



N O R T H F A L L S

Offshore Wind Farm

Further Information Regarding Marine Mammals Disturbance due to Vessel Presence

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1 Introduction

1. This document provides further information, (see Table 1-1) in relation to marine mammals, in response to the following comments set out in Relevant Representations (RR) of Natural England [[RR-243](#)].

Table 1-1 Relevant Representation comments addressed in this document

Comments addressed	Section comment is addressed
NE RR-E29	These comments have been addressed in Section 2.1

2. Responses to the other comments from Natural England [[RR-243](#)] and the MMO [[RR-216](#)] are provided in the following documents, respectively:
 - 9.1 Applicant's Responses to Relevant Representations Received from Natural England [REP1-044]
 - 9.2 Applicant's Responses to Relevant Representations Received from Statutory Consultees and Non Prescribed Consultees [REP1-045]
 - 9.14 Further Information Regarding Marine Mammals [REP1-057]
 - 7.7 Draft Marine Mammal Mitigation Protocol (Revision 1) (submitted at Deadline 3).

2 Further Information Regarding the Marine Mammal Assessment

2.1 Further information for disturbance due to vessels for the ES Chapter 12 [[APP-026](#)]

3. This section provides further information in relation to Section 12.6.1.3.4 Impact 3c: disturbance effects due to associated with construction vessels; Section 12.6.2.3.2 Impact 3b: disturbance due to operation and maintenance vessels; and Section 12.9.3.3.1 Cumulative impact 3a: disturbance from vessels associated with operational OWFs, in response to Natural England's comment (E29; [RR-243](#));

"We note that, when assessing the impacts due to vessel presence, North Falls cites several papers that did not find significant disturbance from operational windfarms, and only one paper that found significant disturbance from vessels. Natural England highlights that the negative effect of vessels on marine mammals has been proven in numerous peer-reviewed papers, including highly cited reviews (Dyndo et al. 2015, Wisniewska et al. 2018, Frankish et al. 2023, Oakley et al. 2017, Erbe et al. 2019, Rojano-Donate et al. 2023).

Further, Natural England does not agree with the statement made in paragraph 829 that marine mammals "get accustomed" to the presence of vessels. In fact, a recent paper by Pigeault et al. (2024) found that harbour porpoises avoid areas with frequent traffic up to distances of 9 km.

Also, paragraph 830 states that vessels, once on-site, would be stationary or slow moving, and therefore the potential for disturbance would be minimal. However, this is not the case for maintenance vessels which use maximum power to keep their position next to a turbine. This manoeuvre produces high levels of noise, and therefore, has the potential to disturb animals up to greater distances than stationary vessels.

Natural England suggests that the impact of vessel presence is re-assessed following up-to-date scientific evidence.

Natural England advises that the Applicant re-assesses the effect of vessel presence on marine mammals following evidence-based findings."

4. The distance at which animals may react to vessels is challenging to predict, as behavioural responses can vary widely depending on factors such as species, location, vessel type and size, speed, noise levels and frequency, ambient noise levels, and environmental conditions.
5. Disturbance caused by underwater sound from construction activities (other than piling) have been assessed in Section 12.6.1.3.4 [APP-026]. This includes the presence of vessels from which the activities would be conducted. During piling and other construction activities, vessel noise is unlikely to add an additional impact, as both the vessels and vessel noise would already be within the maximum impact areas assessed.
6. However, as a precautionary approach, the potential disturbance of marine mammals due to vessel noise and presence has been assessed further to provide some additional information in relation to Natural England's comment (E29; [RR-243](#)).
7. Additional assessment: based on the recent studies by Pigeault *et al.* (2024) which indicated harbour porpoise could avoid areas with numerous vessels or frequent vessel movements within a radius of up to 9km. This additional vessel disturbance assessment (see Table 2-12-1) utilises a very precautionary 9km disturbance range for all marine mammal receptors, based on a 9km buffer round the entire offshore development area (array site and cable corridor).
8. This is considered very precautionary for the following reasons:
 - The Pigeault *et al.* (2024) didn't assess marine mammal responses to vessels at different distance ranges, instead they reported within a 9 km radius, the average presence of 5 to 7 ships/min decreased the expected number of porpoise sightings by a quarter.
 - Whales and seals are less sensitive to underwater noise disturbance than harbour porpoise, therefore assuming all species will react in the same way is precautionary.
 - Not all animals in the 9km radius will react or be disturbed. Therefore, assuming that all marine mammals will respond within a 9km radius is over-precautionary, as it is likely that only a small proportion would respond at distances closer to the noise source.

