

Outer Dowsing Offshore Wind Preliminary Environmental Information Report

Volume 2, Appendix 19.3: Offshore Activities Assessment

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OUTER DOWSING OFFSHORE WIND PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

VOLUME 2, APPENDIX 19.3: OFFSHORE ACTIVITIES ASSESSMENT

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CONTENTS

1.0	OFFSHORE ACTIVITIES ASSESSMENT	1
2.0	VESSEL EMISSIONS	2
2.1	Assessment Methodology.....	2
2.2	Baseline Environment.....	3
2.3	Vessel Emissions Screening Assessment.....	5
3.0	HELICOPTER EMISSIONS	9

DOCUMENT REFERENCES

TABLES

Table 2-1 – Maximum Defra Mapped Background Pollutant Concentrations.....	4
Table 2-2 – Extent of Construction Vessels and Likelihood to Interact with Onshore Sensitive Receptors	6
Table 2-3 – Number of Construction Vessel Movements Within Proximity of an Onshore Receptor .	7

1.0 Offshore Activities Assessment

The scope of the assessment is to understand potential onshore air quality impacts arising from offshore activities generated by the Project. This is in response to comments from The Inspectorate contained within the Scoping Opinion (The Inspectorate, 2022). In accordance with the comments, the assessment has focused on the construction phase, however, the operation and maintenance (O&M) and decommissioning phases have been considered and discussed.

The offshore array area is located approximately 54km off the coast of Lincolnshire. Activities occurring at the array (construction, operational and decommissioning) are highly unlikely to cause onshore impacts – given the separation distance and dispersal of emissions. However, offshore activities which do interact with onshore receptors have the potential to cause onshore impacts. These include:

- Marine vessel movements; and
- Helicopter movements.

Information used for the purposes of informing the offshore activity assessment is consistent with values provided within Volume 1, Chapter 3: Project Description. Each assessment is discussed in turn.

2.0 Vessel Emissions

Consideration has been given to the extent of vessel movements generated by the Project, and the likelihood for a significant effect to arise. The scope of the assessment comprises the following:

- Review of the baseline environment, including:
 - Existing vessel movements;
 - Current marine vessel emissions regulations; and
 - Baseline and future baseline conditions.
- Vessel emissions screening assessment, including:
 - Review of sensitive onshore receptors; and
 - Comparison of the extent of predicted marine vessel movements associated with the construction phase of the Project with reference to screening thresholds to determine whether further assessment is required.

2.1 Assessment Methodology

The screening of vessel emissions has been undertaken in accordance with the Department for Environment, Food and Rural Affairs (Defra) Local Air Quality Management Technical Guidance (TG22) (LAQM.TG22). Within LAQM.TG22, further assessment of vessel emissions is recommended where:

- There are more than 5,000 large ship movements¹ per year, with relevant exposure within 250m of berths and main areas of manoeuvring; or
- There are more than 15,000 large ship movements per year, with relevant exposure within 1km of these areas.

The screening thresholds indicate that sensitive receptors up to 1km of vessel movements can be affected by vessel emissions. The offshore array area is located approximately 54km off the coast of Lincolnshire. Given the separation distance, vessel movements associated with the Project are therefore only likely to interact with onshore sensitive receptors where they are:

- Used to facilitate the construction and decommissioning of onshore infrastructure associated with cable laying and landfall infrastructure. This interaction with onshore sensitive receptors is likely to occur at the location of the onshore and offshore interface (i.e., where the PEIR boundary interacts with the coast e.g., the landfall); and/or
- Exiting/entering a port.

The specific port location(s) to be utilised by vessels are yet to be determined, however is likely to be Teesside during the construction phase, and Grimsby for the O&M phase. Regardless of the port location, all vessel movements will be compliant with the relevant port's operational constraints and management plans. Therefore, further consideration to vessels exiting/entering a port has not been given.

The focus of this assessment thus relates to the potential extent of vessels used to facilitate onshore works and their interaction with onshore sensitive receptors (i.e., at the location of the onshore and offshore interface). In relation to this, the majority of vessel movements supporting onshore works would occur in the construction phase (and potentially the decommissioning phase); associated with cable laying and landfall activities. Nearshore activities during O&M are expected to be very limited, relating to cable maintenance for example.

