East Anglia TWO Offshore Windfarm

Information to Support Appropriate Assessment – Addendum for Marine Mammals

Applicant: East Anglia TWO Limited
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Applicable to East Anglia TWO

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Glossary of Acronyms

ADD	Acoustic Deterrent Device
AEoI	Adverse Effect on Integrity
EDR	Effective Deterrent Radius
EPS	European Protected Species
EU	European Union
FCS	Favourable Conservation Status
HRA	Habitat Regulations Assessment
IAMMWG	Inter-Agency Marine Mammal Working Group
ISAA	Information to Support Appropriate Assessment
JNCC	Joint Nature Conservation Committee
MMMP	Marine Mammal Mitigation Protocol
MU	Management Unit
NS	North Sea
PTS	Permanent Threshold Shift
SAC	Special Area of Conservation
SIP	Site Integrity Plan
SNCB	Statutory Nature Conservation Body
SNS	Southern North Sea
UK	United Kingdom of Great Britain and Northern Ireland
UXO	Unexploded ordnance

Glossary of Terminology

Applicant	East Anglia TWO Limited
Construction, operation and maintenance platform	A fixed offshore structure required for construction, operation, and maintenance personnel and activities.
Development area	The area comprising the Indicative Onshore Development Area and the Offshore Development Area
East Anglia TWO project	The proposed project consisting of up to 75 wind turbines, up to four offshore electrical platforms, up to one offshore construction, operation and maintenance platform, inter-array cables, platform link cables, up to one operational meteorological mast, up to two offshore export cables, fibre optic cables, landfall infrastructure, onshore cables and ducts, onshore substation, and National Grid infrastructure.
East Anglia TWO windfarm site	The offshore area within which wind turbines and offshore platforms will be located.
HRA	Habitat Regulations Assessment is a recognised step by step process which helps determine likely significant effect and (where appropriate) assesses any adverse effects on the integrity of Natura 2000 sites protected under the Birds or Habitats Directives
Likely Significant Effect	Checking for the likelihood of significant effects on Natura sites is a part of HRA. Unless a significant effect can be ruled out, it is considered 'likely' and requires appraisal.

1 Introduction

1.1 Requirement for Addendum

1. In the Information to Support Appropriate Assessment (ISAA) Report (APP-043), the assessments for the spatial and seasonal averages for the Southern North Sea (SNS) Special Area of Conservation (SAC) were based upon an interpretation of guidance which is now superseded. The latest guidance (JNCC et al. 2020) has implications for the assessments which were raised by Natural England in their Relevant Representation (RR-059). The following part of the guidance is relevant:

   "*Noise disturbance within an SAC from a plan/project individually or in combination is significant if it excludes harbour porpoise from more than:*

   1. 20% of the relevant area of the site in any given day, and

   2. an average of 10% of the relevant area of the site over a season"

2. The Applicant interpreted this guidance to mean 'at any one time' rather than 'in any given day (in line with the formulation in previous iterations of the guidance).

3. In their first Written Questions (Question 1.2.28), the Examining Authority asked if the Applicant could update the relevant sections of the ISAA Report to reflect this, therefore, the assessments have been revised to address this in this addendum.

1.2 Southern North Sea SAC Conservation Objectives

4. As outlined in ***section 5.3.1*** of the ISAA report (APP-043), 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.

5. The Conservation Objectives for the site are (JNCC and 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.

Conservation Objective 1: Harbour porpoise is a viable component of the site

6. The intent of this Conservation Objective is 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. The Conservation Objectives state that, with regard to assessing impacts, '*the reference population for assessments against this objective is the Management Unit (MU) population in which the SAC is situated (Inter-Agency Marine Mammal Working Group (IAMMWG) 2015)*".

7. Harbour porpoise are considered to be a *viable component of the site* if they are able to live successfully within it. As this SAC has been selected primarily for its long term preferential use by harbour porpoise in contrast with other areas of the North Sea, with the implication being that it provides relatively good habitat for foraging, and may also be used for breeding and calving (JNCC and Natural England 2019).

8. Harbour porpoise are listed as European Protected Species (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 deemed an offence if harbour porpoise are deliberately disturbed in such a way as to:

   a) Impair their ability to survive, to breed or reproduce, or to rear or nurture their young; or

   b) To affect significantly the local distribution or abundance of that species.

9. 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*'.

Conservation Objective 2: There is no significant disturbance of the species

10. Disturbance of harbour porpoise typically originates from operations that cause underwater noise including seismic surveys, pile driving and sonar. Responses to noise can 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 individual's potential usage of the site is maintained.

11. 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 Statutory Nature Conservation Body (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:*

1. 20% of the relevant area[1] of the site in any given day[2], or

2. an average of 10% of the relevant area of the site over a season[3][4]".

Conservation Objective 3: The condition of supporting habitats and processes, and the availability of prey is maintained.

