Document

5. The purpose of the In Principle SIP is to set out the approach for RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited ('The Applicants') to deliver potential mitigation and management measures that may be required to ensure the avoidance of AEOI of the designated feature of the SNS SAC as recommended under The Crown Estate Guidance 'Record of the Habitats Regulations Assessment' (2022).
6. The Crown Estate considers "the SIP to be an appropriate mechanism to provide a framework to ensure there is no adverse effect on the integrity of the SNS SAC. As a result of the concern expressed by Natural England and The Wildlife Trusts around the robustness of the procedure at project level, The Crown Estate considers it appropriate for a Round 4 Strategic Site Integrity Plan (SSIP) to be established for Preferred Projects 1, 2 and 3. The purpose of the Round 4 SSIP is to set out the approach to be taken by Preferred Projects 1, 2 and 3 to provide certainty as to the conclusion of this Appropriate Assessment's (AA) conclusion of no AEOI in relation to the SNS SAC. The Round 4 SSIP would be secured through Agreements for Lease and must be agreed with The Crown Estate in consultation with the HRA Expert Working Group" any requirements from the SSIP would be applied to the final SIP where needed.

7. The approach and measures in this In Principle SIP are in relation to the Projects only, and are in response to the conclusions of the **Volume 6, Report to Inform Appropriate Assessment (RIAA) (application ref: 6.1)**. The RIAA concludes that, subject to the final design of the Projects, and the actual in-combination scenario for offshore wind farm schemes that could be constructing at the same time, further mitigation and management measures may be necessary in relation to the potential in-combination effects of underwater noise during pile driving in order to ensure there will be no AEOL on the designated harbour porpoise feature of the SNS SAC. This In Principle SIP therefore sets out the approach of the Projects to provide certainty to the conclusions of the RIAA, and specifically that the conclusion of no AEOL on the SNS SAC remains valid.
8. Following completion of the AA by the Competent Authority, it is acknowledged that the SIP may require revision to reflect the conclusions of the AA, the final design of the Projects, and the actual in-combination scenario for offshore wind farm schemes that could be constructing at the same time. The mitigation and management measures that may need to be secured in the final SIP at the pre-construction stage would be based on the AA as well as the final design of the Projects, in relation to the potential in-combination effects of underwater noise during pile driving, in order to ensure there would be no AEOL on the designated feature of the SNS SAC.
9. It is also possible that mitigation and management measures would be required for other schemes located within the vicinity of the Projects as part of the in-combination AA. However, it is not possible at this stage for The Applicants to detail what these would be or how they would be secured and therefore they are outside the scope of the In Principle SIP.
10. In its final form, the SIP would include any updated information on management measures, advice or guidance for the SNS SAC and the final design of the Projects.

1.2 Scope of the Document

11. The scope of this document covers the potential for any significant disturbance of harbour porpoise from underwater noise during piling at the Projects.

12. Any offshore unexploded ordnance (UXO) clearance required for the Projects would be assessed and mitigation determined as part of a separate Marine Licence application at the pre-construction stage. If required, a separate SIP would be developed for UXO clearance to support the Marine Licence application. Therefore, disturbance from underwater noise during UXO clearance at the Projects sites has not been included in this In Principle SIP as it would not be authorised under the Development Consent Order (DCO) application for the Projects.
13. It should be noted that the final Marine Mammal Mitigation Protocol (MMMP) to be produced at the pre-construction stage in accordance with the **Volume 8, Outline MMMP (application ref: 8.25)** would provide details of the mitigation requirements during pile driving at the Projects in relation to any physical or auditory injury to marine mammals, including harbour porpoise. In addition, any requirements to reduce disturbance in relation to European Protected Species (EPS) would be captured through the EPS Licensing process.
14. Indicative mitigation and management measures are outlined which would be developed in consultation with the Marine Management Organisation (MMO) and other relevant bodies (see section 9) at the pre-construction stage, based on the final design of the Projects. This document sets out how the Deemed Marine Licence (DML) conditions for Generation and Transmission would be met and provides a framework for further discussion and consultation by The Applicants with the MMO and other relevant stakeholders, including Statutory Nature Conservation Bodies (SNCBs) and The Wildlife Trusts (TWTs), to agree the exact details of any required Project related management measures.

1.2.1 Draft Development Consent Order / Deemed Marine Licences

15. The final SIP would be submitted for approval by the MMO in consultation with the relevant statutory nature conservation body. This is secured within the conditions of DMLs 1 – 4 of the **Volume 3, Draft DCO (application ref: 3.1)**.
 - *No piling activities can take place until a Site Integrity Plan (“SIP”), which accords with the principles set out in the in principle Site Integrity Plan for the Southern North Sea Special Area of Conservation, has been submitted to, and approved in writing, by the MMO in consultation with the relevant statutory nature conservation body.*

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.

The SIP must be submitted in writing to the MMO no later than six months prior to the commencement of piling activities.

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

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 Project Background

16. The Projects are located in the Dogger Bank region of the southern North Sea, with the closest point to the coast being 100 kilometres (km) from DBS West and 122km from DBS East. The Projects' Array Areas for application cover an area of approximately 349 kilometre squared (km²) for DBS East and 335km² for DBS West, with a combined area of 704km² across the two Projects.
17. The detailed design of the Projects (e.g. numbers of wind turbines and foundation type, number to be piled per day, and number of piling days) would not be determined until the post-consent stage. Therefore, realistic worst case scenarios have been adopted within the assessment which ensures the in-principal mitigation and management measures within this In Principle SIP are precautionary and robust.
18. The indicative construction programme assumes that offshore construction works could start around 2026 at the earliest.
19. As specified in **Volume 7, Chapter 5 Project Description (application ref: 7.5)** offshore construction works are anticipated to take approximately five years per Project, with construction taking place in isolation, concurrently or sequentially with a maximum two year lag i.e. an overall maximum construction period of seven years (excluding pre-construction activities such as surveys).

3 Requirements for this Document

20. Due to the long lead in times for the development of offshore wind farms, it is not possible to provide final detailed method statements for piling prior to consent and, as a result, the detail of any required mitigation could also not be agreed at this stage. The agreement of guiding principles to mitigation, through this In Principle SIP as part of consent, therefore permits the final mitigation to be specified pre-construction as part of the detailed design and allows refinements to be made based on the best practice, available knowledge and technology at that time.
21. This In Principle SIP reflects the commitment of the Projects to undertake required measures to reduce the potential for any significant disturbance of harbour porpoise in the SNS SAC, whilst allowing scope for refinement of the measures through consultation once the final construction methods for the Projects have been confirmed. This would enable use of the most appropriate project related measures to be confirmed based on best knowledge, evidence and proven available technology at the time of construction.
22. A final SIP would be produced at least six months prior to the commencement of pile driving, following revision and consultation, as per the outline schedule in section 4.1.
23. The Applicants acknowledge that any required mitigation or management measures should be precise, effective and deliverable in order to maintain the integrity of the SNS SAC for harbour porpoise. The SIP is designed to ensure that this would be the case once any required measures have been defined. Section 4.1 provides an outline of the proposed schedule for refinement and sign-off for the final SIP.
24. The In Principle SIP has been deemed an appropriate mechanism to ensure mitigation is applied where necessary, whilst allowing scope for refinement of the precise mitigation measures to be adopted through consultation once final construction methods for the Projects have been confirmed. This would enable use of the most appropriate project related measures to be confirmed based on best knowledge, evidence and proven available technology at the time of construction, and to enable the mitigation to be specific to the level of impact reduction deemed necessary, if required. This approach would also remove the need to revise the DML condition should the most suitable measures to be adopted change between the time of consent and construction.
25. Any potential requirements to implement noise abatement technology would be subject to additional marine licensing processes, if required.