¹ Cross-channel ferries, roll on-roll off ships, bulk cargo, container ships, cruise liners, etc – one ship generating two movements (arrival and departure).

In recognition of the current optionality with regards to the landfall, all onshore and offshore interfaces have been assessed – i.e., assuming nearshore vessel movements occur at all locations. This ensures that all potential impacts have been assessed.

Vessel movements used within this assessment derive from values provided within Volume 1, Chapter 3: Project Description. As described, the Applicant requires flexibility in the choice of wind turbine generators (WTGs) to ensure that anticipated changes in available technology and project economics can be accommodated within the project design. Where optionality exists, the maximum vessel movements associated with any scenario have been assessed to ensure worst-case impacts are understood and present a precautionary assessment.

2.2 Baseline Environment

The offshore elements of the Project are located within the North Sea, an area already characterised by a high volume of shipping traffic including large ships/tankers.

Offshore vessel movements associated with the Project would represent a small number of overall vessel traffic in comparison and therefore accounts for a small proportion of total North Sea emissions. Further information is provided within Volume 1, Chapter 15: Shipping and Navigation.

2.2.1 Current and Future Regulation

Vessel emissions within the North Sea are regulated by legislation. The International Convention for the Prevention of Pollution from Ships (MARPOL) is the main international convention for the regulation of emissions from vessels. MARPOL Annex VI, first adopted in 1997, limits the main air pollutants contained in ships exhaust gas, notably sulphur oxides (SO_x) and nitrogen oxides (NO_x).

In 2005 the MARPOL Annex VI was revised with the aim of strengthening the emission limits in light of technological improvements and implementation experience. This was adopted in 2008. The revised MARPOL Annex VI introduced a globally progressive reduction of SO_x, NO_x and particulate matter emissions from vessels alongside discrete emission control areas (ECAs) where more stringent limits apply. The North Sea is a designated ECA under MARPOL Annex VI, where the following limits apply:

- 0.1% sulphur fuel content limit. The sulphur limit for international waters is 0.5%; and
- Vessels which comply with the most stringent NO_x emission limit (Tier III). Tier II standards apply outside of ECAs.

Vessel emission restrictions are expected to tighten in future years, following the availability and introduction of cleaner technologies and fuels, alongside policy such as the Maritime 2050 and Clean Maritime Plan. These policies provide a strategy for the transition to zero emission shipping within the UK. Therefore, emission contributions from vessel emissions are expected to reduce even further. These projections are evidenced in Section 2.2.2.

2.2.2 Background Pollutant Concentrations

As discussed in Volume 1, Chapter 19: Onshore Air Quality, Defra maintains a nationwide model of existing and future background annual mean air quality concentrations at a 1km grid square resolution. A review of annual mean background concentrations provided by Defra for the pollutants of principal importance in relation to shipping has been undertaken to provide an indication of the sensitivity of the study area to pollutant concentration changes. A study area with low background concentrations and a large headroom between Air Quality Assessment Levels (AQALs)/Critical Levels would be considered less sensitive to pollutant concentration changes compared to a study area with high background concentrations and a small headroom between AQALs/Critical Levels, for example.

Consideration has been given to pollutant concentrations reported for the first year of proposed activities associated with the Project (2027 – the first year of construction) where possible. Use of 2027 datasets to characterise baseline conditions for all stages of the Project is likely to be conservative, in recognition of the

forecast improvements to air quality (associated with the introduction of policy and cleaner emission technologies/restrictions). Pollutant concentrations for the year of 2019 have also been provided as a comparison to inform the evolution of the baseline.

Defra’s dataset includes annual average concentration estimates for NO_x, NO₂, PM₁₀ and PM_{2.5} using a reference year of 2018 (the year in which comparisons between modelled and monitoring are made), which are projected up to the year 2030. Annual mean background concentrations of carbon monoxide (CO) and sulphur dioxide (SO₂) are also available, however relate to 2001. These values are therefore likely to be overly conservative in consideration of concentrations anticipated throughout the Project. This is because background CO and SO₂ concentrations are likely to have reduced since 2001 (and will continue to do so in the future), following the introduction of policy and lower emission technologies (discussed in Section 2.2.1).