12. 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.

[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 Habitats Regulation Assessment 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 19x95/183 days (summer) =9.86%

13. 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.

2 Project Commitments

14. The Project commitments in ***section 5.2.2.1*** of the ISAA Report (APP-043) have been amended following responses post-submission, including Natural England's (RR-059).

15. The potential for any lethal effects, physical injury or auditory injury (including Permanent Threshold Shift (PTS)), associated with underwater noise will be mitigated through the Marine Mammal Mitigation Protocol (MMMP) which will ensure this is not a risk for marine mammals. A draft MMMP has been submitted with the DCO application (APP-591) and separate final MMMPs for unexploded ordnance (UXO) clearance and piling will be produced post-consent in accordance with the draft MMMP. The overriding purpose of the MMMPs for both piling works and for UXO clearance is to provide mitigation for the potential to kill or injure marine mammals during such activities.

16. In addition to the MMMP, an In-Principle East Anglia TWO SNS SAC Site Integrity Plan (SIP) (APP-594) has been submitted with the DCO application. This document sets out the approach for the Applicant to deliver the required mitigation measures for the proposed East Anglia TWO project to ensure the avoidance of Adverse Effect on Integrity (AEoI) to the designated features of the Southern North Sea SAC in-combination with other projects, in relation to the Conservation Objectives for harbour porpoise.

17. The Applicant has also committed to the following in order to reduce the potential for significant disturbance of harbour porpoise in relation to the Conservation Objectives and current guidance for the SNS SAC. These commitments apply to the project alone case as well as in-combination with other projects:

    - Only one detonation at a time during UXO clearance operations in the offshore development areas. There would be no simultaneous UXO detonations in either season. In the summer period in the summer area potentially more than one UXO detonation could occur in a 24 hour period. In the winter period in the winter area, only one UXO detonation **without mitigation** could occur in a 24 hour period.
    - There would be no concurrent piling within the offshore development area in either season, with only one pile being installed at a time, with no overlap in the piling duration of any two piles. In the summer period in the summer area potentially more than one piling event could occur in a 24 hour period. In the winter period in the winter area, only one piling event **without mitigation** could occur in a 24 hour period.

- During the winter period there would be no UXO detonation **without mitigation** in the offshore development area in the same 24 hour period as any piling **without mitigation** in the offshore development area.
- There would be no concurrent piling or UXO clearance between the proposed East Anglia TWO and East Anglia ONE North projects in either season.

3 Revised Assessments for Potential Effects on Southern North Sea SAC

3.1 Introduction

18. ***Section 3.2*** provides the updated project alone assessments for the Project. Only the affected parts of the assessment (i.e. those related to UXO clearance and piling) are presented. The in-combination assessment is not presented as this is not affected by the project-alone changes; the in-combination assessment concludes that additional mitigation through the SIP is needed to avoid an AEoI of the SNS SAC and this is unchanged by the updates presented in this addendum.

3.2 East Anglia TWO Project Alone

3.2.1 Potential disturbance during UXO clearance

19. The current SNCBs guidance (JNCC et al. 2020) is that an Effective Deterrent Radius (EDR) of 26km (approximate area of 2,124km^2) around UXO detonations is used to assess the area that harbour porpoise could be disturbed in the SNS SAC. This approach has been used in this assessment, taking into account the potential maximum and average area of possible disturbance of harbour porpoise from the SNS SAC seasonal areas, based on the worst-case scenario (i.e. the maximum area of overlap of the EDR with the SNS SAC) for UXO clearance at East Anglia TWO (***Table 3.1***).

20. As outlined in the revised project commitments (***section 2***):

- Only one UXO would be detonated at a time during UXO clearance operations in the offshore development area. There would be no simultaneous UXO detonations. In the summer period in the summer area potentially more than one UXO detonation could occur in a 24 hour period. In the winter period in the winter area, only one UXO detonation **without mitigation** could occur in a 24 hour period.

3.2.1.1 Spatial assessment

21. Disturbance of harbour porpoise would not exceed 20% of the seasonal component of the SNS SAC area in any given day during UXO clearance at East Anglia TWO (alone), based on the worst-case scenario (***Table 3.1***). Therefore, under these circumstances, **there is no significant disturbance and no potential AEoI of the SNS SAC in relation to the conservation objectives for harbour porpoise**.

22. Given the spatial footprint of a single UXO clearance event, for the revised assessments in this addendum, the option for more than one UXO detonation in

the same 24 hour period in the winter area during the winter period has been removed, unless it can be demonstrated that effective mitigation can be provided. The SIP will therefore cover the project-alone case for multiple UXO clearance events in the winter if it is determined that this option is necessary.