4 Consultation

26. Comments received on the Preliminary Environmental Information Report (PEIR) consultation (17th July 2023) suggested in order for Natural England to agree there would be no AEOL of the SNS SAC, then appropriate mitigation must be implemented through the MMMP and SIP. The comments received and The Applicants' responses are provided in **Table 4-1**.
27. Consultation on the structure and content of the final SIP would be conducted with the MMO and relevant SNCBs throughout its development and a full consultation log would be maintained, the Outline In Principle SIP represented the first stage of that consultation (issued on the 15th December 2023) and comments received have been incorporated into this Outline In Principle SIP submitted with the DCO Application.
28. There would be an ongoing requirement to review the need for Project mitigation and management measures with the MMO and other relevant organisations. The Applicants would consult with Natural England, and TWT on the development of the SIP as project design and construction plans are progressed.
29. A consultation programme would be developed at the pre-construction stage.

Table 4-1 Consultation Comments Received at PEIR for the SNS SAC and draft In Principle SIP

Consultee	Comment Received	Project Response
PEIR Responses 17/07/2023		
Lincolnshire Wildlife Trust (LWT)	LWT also highlight that there is significant potential for construction timelines to overlap with other noisy activities in the region, and therefore there is significant potential to exceed the area-based noise thresholds for the SNS SAC. These thresholds have already been close to being exceeded due to current, and much lower, levels of activity. We urge that collaboration between regulators and other developers (including those from other industries) will be paramount to ensuring that these thresholds are not exceeded, and no adverse impact on the harbour porpoise population of the SNS SAC occurs. Therefore, due to their likely requirement, the use of mitigation and noise abatement technologies should be explored as soon as possible.	A SNS SAC draft In Principle SIP has been prepared to set out the approach to deliver any project mitigation, such as the requirement for any noise abatement technologies, or management measures to reduce the potential for any significant disturbance of harbour porpoise in relation to the SNS SAC conservation objectives. The SIP would be an adaptive management tool, which could be used to ensure that the most adequate, effective and appropriate measures, if required, are put in place to reduce the significant disturbance of harbour porpoise in the SNS SAC. The final SIP would be developed in the pre-construction period and would be based upon best available information and methodologies at that time. Consultation would be undertaken during development of the SIP with relevant stakeholders, including regulators and other developers.
Orsted	In particular Orsted will want to be consulted on the Marine Mammal Mitigation Protocol (MMMP) for piling and UXO and the respective SIPs.	Orsted would be provided with a copy of the In Principle SIP and advised once a copy of the Volume 8, Outline MMMP (application ref: 8.25) for piling and UXO are available for their information.
MMO	In addition to this the MMO supports the development of a document or similar to manage noise within the North Sea. For the SNS SAC, this could be in the form of a SIP for piling and UXO clearance. The document will set out the approach to deliver any project mitigation or management measures to reduce the potential for any significant disturbance from noise and specifically disturbance to harbour porpoise in relation to the SNS SAC conservation objectives. The MMO highlights there is a number of industry wide discussions in relation to noise management and any changes to the approach to noise management will be discussed with The Applicants to be taken into account within their application.	Consultation would be undertaken during development of the final SIP with relevant stakeholders, including regulators and other developers. The Applicants welcomes discussions with the MMO on the industry wide discussions in relation to noise management and any changes to the approach to noise management that would need to be taken into account within their application.
Natural England	Natural England advise that a draft SIP should be submitted at the time of the DCO application.	A Volume 8, In Principal SIP (application ref: 8.26) has been submitted with the DCO application. The final version of the SIP would be developed and submitted prior to construction.
	We highlight that disturbance mitigation will also need to be considered in the final application with respect to the SNS SAC. Natural England advise that, following the mitigation hierarchy, impacts should be minimised as far as possible, and we therefore recommend that the use of Noise Abatement Systems (NAS) is committed to in the draft MMMP/SIP, with the option to demonstrate that it is not needed post-consent. Provide information to demonstrate that injury and disturbance impacts will be sufficiently mitigated in the draft MMMP and SIP at the time of application.	Acknowledged. As outlined in responses above, the final MMMP and final SIP based on the final design of the Projects would provide information to demonstrate that injury and disturbance impacts would be sufficiently mitigated. In addition, Natural England would be consulted during the development of the final MMMP and final SIP, to ensure adequate mitigation measures are agreed prior to construction.

Consultee	Comment Received	Project Response
	Natural England advise that mitigation measures including NAS are committed to in the draft SIP at the point of application, with a view to amend in the future if not needed, as was done for the Hornsea Four and Dudgeon Offshore Wind Farm Extension Project (DEP) & Sheringham Shoal Extension Project (SEP) applications. Given the number of prospective offshore wind farms likely to be constructing at the same time, impact reduction will be essential to ensure in-combination impacts do not exceed the thresholds for the Southern North Sea Special Area of Conservation (SNS SAC). We recommend that the draft SIP if provided for review during the Evidence Plan Process.	In Principle Management and Mitigation Measures are listed in section 9 and include the potential for NAS, if required, that could be used at the Projects.
Draft In Principle SIP consultation response February 2024		
Natural England	Natural England maintains our advice that mitigation measures including NAS are committed to in the draft SIP at the point of application. Given the number of prospective offshore wind farms likely to be constructing at the same time as Dogger Bank South, noise impact reduction will be essential to ensure in-combination impacts do not exceed the thresholds for the SNS SAC. We highlight that the Project's own assessment results presented during the ETG show the thresholds will be exceeded in almost every scenario modelled. We acknowledge that the Project has included NAS as an option in the draft Site Integrity Plan (SIP) and intends to revisit whether it will be included post-consent, in consultation with NE and MMO. However, experience to date suggests that the feasibility for projects to implement NAS as mitigation post-consent if not already committed to it is extremely limited, due to the difference in timeframes for engagement and submission on the SIP and MMMP compared to Project financial milestones. Further, we consider that avoiding AEol in the first instance should be prioritised over a risk based approach. We therefore advise that a commitment to implement NAS is included pre-consent, with a view to amend in the future if not needed, as was done for the Hornsea Four and DEP & SEP applications. We also recommend that consideration is given to other mitigation commitments that could be made pre-application, such as limits on the number of piles installed in a 24 hour period within or across the arrays, and on concurrent piling across the arrays.	The Outline SIP includes NAS, and provision for any new technologies or methods not currently on the market, to be considered at the point of agreeing the final SIP. Updates as needed will be made to the MMMP and SIP, where relevant, for agreement prior to construction. The Applicants have sought to retain flexibility in the application in order to ensure the most effective noise mitigation option(s) can be selected prior to construction. Procurement for construction contractors has not yet commenced, however it is intended that noise mitigation be included within the competitive tender process in order to ensure that the most effective option(s) at the time are being considered. Further updates have been made to section 9.3.Minimisation of underwater noise during piling has been considered following comments received at PEIR, with the following amendments carried through to the Projects' Design Envelope for DCO application submission: • The Array Area boundaries for both Projects have been reduced by approximately 30%; • The maximum monopile diameter, and therefore maximum hammer energy required, has been reduced; • The maximum number of simultaneous monopile installations has been reduced from three to two monopiles across the Projects; and • The potential for simultaneous pile installation at the ECR platform and within the arrays has been removed. Once the final Projects' design and construction methodologies are known, there may be potential for further commitments to be made to minimise underwater noise, post consent.
MMO	Due to the increased activity within the Southern North Sea SAC along with a number of ongoing policy discussions on noise, a number of mitigation measures are likely to be required. The MMO would strongly recommend including NAS as a feasible solution and including this within your programming and financial planning.	
	Please note you will need two separate MMMPs and SIPs for the UXO clearance and piling activities as these are taking place at different times.	Acknowledged. This has been addressed in section 1.2

4.1 Schedule for Agreement

30. It is not possible at this stage to determine exact dates for agreement and refinement of the final SIP. However, the key milestones have been outlined in **Table 4-2** to indicate the likely development of the SIP from its current in principle status to the final version between consent award and the start of construction.
31. In the In Isolation or Sequential Development Scenarios there is the possibility two separate SIPs would be required due to the separate piling installation programs. This will be discussed and agreed with stakeholders through the consultation process.