- Other research has reported smaller disturbance ranges for vessels. Frankish *et al.* (2023) found that harbour porpoise deterrence was mostly observed at close distance to vessels only (<300m), while deterrence of 5-9% of individuals was recorded for vessels over 2km away.
 - The assessments are undertaken based on the maximum area of any potential disturbance for a 9km buffer round the entire array site and cable corridor. When in reality, vessels are more likely to be concentrated in one or two areas where construction or maintenance activities are being undertaken within the array site and / or cable corridor.
9. As a very precautionary approach a 9km disturbance range has been applied onto the entire offshore development area, this covers a total area of 1,797.5km².
 10. The magnitude of the potential disturbance for 9km disturbance around the entire offshore development area is assessed as low for all species, except minke whale which has been assessed as a negligible magnitude of effect.

Table 2-1 Additional assessment of the potential for disturbance due to vessel presence, based on 9km disturbance range around the offshore development area (array area and cable corridor)

Marine mammal species	Assessment of impact (9km disturbance range around offshore development area)	Magnitude of impact
Harbour porpoise	5,783 harbour porpoise (1.7% of the NS MU reference population), based on the HiDef winter density estimate.	Low
Minke whale	28 minke whale (0.1% of the CGNS MU reference population).	Negligible
Grey seal	342 grey seal (1.1% of the SE England MU reference population, or 0.6% of the wider reference population), based on the density for the offshore cable corridor as a worst-case.	Low
Harbour seal	198 harbour seal (4.1% of the SE England MU reference population), based on the density for the offshore cable corridor as a worst-case.	Low

11. Further assessment : based on 4km potential disturbance range. As discussed in ES ([APP-026](#) Section 12.6.1.2.4), Benhemma-Le Gall *et al.* (2021) detected a reduction in porpoise presence up to 4km from construction related vessels at the Beatrice offshore wind farm and Moray East offshore wind farm. Although, a higher proportion were disturbed at 2km.
12. The disturbance assessment based on one vessel is equivalent to that for one construction activity. This scenario has been assessed in the ES Chapter 12 in Table 12-53 ([APP-026](#)) and has therefore not been repeated here. In summary, the magnitude of the potential disturbance impact of one vessel / construction activity with 4km radius (disturbance area of 50.3km²) in the offshore project area is negligible for all species.

13. However, as an additional precautionary approach a 4km disturbance range has been applied onto the entire offshore development area, this covers a total area of 846.51km².
14. This approach is very precautionary as it is based on potential area of disturbance around the entire offshore development area (array site and cable route) irrespective of the number and location of vessels in the offshore development area.
15. The magnitude of the potential disturbance for 4km disturbance range round the offshore development area is assessed as negligible for all species, except harbour seal which has been assessed as a low magnitude of effect.

Table 2-2 Further assessment of the potential for disturbance due to vessel presence based on 4km disturbance range around the offshore development area (array area and cable corridor)

Marine mammal species	Assessment of impact (4km disturbance range around offshore development area)	Magnitude of impact
Harbour porpoise	2,724 harbour porpoise (0.8% of the NS MU reference population), based on the HiDef winter density estimate.	Negligible
Minke whale	13 minke whale (0.06% of the CGNS MU reference population).	Negligible
Grey seal	161 grey seal (0.5% of the SE England MU reference population, or 0.3% of the wider reference population), based on the density for the offshore cable corridor as a worst-case.	Negligible
Harbour seal	94 harbour seal (1.9% of the SE England MU reference population), based on the density for the offshore cable corridor as a worst-case.	Low

16. Within document 9.14 Further Information Regarding Marine Mammals [REP1-057], in response to Natural England's comment ([RR-243], E12), the sensitivity for seal disturbance has been amended from low to medium. Therefore, considering the medium sensitivity of all species to disturbance and the magnitudes of effect. The potential for disturbance due to vessel presence, based on both additional assessments has been assessed as minor adverse (not significant in EIA terms).
17. Considering the Benhemma-Le Gall *et al.* (2021) study indicated harbour porpoise responses decreased as the mean vessel distance increased until no apparent response was observed at 4km, and this was based on OWF construction vessels. Using a 4km disturbance range rather than the 9km

provides a more realistic yet still precautionary assessment in relation to the disturbance effects of vessels associated with the Project. Table 2-3 indicates how this aligns with the assessment in the ES [APP-026]. Therefore, using the more realistic precautionary approach of a 4km disturbance range around the entire offshore development area (array area and cable corridor) does not change the outcome of the assessment in the ES [APP-026].