Table 3.1 Estimated Area of SNS SAC Winter and Summer Areas that Harbour Porpoise Could Potentially be Disturbed from During UXO Clearance at East Anglia TWO

UXO clearance	Maximum potential overlap with SNS SAC	Minimum potential overlap with SNS SAC	Average potential overlap with SNS SAC	Potential AEoI
UXO detonation in East Anglia TWO offshore development area	2,124km^2 (approximately 17%) in the winter area 45km^2 (approximately 0.2%) in the summer area	2,042km^2 (approximately 16%) in the winter area 0km^2 (approximately 0%) in the summer area	2,083km^2 (approximately 16%) in the winter area 23km^2 (approximately 0.1%) in the summer area	**No** Temporary effect. Disturbance of harbour porpoise would not exceed 20% of the seasonal component of the SNS SAC area *in any given day* during UXO clearance at East Anglia TWO (alone), based on the worst-case scenario.

3.2.1.2 Seasonal averages

23. Disturbance from any UXO detonations would be temporary and for a short-duration (i.e. the detonation). For the estimated worst-case it is predicted that there could be up to 80 clearance operations in the offshore development area. As a precautionary worst-case scenario, the maximum number of days of UXO clearance could be up to 80 days, based on one detonation per day within the overall UXO clearance operation, which could be conducted over several months.

24. The seasonal averages have been calculated by multiplying the average of the minimum and maximum effect on any one day by the proportion of days within the season on which UXO clearance could occur (i.e. taking into account the average area of overlap with SAC seasonal areas and number of UXO clearance days per season). The seasonal averages have been based on the worst-case scenario that all detonations could occur in the same season. The summer season is assumed to be 183 days (April-September) and the winter season is assumed to be 182 days (October-March).

25. The seasonal average assessment indicates, less than 10% (up to a maximum of 7%) of the seasonal component of the SNS SAC over the duration of that season could be affected during UXO clearance at East Anglia TWO offshore development area (alone), based on the worst-case scenario of one detonation per day for 80 days in one season (***Table 3.2***). Therefore, under these circumstances, there would be **no significant disturbance and no potential AEoI of the SNS SAC in relation to the conservation objectives for harbour porpoise**.

26. As outlined above, only one UXO would be detonated at a time during UXO clearance operations in the East Anglia TWO offshore development area. There would be no simultaneous UXO detonations. In the summer period in the summer area potentially more than one UXO detonation could occur in a 24 hour period. In the winter period in the winter area, only one UXO detonation **without mitigation** could occur in a 24 hour period.

27. Therefore, for the revised assessments in this addendum, the option for more than one UXO detonation in the same 24 hour period in the winter area during the winter period has been removed, unless it can be demonstrated that effective mitigation can be provided. The SIP will therefore cover the project-alone case for multiple UXO clearance events in the winter.

28. The assessment concludes that less than 10% (approximately 0.04%) of the summer area of the SNS SAC over the duration of the summer season could be affected during UXO clearance in the offshore development area (alone), based on two detonations per day for 40 days and average disturbance area in the SAC summer area for two UXO (46km^2) (***Table 3.2***). Therefore, under these circumstances, there would be **no significant disturbance and no potential AEoI of the SNS SAC in relation to the conservation objectives for harbour porpoise**.

Table 3.2 Estimated Seasonal Area Averages for the SNS SAC Winter and Summer Areas during UXO Clearance at East Anglia TWO

UXO clearance	Number of UXO clearance days per season	Average area within SNS SAC seasonal areas	Estimated seasonal area average	Potential AEoI
UXO detonations in the offshore development area	**One detonation per 24 hour period**			**No** Temporary effect. Disturbance of harbour porpoise would not exceed 10% of the seasonal
	80 days	Winter area = 16% Summer area = 0.1%	Winter area = 7% Summer area = 0.04**%**	
	Two detonations per 24 hour period			

UXO clearance	Number of UXO clearance days per season	Average area within SNS SAC seasonal areas	Estimated seasonal area average	Potential AEoI
	40 days	Summer area = 0.2% Winter area = n/a without mitigation	Summer area = 0.04**%** Winter area = n/a without mitigation	component of the SNS SAC over the duration of that season during UXO clearance at East Anglia TWO (alone)

3.2.2 Potential disturbance during piling

3.2.2.1 Spatial assessment

29. The current SNCBs recommendation is that an EDR of 26km (approximate area of 2,124km^2) around pile locations is used to assess the area that harbour porpoise could be disturbed in the SNS SAC (JNCC et al. 2020). This approach has been used in this assessment, taking into account the potential maximum and average area of possible disturbance of harbour porpoise from the SNS SAC seasonal areas, based on the worst-case scenario during piling (i.e. the maximum area of overlap of the EDR with the SNS SAC) at East Anglia TWO (***Table 3.3***).