Table 4-2 Indicative Milestones for Refinement of the In Principle SIP towards Agreement of the Final SIP Pre-Construction

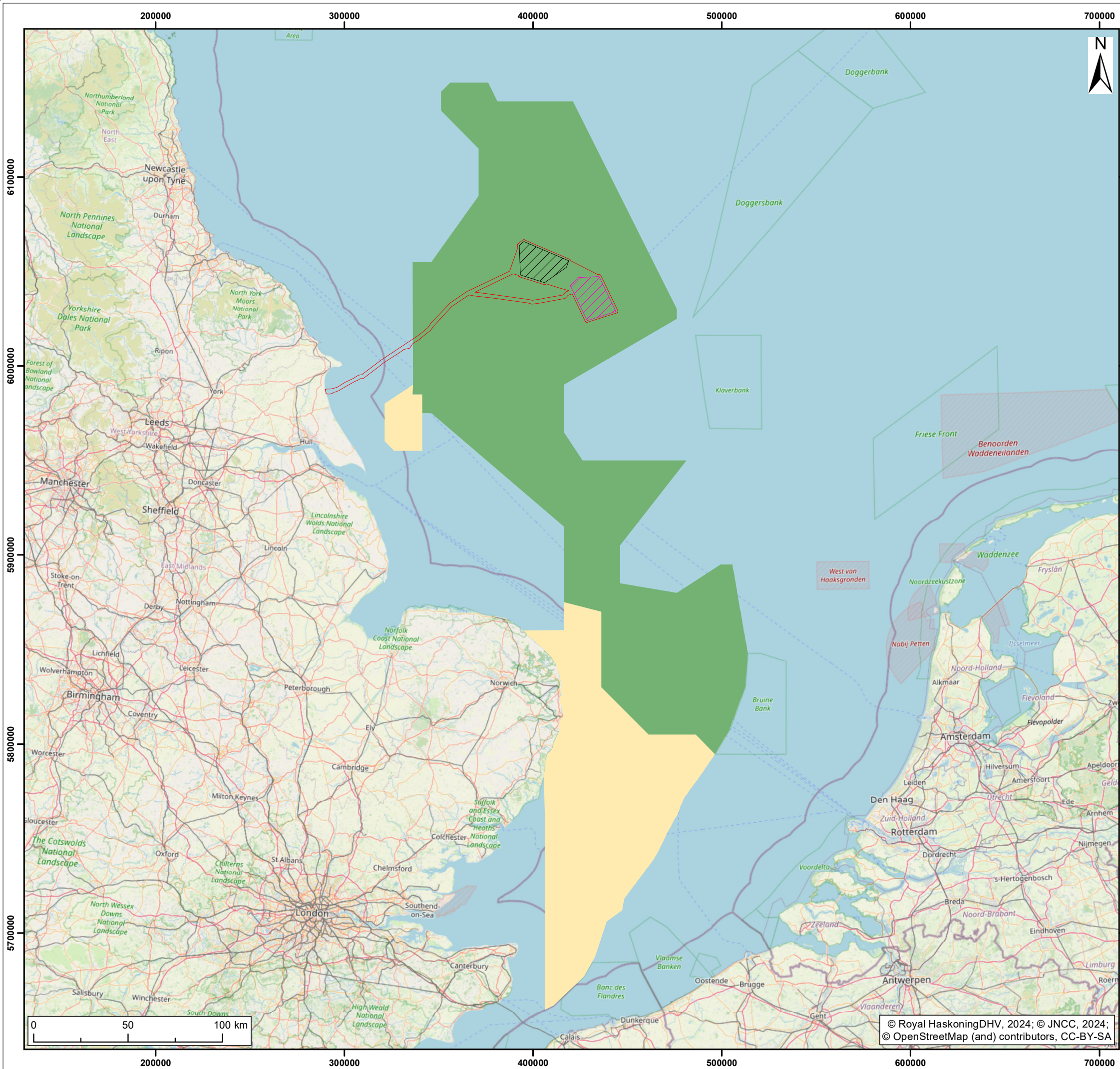
Indicative Stage	When	Action for The Applicants	Relevant Authority / Consultee	Status
Draft In Principle SIP	Prior to DCO submission	Draft In principle SIP to be sent out for review prior to DCO submission	MMO and Natural England; TWT	Completed through EPP
In Principle SIP	DCO submission	In principle SIP to be submitted with DCO application	Secretary of State (SoS)	Completed June 2024 at time of DCO submission
Update to In Principle SIP	Pre-examination	If required, the In Principle SIP would be reviewed and updated pre-examination	MMO and Natural England; TWT	This document
Update to In Principle SIP	During DCO examination process	If required, the In Principle SIP would be reviewed and updated during the DCO examination process	MMO and Natural England; TWT	To be completed
Consent determination and AA	Upon consent determination	Review In Principle SIP, identify areas for revisions/updates which	Internal only	To be completed

Indicative Stage	When	Action for The Applicants	Relevant Authority / Consultee	Status
		would need to be carried forward into the final SIP.		
Engineering Design	Pre-construction	Any updates or changes during the pre-construction period, within the consented envelope. Any updated project design would also require consideration in the SIP.	Internal only	To be completed
Preparation and consultation on draft Final SIP	Approximately 12 months prior to commencement of pile driving	The SIP would be updated to capture all relevant assessments and mitigation measures. Consultation on whether separate SIPs would be required for DBS East and West due to program requirements (if required).	MMO, Natural England, TWT	To be completed
Final design	Approximately 6 months prior to construction	Provide project details relevant to the SIP. In addition, accompanying environmental information, including an assessment of the efficacy of mitigation or management measures would be provided.	MMO, Natural England; with copies sent to TWT and Whale and Dolphin Conservation (WDC)	To be completed
Final SIP approval	Approximately 6 months prior to commencement of pile driving	The SIP would be updated and finalised. Within the final SIP, an implementation plan and details of any monitoring requirements to assess the effectiveness of mitigation	MMO and Natural England	To be completed

Indicative Stage	When	Action for The Applicants	Relevant Authority / Consultee	Status
		measures would be included. The final SIP would be submitted for approval approximately four months prior to the commencement of pile driving for written approval from the MMO prior to any piling works commencing.		
Construction monitoring and reporting	Construction	Monitoring/management reports would be submitted to the MMO.	MMO	To be completed