18. However, even using the very precautionary approach of a 9km disturbance range around the entire offshore development area does not change the outcome of the assessment in the ES, as indicated in Table 2-4.

Table 2-3 Further assessment of effect significance for the potential impacts due to construction vessels, based on 4km disturbance range around entire offshore development area (updates shown in blue)

Marine species	mammal	Sensitivity	Magnitude	Likely significance	effect
Harbour porpoise		Medium	Negligible	Minor adverse	
Minke whale		Medium	Negligible		
Grey seal		Medium (was low)	Negligible		
Harbour seal		Medium (was low)	Low (was negligible)		

Table 2-4 Additional assessment of effect significance for the potential impacts due to construction vessels, based on 9km disturbance range around entire offshore development area (updates shown in blue)

Marine species	mammal	Sensitivity	Magnitude	Likely significance	effect
Harbour porpoise		Medium	Low (was negligible)	Minor adverse	
Minke whale		Medium	Negligible		
Grey seal		Medium (was low)	Low (was negligible)		
Harbour seal		Medium (was low)	Low (was negligible)		

2.1.1 Disturbance due to O&M vessels

19. The Applicant has considered Natural England's comment (E29; RR-243) regarding maintenance vessels using increased power to keep their position next to a turbine. However, the additional construction vessel presence assessment (Section 2.1) uses a precautionary approach of applying a 4km disturbance range round the entire offshore development area. Additionally, for further information, the assessment has also considered a 9km disturbance range round the entire offshore development area as an over-precautionary approach. Both assessments indicated no likely significant effect. As assessed in Section 12.6.2.3.2 in the ES Chapter 12 (APP-026), the impacts associated with underwater noise and disturbance from vessels during operation and maintenance would be less than those during construction. This is due to, the maximum number of vessels that could be required on site at any one-time

during operation and maintenance could be 22, which is less than the 35 vessels that could be on site during construction.

20. As the number of vessels expected on site during the operation and maintenance phase will be less than during construction; as well as operation and maintenance vessel disturbance being intermittent (vessel activity will not be constant) and reversible (disturbance effects are temporary). It is considered sufficient for the assessment for construction to be applied for the operation and maintenance assessment, as a worst-case scenario. It is also considered this assessment is precautionary enough to cover potential disturbance ranges from increased power used by maintenance vessels to maintain positions. Therefore, the overall likely effect significance remains largely the same as reported in the ES (**APP-026**), as shown in Table 2-5.

Table 2-5 Assessment of effect significance for the potential impacts due to O&M vessels (updates shown in blue)

Marine mammal species	Sensitivity	Magnitude	Likely effect significance
Harbour porpoise	Medium	Negligible	Minor adverse
Minke whale	Medium	Negligible	
Grey seal	Medium (was low)	Negligible	Minor adverse (was negligible)
Harbour seal	Medium (was low)	Low (was negligible)	

2.1.2 Cumulative disturbance impacts due to O&M vessels

21. As assessed in Section 12.9.3.3 in the ES Chapter 12 (**APP-026**), the impacts associated with cumulative vessel disturbance during operation and maintenance are considered to be temporary and localised. The increase in vessel presence from operational OWFs is expected to be relatively small compared to the baseline levels of vessel movements in the area. It is also expected that good practice measures, as implemented for North Falls, would be in place for all operational OWFs, further limiting the potential for disturbance.
22. Once on-site, OWF vessels would be stationary or slow moving, as they undertake the activity they are associated with, and therefore the potential for disturbance would be minimal.
23. Therefore, the overall likely effect significance remains largely the same as what was reported in the ES (**APP-026**), as shown in Table 2-6.