30. There will be no concurrent piling at the East Anglia TWO windfarm site (i.e. only one pile will be installed at a time, with no overlap in the piling duration of any two piles). Therefore, the potential effects have been assessed for single pile installation only. Given the spatial footprint of a single piling event, for the revised assessments in this addendum, the option for more than one piling event in the same 24 hour period in the winter area during the winter period has been removed, unless it can be demonstrated that effective mitigation can be provided. The SIP will therefore cover the project-alone case for multiple piling events in the winter.

31. Disturbance of harbour porpoise would not exceed 20% of the seasonal component of the SNS SAC area *in any given day* during piling at East Anglia TWO (alone), based on the worst-case scenario (***Table 3.3***). Therefore, under these circumstances, **there is no significant disturbance and no potential AEoI of the SNS SAC in relation to the conservation objectives for harbour porpoise**.

Table 3.3 Estimated Area of SNS SAC Winter and Summer Areas that Harbour Porpoise Could Potentially be Disturbed from During Piling at East Anglia TWO

Piling	Maximum potential overlap with SNS SAC	Minimum potential overlap with SNS SAC	Average potential overlap with SNS SAC	Potential AEoI
Single pile installation in the East Anglia TWO windfarm site	2,124km^2 (approximately 17%) in the winter area 45km^2 (approximately 0.2%) in the summer area	2,042km^2 (approximately 16%) in the winter area 0km^2 (approximately 0%) in the summer area	2,083km^2 (approximately 16%) in the winter area 23km^2 (approximately 0.1%) in the summer area	**No** Temporary effect. Disturbance of harbour porpoise would not exceed 20% of the seasonal component of the SNS SAC area *in any given day* during piling at East Anglia TWO (alone), based on the worst-case scenario.

3.2.2.2 Seasonal averages

32. The seasonal averages have been 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 SAC and number of piling days per season). The summer season is assumed to be 183 days (April-September) and the winter season is assumed to be 182 days (October-March).

33. The maximum piling duration for the proposed East Anglia TWO project would be up to 938 hours (equivalent of up to 39.2 days) based on the worst-case scenario. The example for ADD activation, based on up to 10 minutes per pile, would be up to 57.3 hours (up to 2.4 days) for 344 pin-piles. Therefore, the duration of potential disturbance, based on the worst-case scenario for the installation of wind turbines with pin-piles, five platforms with pin-piles and 10 minute ADD activation per pile, could be up to 41.6 days of active piling.

34. The seasonal averages have been based on the precautionary approach that all 41.6 days of active piling and related disturbance could occur in a single season.

35. The assessments indicate, based on the maximum potential duration of disturbance (piling, soft-start, ramp-up and ADD activation), less than 10% (up to 3.66%) of the seasonal component of the SNS North Sea SAC over the duration of that season could be affected during piling and ADD activation at East Anglia TWO (alone), based on the worst-case scenario of up to 41.6 days in one season and average area of overlap (***Table 3.4***). Therefore, under these circumstances,

there would be **no significant disturbance and no potential AEoIof the SNS SAC in relation to the conservation objectives for harbour porpoise**.

36. In addition, as a very precautionary approach, an additional assessment has now been added based on up to 77 days for 75 turbine foundation installations and related disturbance plus two days recovery could occur in a single season. This has been added following the recent HRA undertaken as part of the review of consented offshore wind farms in the SNS SAC (BEIS 2020), which used a similar approach. Under these circumstances (***Table 3.4***), there would also be **no significant disturbance and no potential AEoI of the SNS SAC in relation to the conservation objectives for harbour porpoise**.

Table 3.4 Estimated Seasonal Averages for Piling at East Anglia TWO Using Pin-piles for Wind Turbines and Offshore Platforms (Including ADD Activation, Soft-Start and Ramp-Up)

Piling	Duration based on worst-case scenario	Seasonal area averages	Potential AEoI
Pin-piles for 300m wind turbines and offshore platforms (including ADD activation, soft-start and ramp-up)	Up to 42 days	Winter area (based on 16% average overlap) = 3.66% Summer area (based on 0.1% average overlap) = 0.02%	**No** Temporary effect. Disturbance of harbour porpoise would not on average exceed 10% of the seasonal component of the SAC area over the duration of that season.
	Up to 77 days (for 75 turbines and 2 days recover)	Winter area (based on 16% average overlap) = 6.8% Summer area (based on 0.1% average overlap) = 0.04%	

3.2.3 Potential overall effects at East Anglia TWO (alone)

37. It is not anticipated that piling would be undertaken at the same time as UXO clearance, however, as a worst-case scenario it has been assumed that UXO clearance could be undertaken, for example in the cable corridor while piling could be undertaken in the windfarm site during the summer only. As outlined in ***section 2***, the Applicant has made the commitment that during the winter period there would be no UXO clearance without mitigation in the same 24 hour period as any piling without, therefore this has been removed from the assessment. The option to allow both piling and UXO clearance in the same 24 hour period in the winter area during the winter period has been removed, unless it can be demonstrated that effective mitigation can be provided for either activity (or both). The SIP will therefore cover this case if this is required to maintain this flexibility for construction.