5 Southern North Sea SAC for Harbour Porpoise

32. The SNS SAC has been recognised as an area with persistent high densities of harbour porpoise (JNCC, 2017; JNCC & Natural England, 2019) and is the largest designated site for harbour porpoise in the UK and European waters at the time of designation. The SNS SAC is located within the North Sea Management Unit (MU) for harbour porpoise (Inter-Agency Marine Mammal Working Group (IAMMWG), 2023).
33. The SNS SAC covers an area of 36,951km², with both winter and summer habitats of importance to harbour porpoise (JNCC, 2017). Approximately 27,028km² of the site is important in the summer period (183 days from April to September inclusive) and 12,696km² (**Figure 5-1**) of the site is important in the winter period (182 days from October to March inclusive) (JNCC *et al.* 2020). The majority of the site is less than 40m in depth, reaching up to 75m in the northern most areas.
34. The seabed is mainly sublittoral sand and sublittoral coarse sediment (JNCC, 2017). The site overlaps with a number of existing designated sites, including the Dogger Bank SAC, Margate and Long Sands SAC, Haisborough, Hammond and Winterton SAC and North Norfolk Sandbanks and Saturn Reef SAC, all of which have important sandbank and gravel bed features.
35. The SNS SAC Site Selection Report (JNCC, 2017) identified that the SNS SAC site supports approximately 18,500 individuals (95% Confidence Interval (CI) = 11,864 - 28,889) for at least part of the year (JNCC, 2017). However, JNCC and Natural England (2019) state that because this estimate is from a one-month survey in a single year (the Small Cetaceans in European Atlantic waters and the North Sea (SCANS) II survey in July 2005), it cannot be considered as an estimated population for the site. It is therefore not appropriate to use site population estimates in any assessment of effects of plans or projects on the site (i.e. Habitats Regulations Assessment (HRA)), as they need to take into consideration population estimates at the MU level, to account for daily and seasonal movements of the animals (JNCC & Natural England, 2019).



- Legend:
- Offshore Development Area
 - DBS West Array Area
 - DBS East Array Area
 - Southern North Sea SAC Summer Area
 - Southern North Sea SAC Winter Area

S3	P02	04/11/2024	Suitable for review & comment	SM	SB	AS
S2	P01	24/09/2024	Suitable for information	JH	SB	SB
SUI	REV	DATE	DESCRIPTION	DRW	CHK	APR

Title:

The Southern North Sea
Special Area of Conservation

Figure: 5.1 Drawing No: PC2340-RHD-OF-ZZ-DR-Z-0898

Co-ordinate system: WGS 1984 UTM Zone 31N Page Size: A3 Scale: 1:2,000,000

Project: Dogger Bank South Offshore Wind Farms Report: DBS Projects



5.1 Conservation Objectives

36. The Conservation Objectives for the SNS SAC are designed to ensure that the obligations of the Habitats Directive can be met. Article 6(2) of the Directive requires that there should be no deterioration or significant disturbance of the qualifying species or to the habitats upon which they rely.
37. The Conservation Objectives for the site are (JNCC & Natural England, 2019):

‘To ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining Favourable Conservation Status (FCS) for the harbour porpoise in UK waters.

In the context of natural change, this will be achieved by ensuring that:

- *Harbour porpoise is a viable component of the site;*
- *There is no significant disturbance of the species; and*
- *The condition of supporting habitats and processes, and the availability of prey is maintained.’*

38. These Conservation Objectives are “a set of specified objectives that must be met to ensure that the site contributes in the best possible way to achieving Favourable Conservation Status (FCS) of the designated site feature(s) at the national and biogeographic level” (JNCC & Natural England, 2019).

5.1.1 Conservation Objective 1: Harbour Porpoise is a Viable Component of the Site

39. This Conservation Objective is designed to minimise the risk of injury and killing or other factors that could restrict the survivability and reproductive potential of harbour porpoise using the SAC. Specifically, this objective is primarily concerned with operations that would result in unacceptable levels of impact on harbour porpoise using the SAC. Unacceptable levels are defined as those that would have an impact upon the FCS of the population of the species in their natural range.

40. Harbour porpoise are considered to be a viable component of the site if they are able to live successfully within it. This SAC has been selected primarily for its long term, relatively higher densities of harbour porpoise in contrast with other areas of the North Sea. The implication is that it provides relatively good habitat for foraging and may also be used for breeding and calving (JNCC & Natural England, 2019). However, because the number of harbour porpoise using the site naturally varies there is no exact value for the number of animals expected within the site (JNCC & Natural England, 2019).
41. Harbour porpoise are listed as EPS under Annex IV of the Habitats Directive and are therefore protected from the deliberate killing (or injury), capture and disturbance throughout their range. Within the UK, the Habitats Directive is enacted through The Conservation of Habitats and Species Regulations 2017 and the Conservation of Offshore Marine Habitats and Species Regulations 2017. Under these Regulations, it is an offence if harbour porpoise are deliberately disturbed in such a way as to:
- Impair their ability to survive, to breed or reproduce, or to rear or nurture their young; or
 - To affect significantly the local distribution or abundance of that species.
42. The term deliberate is defined as any action that is shown to be any action “by a person who knows, in the light of the relevant legislation that applies to the species involved, and the general information delivered to the public, that his action will most likely lead to an offence against a species, but intends this offence or, if not, consciously accepts the foreseeable results of his action”.

5.1.2 Conservation Objective 2: There is no Significant Disturbance of the Species

43. Disturbance of harbour porpoise typically, but not exclusively, originates from operations that cause underwater noise, including activities such as seismic surveys, pile driving and sonar. Responses to noise could be physiological and / or behavioural. However, disturbance is primarily a behavioural response to noise and may lead to harbour porpoise being displaced from the affected area. Therefore, operations within or affecting the SAC should be managed to ensure that any individuals potential usage of the site is maintained.

44. JNCC *et al.* (2020) have produced guidelines to minimise the risk of physical injury to cetaceans from various sources of loud, underwater noise. Disturbance is considered to be significant if it leads to the exclusion of harbour porpoise from a significant portion of the site for a significant period of time. The current SNCB guidance for the assessment of significant noise disturbance on harbour porpoise in the SNS SAC (JNCC *et al.*, 2020) is that:

“Noise disturbance within an SAC from a plan/project individually or in combination, is significant if it excludes harbour porpoises from more than:

- 20% of the relevant area¹ of the site in any given day², or
- an average of 10% of the relevant area of the site over a season^{3,4}”.

5.1.3 Conservation Objective 3: The Condition of Supporting Habitats and Processes, and the Availability of Prey is Maintained.

45. Within this Conservation Objective, supporting habitats relates to the characteristics of the seabed and water column, and supporting processes encompass the movements and physical properties of the habitat. The maintenance of supporting habitats and processes contributes to ensuring that prey is maintained and available to harbour porpoise using the SAC. Harbour porpoise are strongly reliant on the availability of prey species due to their high energy demands and are highly dependent on being able to access prey species year-round. The densities of harbour porpoise within a site are therefore highly dependent on the availability of key prey species.
46. This Conservation Objective is designed to ensure that harbour porpoise are able to access food resources year round, and that activities occurring in the SNS SAC will not affect this.

¹ The relevant area is defined as that part of the SAC that was designated on the basis of higher persistent densities for that season (summer defined as April to September inclusive, winter as October to March inclusive).

² To be considered within the HRA and, if needed, licence conditions should ensure that daily thresholds are not exceeded. Day to day monitoring of compliance is not practicable and therefore retrospective compliance monitoring is required to test whether the licence conditions are being adhered to.

³ Summer defined as April to September inclusive, winter as October to March inclusive.