Table 2-6 Cumulative assessment of effect significance for the potential impacts due to O&M vessels

Marine mammal species	Sensitivity	Magnitude	Likely effect significance
Harbour porpoise	Medium	Low	Minor adverse
Minke whale	Medium	Low	
Grey seal	Medium (was low)	Low	

Marine mammal species	Sensitivity	Magnitude	Likely effect significance
Harbour seal	Medium (was low)	Low	Minor adverse (was negligible)

2.2 Further information for disturbance due to vessels for the RIAA Part 3 Marine Mammals [APP-176]

2.2.1 Southern North Sea SAC

Disturbance due to construction vessels

24. The assessment for number of harbour porpoise disturbed is the same as assessed in Table 2-2, for the Southern North Sea (SNS) Special Area of Conservation (SAC) as the same density estimate and reference population is used. The assessment indicates less than 1% of the North Sea (NS) Management Unit (MU) reference population would be impacted. Therefore, as assessed in the RIAA Part 3 [APP-176] Section 3.4.3.1.3, it is considered that there would be no adverse effect on the integrity of the SNS SAC in relation to the conservation objectives for harbour porpoise from disturbance from underwater noise associated with vessels.

25. However, an updated spatial and seasonal assessment has been provided for the SNS SAC.

Spatial Assessment

26. The spatial assessment disturbance area is based on a 4km disturbance range round the offshore development area. Disturbance of harbour porpoise would not exceed 20% of the spatial component of the SNS SAC winter area on any given day during construction vessel presence at North Falls, based on the worst-case scenario (Table 2-7).

27. As described in Section 2.1, the 4km disturbance range is the preferred assessment approach due to being more realistic. However, the 9km disturbance range assessment has also been undertaken for further information. As seen in Table 2-7, the very precautionary approach of a 9km disturbance range around the entire offshore development area does not change the outcome of the assessment as it does not exceed the 20% threshold for the spatial component of the SNS SAC winter area.

Table 2-7 Maximum potential overlap with SNS SAC Winter Area based on the potential vessel presence disturbance during construction at North Falls

Scenario	Maximum area of overlap with SNS SAC winter area (% of SNS SAC winter area)	Potential adverse effect on site integrity
Vessel presence during construction (4km disturbance range around	517.6 km ² (4.08%)	No Temporary effect.

Scenario	Maximum area of overlap with SNS SAC winter area (% of SNS SAC winter area)	Potential adverse effect on site integrity
offshore development area)		Displacement of harbour porpoise would not exceed 20% of the spatial component of the SNS SAC area on any given day during construction vessel presence at North Falls based on the worst-case scenario.
Vessel presence during construction (9km disturbance range around offshore development area)	1,042.1km ² (8.21%)	No Temporary effect. Displacement of harbour porpoise would not exceed 20% of the spatial component of the SNS SAC area on any given day during construction vessel presence at North Falls based on the worst-case scenario.

Seasonal Assessment

28. The seasonal averages have been calculated by taking into account the maximum potential overlap with SNS SAC seasonal area on any one day by the estimated maximum number of days within the season on which construction vessel presence could occur. In this case, it is assumed that construction could occur throughout the whole winter season (182 days).
29. The assessment indicates less than 10% of the seasonal component of the SNS SAC over the duration of that season could be affected during construction vessel presence at North Falls, based on the worst-case scenario (Table 2-8).

Table 2-8 Estimated seasonal average for SNS SAC Winter Area based on construction vessel presence disturbance range of 4km for the offshore development area

Scenario	Number of disturbance days per season	Maximum seasonal average for SNS SAC winter area	Potential adverse effect on site integrity
Vessel presence during construction (4km disturbance range around offshore development area)	182	4.08%	No Temporary effect. Displacement of harbour porpoise would not exceed 10% of the seasonal component of the SNS SAC over the duration of that season during construction vessel presence at North Falls, based on the worst-case scenario.
Vessel presence during construction (9km disturbance range around offshore development area)	182	8.21%	No Temporary effect.

Scenario	Number of disturbance days per season	Maximum seasonal average for SNS SAC winter area	Potential adverse effect on site integrity
range around offshore development area)			Displacement of harbour porpoise would not exceed 10% of the seasonal component of the SNS SAC over the duration of that season during construction vessel presence at North Falls, based on the worst-case scenario.