38. Only one UXO would be detonated at a time during UXO clearance operations in the East Anglia TWO offshore development area, as previously outlined, there

would be no simultaneous UXO detonations, but potentially more than one UXO detonation could occur in a 24 hour period during the summer period. There would also be no concurrent piling at East Anglia TWO, as previously outlined, only one pile will be installed at a time, with no overlap in the piling duration of any two piles. Piles will be installed sequentially.

3.2.3.1 Spatial assessment

39. ***Table 3.5*** outlines the potential maximum, minimum and average overlap with the summer area of the SNS SAC, taking into account the overlap in the impact areas for UXO detonation in the cable corridor and piling in the windfarm site. The assessment indicates that the maximum overlap with the summer area would not exceed 20% of the summer area. Therefore, under this worst-case scenario if any UXO clearance in the offshore cable corridor was undertaken in summer during piling at the East Anglia TWO windfarm site, there is **no potential for an AEoI of the SNS SAC in relation to the conservation objectives for harbour porpoise**.

Table 3.5 Estimated Area of SNS SAC Summer Areas that Harbour Porpoise Could Potentially be Disturbed from During UXO Clearance and Piling at East Anglia TWO

Potential effect	Maximum potential overlap with SNS SAC	Minimum potential overlap with SNS SAC	Average potential overlap with SNS SAC	Potential AEoI
UXO detonation in cable corridor and piling at windfarm site - summer	174km^2 (approximately 0.6%) in the summer area	0km^2 (approximately 0%) in the summer area	87km^2 (approximately 0.3%) in the summer area	**No** Temporary effect. Disturbance of harbour porpoise would not exceed 20% of the seasonal component of the SNS SAC area *in any given day* during any UXO clearance and piling at East Anglia TWO (alone), based on the worst-case scenario.

3.2.3.2 Seasonal averages

40. This assessment is based on a precautionary approach of the maximum number of days of potential disturbance during UXO clearance, based on one UXO detonated per day, for up to 80 days. It is assumed, as a worst-case scenario, that harbour porpoise could be disturbed for maximum duration of these 80 days in one summer season.

41. The assessment (***Table 3.6***) indicates that piling in the East Anglia TWO windfarm site and UXO clearance within the cable corridor, would not on average

exceed the seasonal component of the site, if these activities were undertaken in the summer period. Therefore, if any UXO clearance in the offshore cable corridor was undertaken in summer during piling at the East Anglia TWO windfarm site, there would be **no potential for an AEoI of the SNS SAC summer area in relation to the conservation objectives for harbour porpoise**.

Table 3.6 Estimated Seasonal Averages for UXO Clearance and Piling at East Anglia TWO

Potential effect	Duration based on worst-case scenario	Seasonal area averages	Potential AEoI
UXO detonation in cable corridor and piling at windfarm site - summer	Up to 80 days of UXO clearance per season	Summer area (based on average 0.3% overlap) = 0.13%	**No** Temporary effect. Disturbance of harbour porpoise would not on average exceed 10% of the seasonal component of the SAC area over the duration of that season.

3.2.4 Summary of Potential Effects for East Anglia TWO Project Alone

42. ***Table 3.7*** summarises the assessment of the potential effects of the proposed East Anglia TWO project alone and indicates there is **no predicted AEoI of the SNS SAC from the proposed East Anglia TWO project alone**.

Table 3.7 Summary of the potential effects of the proposed East Anglia TWO project alone

Potential Effect	Assessment in relation to the North Sea MU population	Spatial assessment in relation to the SNS SAC summer and winter areas	Potential AEoI
During Construction			
Risk of permanent auditory injury (PTS) associated with underwater noise during UXO clearance.	Without mitigation, up to 0.08% of NS MU reference population could be at increased risk.	N/A Assessment based on number of individuals at potential risk.	**No with the implementation of MMMP for UXO clearance**
Potential disturbance from underwater noise associated with UXO clearance (26km EDR).	0.5% or less of the NS MU reference population could	A single event without mitigation could impact: Up to 17% of the winter area during winter period; based on one detonation a day for up to 80 days	**No with the commitments in Section 2.**