⁴ For example, a daily footprint of 19% for 95 days would result in an average of $19 \times 95 / 183$ days (summer) = 9.86%

5.2 Management Measures

47. Specific management measures are yet to be developed for the SNS SAC, however JNCC and Natural England (2019) advise that “the site should be managed in a way that ensures that its contribution to the maintenance of the harbour porpoise population at FCS is optimised, and that this may require management of human activities occurring in or around the site if they are likely to have an adverse impact on the site’s Conservation Objectives either directly or indirectly identified through the assessment process”.
48. JNCC and Natural England (2019) also state that “management measures are the responsibility of the relevant regulatory bodies, which consider the SNCBs” advice and hold appropriate discussions with the sector concerned, but the scale and type of mitigation is decided by the Regulators’.

5.3 Advice on Activities

49. JNCC and Natural England (2019) have provided advice on activities that specifically occur within or near to the SNS SAC site that could be expected to impact on site integrity. The key impacts and activities that JNCC and Natural England (2019) consider as having the greatest impact on the population of UK harbour porpoise and therefore the SNS SAC are:
- Commercial fisheries with by-catch of harbour porpoise;
 - Increased contaminants from discharge / run-off from land fill, terrestrial and offshore industries;
 - Increased anthropogenic underwater noise from shipping, drilling, dredging and disposal, aggregate extraction, pile driving, acoustic surveys, underwater explosion, military activity, acoustic deterrent devices and recreational boating;
 - Death or injury by collision with, shipping, recreational boating and tidal energy installations; and
 - Reduction in prey resources by commercial fisheries.
50. The aim is that the advice should help identify the extent to which existing activities are, or can be made, consistent with the Conservation Objectives, and thereby focus the attention of Relevant and Competent Authorities and surveillance programmes to areas that may need management measures (JNCC & Natural England, 2019).

6 Project Description

51. A full description of the Projects Design Envelope is presented in the Environmental Statement (ES) (see **Volume 7, Chapter 5 Project Description (application ref: 7.5)** and **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**). The project description will be updated in the final SIP as the final project design is confirmed at the pre-construction stage.
52. Both the Projects' Array Areas are located within SNS SAC summer area (**Figure 5-1**). The closest point to the DBS East Array Area is approximately 95km from the SNS SAC winter area and the closest point to the DBS West Array Area is approximately 84km from the SNS SAC winter area (see **Volume 6, RIAA (application ref: 6.1)**). There is also scope for an Electrical Switching Platform (ESP) to be located in the Offshore Export Cable Corridor, which could be located in the SNS SAC summer area or approximately 20km from the SNS SAC winter area at the closest point.

6.1 Project Commitments

53. The Applicants have committed to mitigation measures described in the **Outline MMMP (Revision 2)** [document reference: 8.25] and are summarised here. Additional mitigation methods that the Applicants are considering are presented in section 9. Any addition mitigation to be used for the Projects will be confirmed in the Final SIP:
 - Monitoring Area;
 - Marine Mammal Observers (MMObs);
 - Passive Acoustic Monitoring (PAM);
 - Acoustic Deterrent Device (ADD); and
 - Soft-Start and Ramp-Up.

7 Indicative Assessment for the Projects Alone

7.1 Approach to Assessment

54. The approach to the assessment for the potential disturbance of harbour porpoise in the SNS SAC winter area from underwater noise follows the current advice from the SNCBs (currently JNCC *et al.* 2020), that:
- Displacement of harbour porpoise should not exceed 20% of the relevant area of the site in any given day or on average exceed 10% of the relevant area of the site over a season.
 - The effect of the Projects should be considered in the context of the seasonal components of the SAC area, rather than the SAC area as a whole.
 - For monopiles, a distance of 26km (Effective Deterrent Radius; EDR) from an individual percussive piling location should be used to assess the area of SAC habitat that harbour porpoise may be disturbed from during piling operations for monopiles, with a potential disturbance area of 2,123.7km².
 - For pin-piles, or monopiles with noise abatement, a distance of 15km (EDR) from an individual percussive piling location should be used to assess the area of SAC habitat that harbour porpoise may be disturbed from during piling operations, with a potential disturbance area of 707.9km².
55. The JNCC *et al.* (2020) recommended EDRs are not equivalent to 100% deterrence / disturbance in the associated area (i.e. some animals show greater reaction than others) but nor do they represent the limit range at which effects have been detected.
56. The summer area is approximately 27,028km² and the summer period is from 1st April to 30th September (183 days). The winter area is approximately 12,696km² and the winter period is from 1st October to 31st March (182 days) (JNCC *et al.* 2020). The summer area is the only one of relevance for the Projects.
57. The seasonal averages are calculated by multiplying the average potential area of effect on any one day by the proportion of days within the season piling could occur (i.e. taking into account the average area of overlap with the summer area of the SNS SAC and number of piling days in that season). For example, a daily footprint of 19% for 95 days would result in an average of $19 \times 95 / 183$ days (summer) = 9.86% (JNCC *et al.* 2020).

58. The assessment to inform the final SIP for the Projects would take into account:
- Whether the piling would be by monopile or jacket pin pile;
 - Whether NAS would be used;
 - The number of piling locations in any one day⁵;
 - The distance between multiple piling locations in any one day; and
 - The number of days of piling activities in the winter and summer seasons.
59. It should be noted that when referring to the number of piling locations on any one day, the number of pile strikes, or the length of piling at each location, does not matter under these thresholds, as the thresholds refer to just the location of piling. This means that a pile installation that goes over midnight into a new day, would count as piling on two days.
60. The number of pile locations in a day, and the number of piling days required, would be considered together to inform a number of scenarios relating to number of piles per day and number of piling days (e.g. one pile location per day for 59 days, or two pile locations per day for 30 days). This is to ensure that the assessment under the seasonal threshold is not artificially inflated when considering the worst-case of both two piles per day and for 59 days. Contingency would be included within these scenarios to account for the potential for one pile location to be piled across multiple days, and the worst-case of all potential options would be taken forward for assessment.

7.2 Assessment of Likely Adverse Effects on Integrity

61. The estimated number of harbour porpoise and percentage of the North Sea MU reference population that could be disturbed as a result of underwater noise during piling at DBS East, West or the Offshore Export Cable Corridor (OECC) based on the site-specific (as worse case) density is presented in **Table 7-1**.

⁵ One day refers to one calendar day (i.e. midnight to midnight) to ensure noisy activities could be effectively assessed and managed across projects (if required)

62. For one piling event at a time, the potential impact for the 26km EDR for monopiles is 0.40% (or less) of the MU population anticipated to be affected and 7.86% of the SNS SAC summer area, and for the 15km EDR for jacket pin piles 0.13% or less of the reference population anticipated to be temporarily disturbed with 2.62% of the SNS SAC summer area disturbed (**Table 7-1**).

Table 7-1 Assessment of the Potential for Disturbance to Harbour Porpoise Based on the EDR Approach for Monopiles and Jacket Pin Piles, and for a Single Piling Events at DBS East or DBS West

EDR	Source	Assessment of effect	Potential adverse effect on site integrity
Monopiles (EDR – 26km, Impact area 2,123.7km ²)	DBS East	1274.2 (0.367% of the NS MU) (7.86% of SNS SAC summer area)	No Less than 5% of the population affected Less than 20% of the summer area
	DBS West	1401.6 (0.404% of the NS MU) (7.86% of SNS SAC summer area)	
	OECC	1401.6 (0.404% of the NS MU) (5.83% of SNS SAC summer area)	
Jacket pin piles (EDR – 15km, Impact area 706.9km ²)	DBS East	424.1 (0.122% of the NS MU) (2.62% of SNS SAC summer)	No Less than 5% of the population affected Less than 20% of the summer area
	DBS West	466.5 (0.134% of the NS MU) (2.62% of SNS SAC summer)	
	OECC	466.5 (0.134% of the NS MU) (2.62% of SNS SAC summer)	

63. The estimated number of harbour porpoise and percentage of the North Sea MU reference population, based on the worst case, that could be disturbed as a result of underwater noise during piling at DBS East and DBS West together is presented in **Table 7-2**.