Summary for construction vessel presence disturbance

30. The potential for disturbance due to construction vessel presence disturbance, would impact less than 1% of the harbour porpoise NS MU population.
31. Disturbance of harbour porpoise has no potential to exceed 20% of the spatial component of the SNS SAC winter area on any given day due to construction vessel presence disturbance at North Falls, based on the worst-case scenario (Table 2-7).
32. The assessment indicates less than 10% of the seasonal component of the SNS SAC over the duration of that season could be affected during construction vessel presence disturbance at North Falls, based on the worst-case scenario (Table 2-8).
33. Therefore, there would be no adverse effect on the integrity of the SNS SAC in relation to the conservation objectives for harbour porpoise from construction vessel presence disturbance. This is in line with the assessment made in the RIAA Part 3 (**APP-176**) Section 3.4.3.1.2.

Disturbance due to O&M vessels

34. As assessed in Section 3.4.3.2.3 in the RIAA Part 3 (**APP-176**), the impacts associated with underwater noise and disturbance from vessels during operation and maintenance would be less than those during construction.
35. As the potential for disturbance due to O&M vessel presence is based on the construction vessel presence as a worst-case scenario, the assessment indicates less than 1% of the harbour porpoise NS MU population would be impacted.
36. Disturbance of harbour porpoise has no potential to exceed 20% of the spatial component of the SNS SAC winter area on any given day due to O&M vessel presence disturbance at North Falls, based on the worst-case scenario (Table 2-7).
37. Less than 10% of the seasonal component of the SNS SAC over the duration of that season could be affected during O&M vessel presence disturbance at North Falls, based on the worst-case scenario (Table 2-8).

38. Therefore, as assessed in the RIAA Part 3 [APP-176] Section 3.4.3.2.3 it is considered that there would be no adverse effect on the integrity of the SNS SAC in relation to the conservation objectives for harbour porpoise from disturbance from underwater noise associated with O&M vessels.

In-combination disturbance impacts due to O&M vessels

39. As in the RIAA Part 3 [APP-176] Section 3.4.3.4.3, a quantitative assessment for in-combination disturbance from vessels associated with operational OWFs has not been undertaken due to there being no information on the potential number of vessels present at relevant projects. However, as described above, the potential for vessel disturbance is considered to be localised and temporary.
40. Therefore, as assessed in the RIAA, there would be no adverse effect on the integrity of the SNS SAC in relation to the conservation objectives for harbour porpoise from disturbance associated with O&M vessels.

2.2.2 Humber Estuary SAC and Ramsar

Disturbance due to construction vessels

41. The assessment for number of grey seal disturbed is assessed in Table 2-9. The assessment indicates less than 1% of the Humber Estuary (HE) SAC reference population would be impacted. Therefore, as assessed in the RIAA Part 3 [APP-176] Section 3.5.3.1.3, it is considered that there would be no adverse effect on the integrity of the HE SAC in relation to the conservation objectives for grey seal from disturbance from underwater noise associated with vessels. The assessment is based on the 4km disturbance range round offshore development area, however, the over-precautionary approach of a 9km disturbance range also has the same assessment conclusion.

Table 2-9 Assessment of the potential for disturbance due to construction vessel presence

Scenario	Assessment of impact (4km disturbance range around offshore development area)
Construction vessel presence (based on 4km disturbance range round offshore development area (846.51km ²))	5 grey seal associated with the Humber Estuary SAC (0.03% of the Humber Estuary SAC population) based on the array area density of 0.005/km ² , or 11 grey seal associated with the Humber Estuary SAC (0.07% of the Humber Estuary SAC population) based on the offshore cable corridor density of 0.013/km ² .
Construction vessel presence (based on 9km disturbance range round offshore development area (1,797.5km ²))	9 grey seal associated with the Humber Estuary SAC (0.06% of the Humber Estuary SAC population) based on the array area density of 0.005/km ² , or 23 grey seal associated with the Humber Estuary SAC (0.1% of the Humber Estuary SAC population) based on the offshore cable corridor density of 0.013/km ² .