Potential Effect	Assessment in relation to the North Sea MU population	Spatial assessment in relation to the SNS SAC summer and winter areas	Potential AEoI
	be temporarily disturbed.	in the winter period the seasonal average would be up to 7%; or Up to 0.2% of summer area in the summer period; based on one detonation per day for up to 80 days in the summer period the seasonal average would be up to 0.04%. Temporary displacement of harbour porpoise would be less than 20% of the seasonal component of the SNS SAC area *in any given day* and on average would not exceed 10% of the seasonal component of the SNS SAC area over the duration of that season.	
Risk of permanent auditory injury (PTS) associated with underwater noise during piling.	Without mitigation, up to 0.21% of the NS MU reference population could be at increased risk.	N/A Assessment based on number of individuals at potential risk.	**No with the implementation of MMMP for piling**
Potential disturbance from underwater noise during proposed mitigation (e.g. 10 minute ADD activation).	0.0005% or less of the NS MU reference population could be temporarily disturbed.	Temporary displacement of harbour porpoise would be less than 20% of the seasonal component of the SNS SAC area *in any given day* and on average would not exceed 10% of the seasonal component of the SNS SAC area over the duration of that season. (NB, disturbance as a result of ADD activation prior to piling would be part of the 26km EDR. However, the duration of the ADD activation prior to piling has been taken into account in the assessment of the duration of	**No**

Potential Effect	Assessment in relation to the North Sea MU population	Spatial assessment in relation to the SNS SAC summer and winter areas	Potential AEoI
		potential disturbance for piling, see below).	
Potential disturbance from underwater noise during piling (26km EDR).	0.85% or less of the NS MU reference population could be temporarily disturbed.	A single event without mitigation could impact: Up to 17% of the winter area during winter period; or Up to 0.2% of summer area in the summer period. Temporary displacement of harbour porpoise would be less than 20% of the seasonal component of the SNS SAC area *in any given day* and on average would not exceed 10% of the seasonal component of the SNS SAC area over the duration of that season (for example, up to 4% of winter area during winter season for up to 42 days of active piling, including ADD activation, soft-start and ramp-up).	**No with the commitments in Section 2.**
Potential disturbance from underwater noise during other construction activities.	Up to 0.08% of the NS MU reference population could be temporarily disturbed.	Temporary displacement of harbour porpoise would not exceed 20% of the seasonal component of the SNS SAC area *in any given day* (for example, up to a maximum of 3% of winter area, based on total East Anglia TWO offshore development area) and on average would not exceed 10% of the seasonal component of the SNS SAC area over the duration of that season (for example, up to a maximum of 3% based on 183 days in winter period).	**No**
Potential disturbance from vessels during construction.	Up to 0.08% of the NS MU reference population could	Temporary displacement of harbour porpoise would not exceed 20% of the seasonal component of the SNS SAC area *in any given day* (for example, up	**No**

Potential Effect	Assessment in relation to the North Sea MU population	Spatial assessment in relation to the SNS SAC summer and winter areas	Potential AEoI
	be temporarily disturbed.	to a maximum of 3% of winter area, based on total East Anglia TWO offshore development area) and on average would not exceed 10% of the seasonal component of the SNS SAC area over the duration of that season (for example, up to a maximum of 3% based on 183 days in winter period).	
Potential barrier effects from underwater noise during construction at East Anglia TWO	Up to 0.9% of the NS MU reference population could be temporarily affected.	N/A Assessment based on number of individuals potentially affected	**No**
Possible vessel interaction (collision risk).	Up to 0.008% of the NS MU reference population could be at increased risk.	N/A	**No**
Potential changes to prey resource.	Up to 0.08% of the NS MU reference population could be temporarily disturbed.	Temporary displacement of harbour porpoise would not exceed 20% of the seasonal component of the SNS SAC area *in any given day* (for example, up to a maximum of 3% of winter area, based on total East Anglia TWO offshore development area) and on average would not exceed 10% of the seasonal component of the SNS SAC area over the duration of that season (for example, up to a maximum of 3% based on 183 days in winter period)..	**No**
Potential changes to water quality.	Up to 0.08% of the NS MU reference population could be temporarily affected.	Temporary displacement of harbour porpoise would not exceed 20% of the seasonal component of the SNS SAC area *in any given day* (for example, up to a maximum of 3% of winter area, based on total East Anglia	**No**

Potential Effect	Assessment in relation to the North Sea MU population	Spatial assessment in relation to the SNS SAC summer and winter areas	Potential AEoI
		TWO offshore development area) and on average would not exceed 10% of the seasonal component of the SNS SAC area over the duration of that season (for example, up to a maximum of 3% based on 183 days in winter period).	
UXO detonation in cable corridor and piling at windfarm site – summer period only	Less than 0.9% of the reference population could be temporarily disturbed.	Temporary displacement of harbour porpoise would not exceed 20% of the seasonal component of the SNS SAC area *in any given day* (for example, up to a maximum of 0.6% of summer area) and would not on average exceed 10% of the seasonal component of the SNS SAC area over the duration of that season (for example, up to 0.13% based on average overlap with summer area and up to 80 days for UXO clearance).	**No**
Piling at windfarm site and other construction activities and vessels in cable corridor	0.5% or less of the NS MU reference population could be temporarily disturbed.	Temporary displacement of harbour porpoise would not exceed 20% of the seasonal component of the SNS SAC area *in any given day* (for example, up to a maximum of 17.9% of winter area; or up to 0.2% of summer area based on maximum area and overlap) and on average would not exceed 10% of the seasonal component of the SNS SAC area over the duration of that season (for example, up to 4% for winter area during winter period based on up to 42 days active piling, including ADD activation, soft-start and ramp-up).	**No**
During Operation and Maintenance			
Potential disturbance from the underwater	0.05% or less of the NS MU reference	Displacement of harbour porpoise would not exceed 20% of the seasonal component of the SNS	**No**