64. For two simultaneous piling events, the potential impact for the 26km EDR for monopiles, is 0.81% (or less) of the reference population and 15.71% of the SNS SAC summer area. For the 15km EDR for jacket pin piles the potential impact is 0.40% of the reference population and 7.85% of the SNS SAC summer area (**Table 7-2**). Note that this does not assume any overlap between disturbance areas from the piling events and is therefore precautionary.

Table 7-2 Assessment of the Potential for Disturbance to Harbour Porpoise Based on the EDR Approach for Monopiles and Jacket Pin Piles, and for Simultaneous Piling Events

EDR*	Assessment of effect	Potential effect on site integrity
EDR of 26km for mono-piles, at two simultaneous locations (4,247.4km ²)	2,803.3 (0.81% of the NS MU) (15.71% of SNS SAC summer area)	No Less than 5% of the population affected Less than 20% of the summer area
EDR of 15km for jacket pin piles, at three simultaneous locations (2,120.6km ²)	1,399.6 (0.40% of the NS MU) (7.85% of SNS SAC summer area)	No Less than 5% of the population affected Less than 20% of the summer area

* Not taking into account any overlap between disturbance areas between the piling locations

8 Indicative Assessment of Potential In-Combination Effects

8.1 Approach to Assessing Potential In-Combination Effects

65. The approach to the in-combination assessment for the potential disturbance of harbour porpoise in the SNS SAC winter and summer areas from underwater noise would follow the current advice from the SNCBs (currently JNCC *et al.* 2020), that:
- For high-order UXO clearance, a distance of 26km (EDR) should be used to assess the area of SAC habitat that harbour porpoise may be disturbed from during a clearance event, with a potential disturbance area of 2,123.7km².
 - For high-order UXO clearance with a bubble curtain, a distance of 15km (EDR) (JNCC, 2023) should be to assess the area that harbour porpoise may be disturbed from, with a potential disturbance area of 706.9km².
 - For low-order UXO clearance (e.g. deflagration), a distance of 5km (EDR) (JNCC, 2023) should be to assess the area that harbour porpoise may be disturbed from, with a potential disturbance area of 78.5km².
 - For seismic surveys, a distance of 12km (EDR) from the source location should be used to assess the area of SAC habitat that harbour porpoise may be disturbed from, with a potential disturbance area of 452.4km². For seismic surveys, it should be considered as a moving noise source, rather than a stationary one, and therefore the distance a survey could be undertaken on, over a day, should be considered as the source of disturbance, and a buffer of 12km applied to that distance.
 - For geophysical surveys (such as those associated with construction works), a distance of 5km (EDR) (JNCC, 2023) from the source location should be used to assess the area of SAC habitat that harbour porpoise may be disturbed from, with a potential disturbance area of 78.5km². As for seismic surveys, geophysical surveys should be considered as a moving source, and the distance that could be surveyed in one day taken into account.
66. The JNCC *et al.* (2020) recommended EDRs are not equivalent to 100% deterrence / disturbance in the associated area (i.e. some animals show greater reaction than others) but nor do they represent the limit range at which effects have been detected.

67. The summer area is 27,028km² and the summer period is from 1st April to 30th September (183 days). The winter area is 12,696km² and the winter period is from 1st October to 31st March (182 days) (JNCC *et al.* 2020). Both the summer and the winter area are of relevance for the Projects.
68. The seasonal averages are calculated by multiplying the average potential area of effect on any one day by the proportion of days within the season piling could occur (i.e. taking into account the average area of overlap with the summer area of the SNS SAC and number of piling days in that season). For example, a daily footprint of 19% for 95 days would result in an average of $19 \times 95 / 183$ days (summer) = 9.86% (JNCC *et al.* 2020).
69. The number of harbour porpoise that could be disturbed is based on the latest density estimates from the SCANS-IV survey (Gilles *et al.* 2023). The reference population for harbour porpoise is the North Sea MU. Currently the population estimate for the harbour porpoise North Sea MU is 338,918 (coefficient of variation (CV) = 0.17; 95% Confidence Level (CL) = 243,063 – 476,203; Gilles *et al.* 2023).

8.2 Indicative Assessment of Potential In-Combination Effects

70. There is the potential for in-combination effects from underwater noise with other schemes and activities during piling at the Projects to disturb harbour porpoise in both the SNS SAC summer and winter areas.
71. The approach to the in-combination assessments for the disturbance of harbour porpoise follows the current advice from the SNCBs (JNCC *et al.* 2020), using the recommended EDRs for activities that could generate underwater noise.
72. The in-combination assessment is based on both the Projects being constructed at the same time, as the worst case scenario. If only DBS East or DBS West were to be developed, all potential in-combination effects would be less than those assessed.
73. The in-combination assessments are based on the maximum potential overlap with SNS SAC summer and winter areas based on 26km EDR at closest point for the Projects.
74. For the potential in-combination scenarios, other noise generating activities where there is a high likelihood that the activity could occur at the same time as piling at the Projects would be determined. This is to ensure that the SIP provides a realistic in-combination assessment for the activities that could be occurring at the same time.

75. The approach to the in-combination assessments is based on a precautionary approach to determine the worst case scenario for piling and / or other activities that could result in underwater noise and the potential disturbance of harbour porpoise in the SNS SAC. As previously outlined, the in-combination assessment would be reviewed and updated as the SIP is developed, and more information is available on the schedules for other projects and activities.
76. Activities and other noise sources considered for in-combination effects of underwater noise which could disturb harbour porpoise currently include:
- Piling at offshore wind farms (OWFs), including the Projects;
 - Other construction activities at OWFs (vessels, cable installation works, dredging, seabed preparation and rock placement);
 - Geophysical surveys for other OWFs;
 - Seismic surveys; and
 - UXO clearance (other than for the Projects).
77. The potential piling period for the Projects has been based on the widest likely range of offshore construction and piling dates, dependent on the construction scenario, as a very precautionary approach. It should be noted that while the schemes included within the assessment have the potential to overlap with the Projects, there is a lot of uncertainty on when OWFs could be piling. This assessment is therefore considered worst-case (presented in **Table 8-1**).
78. Under the SNCB guidance for assessing the potential for effect from disturbance as a result of piling, it is important to consider schemes that have the potential for disturbance effects to overlap with the summer area of the SNS SAC. Therefore, OWF schemes that are either within the summer area of the SNS SAC, or within 26km considered in the assessment, and based on the in-combination screening, are:
- Hornsea Project Four is within the summer area.
 - Hornsea Project Three is within 26km of the summer area.
 - East Anglia ONE North is within the winter area, and partly within the summer area.
 - Outer Dowsing is partly within the summer area.
 - Sheringham Shoal Extension Project (SEP) is within 26km of the summer and winter area.
 - Dudgeon Extension Project (DEP) is within 26km of the summer and winter area.