Disturbance due to O&M vessels

42. As assessed in Section 3.5.3.2.3 in the RIAA Part 3 (**APP-176**), the impacts associated with underwater noise and disturbance from vessels during operation and maintenance would be less than those during construction.
43. As the potential for disturbance due to O&M vessel presence is based on the construction vessel presence as a worst-case scenario, the assessment indicates less than 1% of the grey seal HE SAC population would be impacted.
44. Therefore, as assessed in the RIAA Part 3 [**APP-176**] Section 3.5.3.2.3, it is considered that there would be no adverse effect on the integrity of the HE SAC in relation to the conservation objectives for grey seal from disturbance from underwater noise associated with O&M vessels.

In-combination disturbance impacts due to O&M vessels

45. As in the RIAA Part 3 [**APP-176**] Section 3.5.3.4.3, a quantitative assessment for in-combination disturbance from vessels associated with operational OWFs has not been undertaken due to there being no information on the potential number of vessels present at relevant projects. However, as described above, the potential for vessel disturbance is considered to be localised and temporary.
46. Therefore, as assessed in the RIAA, there would be no adverse effect on the integrity of the HE SAC in relation to the conservation objectives for grey seal from disturbance associated with O&M vessels.

2.2.3 The Wash and North Norfolk Coast SAC

Disturbance due to construction vessels

47. The assessment for number of harbour seal disturbed is assessed in Table 2-10. The assessment indicates less than 1% of the Wash and North Norfolk Coast (WNNC) SAC reference population would be impacted. Therefore, as assessed in the RIAA Part 3 [**APP-176**] Section 3.6.3.1.3, it is considered that there would be no adverse effect on the integrity of the WNNC SAC in relation to the conservation objectives for harbour seal from disturbance from underwater noise associated with vessels. The assessment is based on the 4km disturbance range round offshore development area, however, the over-precautionary approach of a 9km disturbance range also has the same assessment conclusion.

Table 2-10 Assessment of the potential for disturbance due to construction vessel presence

Scenario	Assessment of impact (4km disturbance range around offshore development area)
Construction vessel presence (based on 4km disturbance range round offshore development area (846.51km ²))	0.009 harbour seal associated with the WNNC SAC (0.0002% of WNNC SAC population) based on the array area density of 0.00001/km ² , or 0.9 harbour seal associated with the WNNC SAC (0.02% of the WNNC SAC population) based on the offshore cable corridor density of 0.0011/km ² .

Scenario	Assessment of impact (4km disturbance range around offshore development area)
Construction vessel presence (based on 9km disturbance range round offshore development area (1,797.5km ²))	0.02 harbour seal associated with the WNNC SAC (0.0005% of WNNC SAC population) based on the array area density of 0.00001/km ² , or 2 harbour seal associated with the WNNC SAC (0.05% of the WNNC SAC population) based on the offshore cable corridor density of 0.0011/km ² .

Disturbance due to O&M vessels

48. As assessed in Section 3.6.3.2.3 in the RIAA Part 3 (**APP-176**), the impacts associated with underwater noise and disturbance from vessels during operation and maintenance would be less than those during construction.
49. As the potential for disturbance due to O&M vessel presence is based on the construction vessel presence as a worst-case scenario, the assessment indicates less than 1% of the harbour seal WNNC SAC population would be impacted.
50. Therefore, as assessed in the RIAA Part 3 [**APP-176**] Section 3.6.3.2.3, it is considered that there would be no adverse effect on the integrity of the WNNC SAC in relation to the conservation objectives for harbour seal from disturbance from underwater noise associated with O&M vessels.

In-combination disturbance impacts due to O&M vessels

51. As in the RIAA Part 3 [**APP-176**] Section 3.6.3.4.3, a quantitative assessment for in-combination disturbance from vessels associated with operational OWFs has not been undertaken due to there being no information on the potential number of vessels present at relevant projects. However, as described above, the potential for vessel disturbance is considered to be localised and temporary.
52. Therefore, as assessed in the RIAA, there would be no adverse effect on the integrity of the WNNC SAC in relation to the conservation objectives for harbour seal from disturbance associated with O&M vessels.

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NORTH FALLS

Offshore Wind Farm



RWE

HARNESSING THE POWER OF NORTH SEA WIND

North Falls Offshore Wind Farm Ltd

A joint venture company owned equally by SSE Renewables and RWE.

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