Potential Effect	Assessment in relation to the North Sea MU population	Spatial assessment in relation to the SNS SAC summer and winter areas	Potential AEoI
noise associated with operational turbines.	population could be disturbed.	SAC area *in any given day* (for example, maximum of up to 2% of winter area, based on area of wind farm site) and on average would not exceed 10% of the seasonal component of the SNS SAC area over the duration of that season (for example, maximum of up to 2%, based on area of wind farm site and 182 days in winter period).	
Potential disturbance from the underwater noise associated with maintenance activities.	Up to 0.08% of the NS MU reference population could be temporarily disturbed.	Temporary displacement of harbour porpoise would not exceed 20% of the seasonal component of the SNS SAC area *in any given day* (for example, maximum of up to 3% of winter area, based on East Anglia TWO offshore development area) and on average would not exceed 10% of the seasonal component of the SNS SAC area over the duration of that season (for example, maximum of up to 3%, based on offshore development area and 182 days in winter period).	**No**
Potential disturbance from vessels during operation and maintenance.	Up to 0.08% of the NS MU reference population could be temporarily disturbed.	Temporary displacement of harbour porpoise would not exceed 20% of the seasonal component of the SNS SAC area *in any given day* (for example, maximum of up to 3% of winter area, as above) and on average would not exceed 10% of the seasonal component of the SNS SAC area over the duration of that season (for example, maximum of up to 3%, as above).	**No**
Possible vessel interaction (collision risk).	Up to 0.008% of the NS MU reference population could	N/A	**No**

Potential Effect	Assessment in relation to the North Sea MU population	Spatial assessment in relation to the SNS SAC summer and winter areas	Potential AEoI
	be at increased risk.		
Potential changes to prey resource.	Up to 0.08% of the NS MU reference population could be displaced.	Displacement of harbour porpoise would not exceed 20% of the seasonal component of the SNS SAC area *in any given day* (for example, maximum of up to 3% of winter area, as above) and on average would not exceed 10% of the seasonal component of the SNS SAC area over the duration of that season (for example, maximum of up to 3%, as above).	**No**
Potential changes to water quality	Less than construction	Temporary displacement of harbour porpoise would not exceed 20% of the seasonal component of the SNS SAC area *in any given day* and on average would not exceed 10% of the seasonal component of the SNS SAC area over the duration of that season.	**No**
Potential overall effects during operation and maintenance.	Up to 0.08% of the NS MU reference population could be displaced.	Displacement of harbour porpoise would not exceed 20% of the seasonal component of the SNS SAC area *in any given day* (for example, maximum of up to 3%, as above)and on average would not exceed 10% (up to 3%) of the seasonal component of the SNS SAC area over the duration of that season (for example, maximum of up to 3%, as above).	**No**
During Decommissioning			
Potential disturbance from the underwater noise associated with foundation removal.	Up to 0.08% of the NS MU reference population could be temporarily disturbed.	Temporary displacement of harbour porpoise would not exceed 20% of the seasonal component of the SNS SAC area *in any given day* (for example, maximum of up to 3%, as above) and on average would not exceed 10% of the seasonal component of	**No**

Potential Effect	Assessment in relation to the North Sea MU population	Spatial assessment in relation to the SNS SAC summer and winter areas	Potential AEoI
		the SNS SAC area over the duration of that season (for example, maximum of up to 3%, as above).	
Potential disturbance from underwater noise and disturbance from vessels.	Up to 0.08% of the NS MU reference population could be temporarily disturbed.	Temporary displacement of harbour porpoise would not exceed 20% of the seasonal component of the SNS SAC area *in any given day* (for example, maximum of up to 3%, as above) and on average would not exceed 10% of the seasonal component of the SNS SAC area over the duration of that season (for example, maximum of up to 3%, as above).	**No**
Possible vessel interaction (collision risk).	Up to 0.008% of the NS MU reference population could be at increased risk.	N/A	**No**
Potential changes to prey resource.	Up to 0.08% of the NS MU reference population could be temporarily displaced.	Temporary displacement of harbour porpoise would not exceed 20% of the seasonal component of the SNS SAC area *in any given day* (for example, maximum of up to 3%, as above) and on average would not exceed 10% (up to 3%) of the seasonal component of the SNS SAC area over the duration of that season (for example, maximum of up to 3%, as above).	**No**
Potential changes to water quality.	Up to 0.08% of the NS MU reference population could be temporarily affected.	Temporary displacement of harbour porpoise would not exceed 20% of the seasonal component of the SNS SAC area *in any given day* (for example, maximum of up to 3%, as above) and on average would not exceed 10% of the seasonal component of	**No**