79. The assessments for all OWFs are based on the worst-case for piling of monopiles with no noise abatement or reduction (26km EDR).
80. Other noisy activities to be considered for the in-combination assessment are:
 - Up to one geophysical surveys at any one time;
 - Up to two seismic surveys; and
 - Up to two UXO clearance events (assuming one high order and one low order or high order with bubble curtain).
81. Note that the above three listed activities have much shorter lead-in times than offshore wind piling, and therefore it is not possible to determine whether and how many (if any) have the potential to be undertaken at the same time as piling at the Projects. These activities would be included within the In Principle SIP to ensure a worst case scenario is considered, however, a review of the applied for and consented activities at time of SIP finalisation would be conducted, and only those activities that have either been applied for or consented at the time of submission would be considered. It is assumed that any activity that may be applied for after that point would be effectively managed by the MMO to ensure the thresholds are not breached. The UXO clearance is included as low-order, or high-order with bubble curtains only, as current guidance states this is the method that should be used (unless not possible).
82. The potential in-combination effect of all noisy activities that has the potential to happen at the same time as DBS East and / or DBS west in the SNS SAC is presented in **Table 8-1**.

Table 8-1 Quantitative assessment for all noisy activities with the potential for in-combination disturbance effects for harbour porpoise

Potential in-combination effect	Maximum number of individuals potentially disturbed (% of reference population)	Potential in-combination effect area (km ²)	Spatial impact area of the SNS SAC	Seasonal effect of the SNS SAC
DBS East	1,279.9 (0.37% of the NS MU)	2,123.7km ²	7.59%	2.11%
DBS West	1,401.6 (0.40% of the NS MU)	2,123.7km ²	7.59%	2.11%

Potential in-combination effect	Maximum number of individuals potentially disturbed (% of reference population)	Potential in-combination effect area (km ²)	Spatial impact area of the SNS SAC	Seasonal effect of the SNS SAC
Piling at other OWFs	11,996.8 (3.46% of the NS MU)	1,175.81km ²	16.98%	7.87%
One Geophysical surveys	612.4 (0.18% of the NS MU)	1,113.5km ²	4.12%	4.12%
Two Seismic surveys	3,197.0 (0.92% of the NS MU)	5,812.8km ²	10.86%	10.86%
UXO clearance (HO)	1,168.0 (0.33% of the NS MU)	2,123.7km ²	7.86%	7.86%
UXO clearance (LO)	43.2 (0.014% of the NS MU)	78.5km ²	0.29%	0.29%
Total number of individuals with DBS East	18,297.3 (5.3% of the NS MU)	12,428.01km²	47.7%	33.1%
Total number of individuals with DBS West	18,419.0 (5.4% of the NS MU)	12,428.01km²	47.7%	33.1%
Total number of individuals with Projects together	19,689.8 (5.8% of the NS MU)	14,551.71km²	55.3%	35.2%

83. There is the potential for the thresholds to be breached, and therefore, the development of the SIP for the Projects and SIPs for other OWF schemes would be required to deliver the appropriate mitigation and management measures across projects and management by the MMO, to ensure that there would be no significant disturbance and no AEOL of the SNS SAC in relation to the conservation objectives for harbour porpoise.

9 In Principle Management and Mitigation Measures

84. This section of the In Principle SIP outlines the measures currently available, or likely to be available in the future, which could be applicable to reduce the in-combination effects of underwater noise disturbing harbour porpoise in the SNS SAC during pile driving at the Projects.
85. For each of the measures, information would be provided in the final SIP to detail how the measure would result in the avoidance of significant disturbance to harbour porpoise, and hence allow the conclusion of 'no adverse effect' on the SNS SAC. The final SIP would also provide details of measures that would not be implemented with justification.
86. It should be noted that the following factors need to be considered and taken into account in the final SIP:
- The SNS SAC management measures are currently unavailable;
 - The final design parameters for the Projects have not yet been determined, and the **Volume 6, RIAA (application ref: 6.1)** was based on the predicted worst case scenario;
 - The final design and programme of other schemes has not yet been determined, and therefore the actual in-combination scenario is currently unknown; and
 - Potential strategic management measures such as scheduling of pile driving (section 9.4) would need to be carefully managed to achieve a coordinated approach with other developers. The mechanism for managing activities is currently being developed by the MMO as part of the SNS Regulators Forum which includes the SNS activity tracker (DESNZ, 2024a).
87. The adopted Project measures would be agreed and secured in the period between consent and the commencement of piling, following an updated assessment of the potential impacts and an assessment of the efficacy of proposed management measures.
88. Potential measures are outlined in this section of the In Principle SIP, however, as previously noted, confirmation of any measure(s) that would be employed cannot be confirmed until project design parameters are finalised, and the management measures are known for the SNS SAC. At that point, it would be clear what any required measures would be seeking to achieve in terms of mitigation.
89. Potential mitigation that could be delivered by the Projects management measures include:

- Spatial: Minimising the total area of ‘significant disturbance’ at any one time. This could be a reduction in the area of the SNS SAC which is subject to noise levels that may cause significant disturbance to harbour porpoise; and / or
- Temporal: Minimising the duration of additional underwater noise generated through UXO clearance and piling events over any given time frame that may cause ‘significant disturbance’ to harbour porpoise in the North Sea MU or the SNS SAC.

9.1 Measure 1: Seasonal and Spatial Restriction

90. Due to the potential location of the ESP in the Offshore Export Cable Corridor, it may be possible to ensure there is no potential for significant disturbance (or AEOI) within the winter area of the SNS SAC by ensuring no piling in the Offshore Export Cable Corridor is undertaken in the winter season (October to March inclusive). This would need to be managed alongside any other seasonal restriction in place for piling activities (e.g. for fish species).
91. There will be no installation of monopiles in the Offshore Export Cable Corridor (the ESP) concurrently with monopile installation at either of the Array Areas.

9.2 Measure 2: Different Foundation Types and Installation Methods

92. The use of different foundation types and installation methods within the consented Project Envelope, such as gravity base structure foundations (for the potential ESP only), drilling, water jetting, vibro-piling, Blue piling, and / or electro-osmosis, would be considered and assessed during the final design of the Projects. This would include consideration of relevant technologies or methodologies, based on technical feasibility and commercial availability. This would be informed by pre-construction site investigation and future technology developments. If possible, the use of foundation types and / or installation methodologies other than pile driving could result in lower noise levels during the construction of the wind farms.
93. Developments are on-going in relation to various methods (such as double walled piles), which also have the potential to greatly reduce the area of potential disturbance from pile driving.

9.3 Measure 3: Noise Mitigation Systems

94. Noise mitigation systems are currently being developed and improved that enable a reduction of pile driving noise (decibels) at source. These methods currently include various types of bubble curtain, hydro-sound dampers, screens or tubes.
95. A reduction in the noise at source would reduce the total area of potential disturbance to harbour porpoise. However, it should also be noted that many of these measures may increase the total duration of disturbance from underwater noise during foundation installation and this should be a consideration in an assessment of their efficacy.
96. The mitigation measure(s) (or suite of measures including Noise Abatement Systems) that may be implemented during the construction of the Projects will be determined in consultation with the regulator and relevant statutory nature conservation bodies. Any requirement for noise mitigation, or not as the case may be, shall be determined following confirmation of final hammer energies and foundation types, collection of additional survey data (e.g. geophysical data), and/or acquisition of noise monitoring data, the update of the project and location specific noise model(s) including information on maturation of emerging technologies.
97. It should be noted that suitability of any noise mitigation system would be dependent on a number of factors including pile diameter and length, ground conditions, environmental conditions, and water depth. These factors would be considered in any assessment of the efficacy of the measure. The information to inform this selection would be contingent on the selection of the chosen foundation type and supplier which would only be available once contracts are being finalised post consent.

9.4 Measure 4: Scheduling of Pile Driving within the Projects

98. Subject to the final design and programme of DBS East and / or DBS West, refinement of the piling programme could potentially allow a reduction in the total area of disturbance from the Projects, if required. Measures that could be considered include limiting the number of piles installed per day, limiting the distance between any piles that are installed on the same day, ensuring piling is not undertaken at both the Projects on the same day, and / or limiting the number of piling days within the summer season. This would reduce the area of the SNS SAC that harbour porpoise may be displaced from on any one day. It could also be used as a measure to reduce the duration of any disturbance within the summer season or year.

99. The DBS East and DBS West Array Areas are both located in the SNS SAC summer area but are not located within the SNS SAC winter area, however, based on a 26km EDR for monopiles (without mitigation), there is the potential for the disturbance area to overlap with the SNS SAC. Therefore, the location and season in which piling is undertaken would be considered to reduce the potential impacts on the seasonal areas.

9.5 Measure 5: Scheduling of Pile Driving with other Projects

100. Subject to the final design and programme of the Projects alongside other offshore wind farms, and the potential for other management measures, refinement of the piling programme could potentially allow a reduction in the total in-combination area of disturbance from multiple projects, if required. Management could also include the limiting of piling on the same day as certain other activities. This would reduce the area of the SNS SAC that harbour porpoise may be displaced from at any one time. It could also be used as a measure to reduce the duration of any in-combination continuous disturbance within a given time period (month, season or year).

9.6 Measure 6: Scheduling of UXO Clearance with other Projects

101. Subject to the final design and programme of the Projects UXO clearance alongside other activities such as piling, and the potential for other management measures, refinement of the noisy activity programme could potentially allow a reduction in the total in-combination area of disturbance from multiple projects, if required. Management could also include the limiting of piling and high-order detonation on the same day. This would reduce the area of the SNS SAC that harbour porpoise may be displaced from at any one time. It could also be used as a measure to reduce the duration of any in-combination continuous disturbance within a given time period (month, season or year).
102. Seasonal considerations for pile driving and UXO clearance may be applicable to other projects in order to restrict pile driving or UXO clearance to a season in which harbour porpoise are less reliant on part of the seasonal area of the Southern North Sea SAC.

9.7 Measure 7: Clustering of UXO Devices

103. The ability to cluster UXO devices will limit the total potential area of disturbance and the potential cumulative noise exposure that would otherwise result from successive detonations of UXO devices in discrete areas. If it is possible (and safe to do so), UXO could be detonated together in one area, once they have been clustered. This will be considered as an option when the UXO ML is submitted.

9.8 Measures Not Applicable

104. The SNS SAC winter area restrictions are not applicable as the Projects' Array Areas are over 26km from the winter area. Changes in the location of wind turbines or Offshore Platforms are not included in the SIP as a potential project mitigation or management measure. As the Projects are located entirely within the SNS SAC summer area, it is not possible to relocate wind turbines to locations outside the SNS SAC, or to maximise distance from the SNS SAC boundary.

9.9 Other Potential Measures

105. Given the time lag between consent and the start of offshore construction, it is possible that new measures would become available. As such, the final SIP would not be restricted only to potential measures outlined above. Rather, the SIP allows the consideration and assessment of other relevant technologies or methodologies that may have emerged by the time of offshore construction. This would ensure that any new technologies or methods that may be developed could be used during construction of the Projects.

9.10 Other Potential Mitigation Measures outside the Scope of the SIP

106. The project measures outlined in the SIP are in addition to the following mitigation secured within the **Outline MMMP (Revision 2)** [document reference: 8.25] (summarised in section 6.1).
107. Embedded mitigation (i.e. those measures that have been incorporated into the design of the development to prevent or reduce any significant adverse effects) would include soft-start and ramp-up of piling activity in order to minimise potential impacts on physical and auditory injury. Appropriate mitigation measures considered adequate to exclude marine mammals from within a mitigation zone will be implemented prior to piling, to reduce the risk of any PTS.
108. The MMMP for piling will detail the proposed mitigation measures to reduce the risk of any physical or permanent auditory injury to marine mammals during all piling operations. This will include details of the embedded mitigation, for the soft-start, ramp-up and Monitoring Area (MA), as well as details of any further mitigation that could be required.
109. The final MMMP for piling will be developed in the pre-construction period and will be based upon best available information and methodologies at that time in consultation with the relevant authorities.

110. A detailed MMMP will also be prepared for UXO clearance. The MMMP for UXO clearance will ensure there are effective mitigation measures to prevent the risk of any physical or permanent auditory injury to marine mammals, if UXO clearance is required. The MMMP for UXO clearance would be developed in the pre-construction period, when there is more detailed information on what UXO clearance could be required and what the most suitable mitigation measures are, based upon best available information and methodologies at that time, in consultation with the relevant authorities.
111. Mitigation for cumulative disturbance impacts will be discussed with the MMO and other relevant bodies, and options will be outlined within the SIP, where relevant.

9.11 Assessment of Efficacy of Measures and Implementation

112. Prior to the potential implementation of project mitigation or management measures, an assessment of the ability of each measure (alone or in conjunction with other measures) would be required to ensure the approach is able to contribute to a reduction in disturbance to harbour porpoise within the SNS SAC. The assessment is expected to include a degree of likely confidence in each measure.
113. The Applicants would work with the MMO and other consultees to ensure that any approach to such assessment is done in timely manner, and using the most robust approach possible.
114. Following assessment of project mitigation and management measures, The Applicants would work with the MMO to develop a timescale for the delivery of any measures, an implementation plan, as well as agreeing any reporting or monitoring requirements. The implementation plan would include the approach to enforcement of the measures, and how any failures would be rectified.

9.12 Population Modelling

115. If required, population modelling, such as Population Consequences of Disturbance (PCoD) or Disturbance Effects of Noise on the Harbour Porpoise Population in the North Sea (DEPONS), could be considered in developing the final SIP. Population modelling would allow consideration of the biological fitness consequences of disturbance from underwater noise, and the conclusions of a quantitative assessment to be put into a population level context.

10 Finalisation of the SIP

116. This In Principle SIP is based on the most appropriate potential mitigation and management measures, taking into account the current requirements, guidance, knowledge and proven available technology. This In Principle SIP provides a summary of measures that could be undertaken to ensure there is no AEOL of the SNS SAC but is not intended to provide an exhaustive list of potential measures, as other options may become available at the time of finalisation.
117. Within the final SIP, The Applicants would provide an up to date in-combination assessment using the most recent information on other schemes' planned programmes in order to inform the final assessment. This would include consideration of all data provided through both the Regulators SNS Activity Tracker (DESNZ, 2024b) and the Developers Activity Tracker shared between the key offshore wind farms within (or within 26km of) the SNS SAC. The Applicants are willing to liaise directly with other offshore wind farm schemes to ensure the best information and most accurate detail is used to inform these assessments.

11 Marine Wildlife Licence

118. A Marine Wildlife Licence for EPS would be sought from the MMO, supported by a detailed risk assessment of the potential risk to harbour porpoise (and any other EPS deemed necessary at the time of application), based on the finalised project parameters and piling schedule / details.

12 Additional Marine Licence/s

119. Any requirements to implement noise abatement technology could be subject to additional marine licensing processes, as required.

13 Summary

120. The final SIP would be used to identify and assess any potential management or mitigation measures that could ensure 'no adverse effect' on the SNS SAC for the significant disturbance of harbour porpoise based on the final design of DBS East and / or DBS West. The final SIP would also be used to record all consultation on the proposed project management or mitigation measures it contains.

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