Potential Effect	Assessment in relation to the North Sea MU population	Spatial assessment in relation to the SNS SAC summer and winter areas	Potential AEoI
		the SNS SAC area over the duration of that season (for example, maximum of up to 3%, as above).	
Potential overall effects during decommissioning.	Up to 0.08% of the NS MU reference population could be temporarily affected.	Temporary displacement of harbour porpoise would not exceed 20% of the seasonal component of the SNS SAC area *in any given day* (for example, maximum of up to 3%, as above) and on average would not exceed 10% of the seasonal component of the SNS SAC area over the duration of that season (for example, maximum of up to 3%, as above).	**No**

43. ***Table 3.7*** summarises the potential effects of the proposed East Anglia TWO project alone in relation to the Conservation Objectives of the SNS SAC for harbour porpoise.

44. The assessments indicate that, based on the Conservation Objectives, development of the proposed East Anglia TWO project alone would allow the Conservation Objectives to be upheld, and there would be **no potential for an AEOI of the SNS SAC in relation to the Conservation Objectives for harbour porpoise** (***Table 3.8***).

Table 3.8 Summary of the assessment of the potential effects of the proposed East Anglia TWO project (alone) on the SNS SAC in relation to the Conservation Objectives for harbour porpoise

Conservation Objectives	Auditory injury from underwater noise	Disturbance effects from underwater noise	Vessel interaction	Changes to prey resources	Changes to water quality
Harbour porpoise is a viable component of the site	×	×	×	×	×
There is no significant disturbance of the species	×	×	×	×	×

Conservation Objectives	Auditory injury from underwater noise	Disturbance effects from underwater noise	Vessel interaction	Changes to prey resources	Changes to water quality
The condition of supporting habitats and processes, and the availability of their prey is maintained	×	×	×	×	×

× = No potential for any AEOI of the site in relation to the conservation objectives, based on proposed mitigation in MMMP and commitments in SIP.

4 Site Integrity Plan (SIP)

45. The SIP was originally developed to manage the potential for adverse effects on integrity of the SNS SAC from in-combination effects. It is acknowledged by the Applicant that in the case of the Project, there is potential for project-alone effects that could result in adverse effects on integrity of the SNS SAC in the winter given the location of the offshore development site within the SNS SAC winter area.

46. As such, it is proposed that the In-principle SIP (ISIP) for the Project is expanded in scope to reflect the project-alone effects as well as in-combination effects. Should the Applicant wish to undertake multiple UXO clearance or piling events on the same day in the winter period, this will be possible if it can be demonstrated that effective mitigation can be provided. The evidence for this will be provided in the relevant SIP(s) (either for UXO clearance, piling or both) post-consent.

47. It remains the Applicant's view that the SIP provides the most flexible and appropriate mechanism for managing potential noise impacts:

- The approach allows for the review of currently available mitigation techniques as well as consideration of new techniques that may become available during the pre-construction phase;
- The approach enables changes to the science, changes in guidance and regulatory advice and any changes to the conservation objectives for the SAC to be taken into consideration prior to approval of the SIP by the Marine Management Organisation; and
- The Applicant has committed to consulting with Natural England (and The Wildlife Trust) through the in-principle SIP and have proposed a consultation programme within the in-principle SIP (Table 2.1) that commences more than 12 months in advance of the first noisy activity (UXO clearance).

5 References

BEIS (2020). Record of the Habitats Regulations Assessment undertaken under Regulation 65 of the Conservation of Habitats and Species 2017, and Regulation 33 of the Conservation of Offshore Marine Habitats and Species Regulations 2017. Review of Consented Offshore Wind Farms in the Southern North Sea Harbour Porpoise SAC. September 2020. Department for Business, Energy and Industrial Strategy.

IAMMWG (2015). Management Units for cetaceans in UK waters (January 2015). JNCC Report No. 547, JNCC Peterborough.

JNCC and Natural England (2019). Harbour Porpoise (*Phocoena phocoena*) Special Area of Conservation: Southern North Sea Conservation Objectives and Advice on Operations. Advice under Regulation 21 of The Conservation of Offshore Marine Habitats and Species Regulation 2017 and Regulation 37(3) of the Conservation of Habitats and Species Regulations 2017.

JNCC, Department of Agriculture, Environment and Rural Affairs (DAERA) and Natural England (2020). Guidance for assessing the significance of noise disturbance against Conservation Objectives of harbour porpoise SACs (England, Wales & Northern Ireland). June 2020. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/889842/SACNoiseGuidanceJune2020.pdf