As justified in Section 2.1, consideration has been given to onshore locations within 1km of potential nearshore vessels movements at the offshore and onshore interface i.e., where vessels are used to facilitate the construction and decommissioning of onshore infrastructure (cable laying and landfall infrastructure). The maximum annual mean background concentrations for each relevant pollutant considered, based on the 1km grid squares which cover the onshore study area are provided in Table 2-1. The corresponding AQALs and Critical Levels are provided as a comparison, where available.

Table 2-1 – Maximum Defra Mapped Background Pollutant Concentrations

Pollutant		Year	Annual Mean Concentration (µg/m ³)	
			Maximum Background	AQAL or Critical Level
Nitrogen Oxides	NO _x	2019	10.4	30
		2027	8.2	
Nitrogen Dioxide	NO ₂	2019	8.0	40
		2027	6.4	
Particulate Matter	PM ₁₀	2019	14.7	40
		2027	13.6	
Particulate Matter	PM _{2.5}	2019	8.3	25
		2027	7.5	
Sulphur Dioxide	SO ₂	2001	2.2	10 / 20 ^(A)
Carbon Monoxide	CO	2001	219	-

Table notes:
 (A) 10µg/m³ where lichens or bryophytes are present, 20µg/m³ where they are not present.
 (B) 2018 reference datasets: NO_x, NO₂, PM₁₀ and PM_{2.5}
 (C) 2001 reference datasets: SO₂, CO

The maximum background concentrations reported for the onshore locations likely to be affected by nearshore vessel emissions are below the corresponding AQALs and Critical Levels. Reported maximum 2001 concentrations of SO₂ and CO are likely to be greater in comparison to those anticipated during the Project – as they do not take into account any improvements beyond 2001 (i.e., introduction of cleaner emission technologies and restrictions).

A large headroom exists between projected annual mean pollutant background concentrations and the corresponding AQALs/Critical Levels at locations where offshore vessel movements are most likely to interact with onshore sensitive receptors. The likelihood of vessel emission pollutant contributions causing an exceedance of the AQALs/Critical Levels is therefore low. The sensitivity of the study area with respect to pollutant concentration changes is therefore low.

Furthermore, baseline concentrations anticipated during the O&M and decommissioning phases are expected to be lower in comparison. This is largely driven by legislative and policy interventions which target emissions

reductions alongside the introduction of cleaner technologies (discussed in Section 2.2.1). These forecast improvements are reflected within Table 2-1, whereby the maximum background concentrations across the study area decrease in future years.

2.3 Vessel Emissions Screening Assessment

2.3.1 Review of Onshore Sensitive Receptors

In recognition of the LAQM.TG22 screening thresholds, a review of onshore coastal sensitive receptors (human and ecological) located within 1km of potential nearshore vessel movements generated by the Project (at the locations of the onshore and offshore interface) has been undertaken. Outcomes of this exercise will be used to indicate whether exposure exists, and further assessment is required.

In recognition of the current optionality with regards to the landfall options, sensitive receptors up to 1km from all onshore and offshore interfaces have been assessed (i.e., assuming nearshore vessel movements occur at all locations) – as illustrated in Volume 1, Chapter 19: Onshore Air Quality Figure 19.5. This ensures that all potential scenarios and associated impacts have been assessed.

For the purposes of defining the onshore study area (the potential area affected by nearshore vessel emissions), a 1km onshore buffer from the onshore and offshore interfaces has been established. This theoretically assumes that vessel movements at the onshore and offshore interfaces occur up to the point of the coastline, irrespective of logistical constraints (i.e., shallow water). This is considered conservative as it increases the spatial extent of the onshore study area, as realistically vessels movements are likely to occur some distance from the coast, given logistical constraints.

Human Receptors

The coastal villages of Anderby Creek and Chapel St Leonards are located within 1km of potential nearshore vessel movements generated by the Project. Other transient exposure locations, such as footpaths, car parks and the beach are also within 1km. These locations are illustrated in Volume 1, Chapter 19: Onshore Air Quality Figure 19.5.

As such, further assessment in relation to human receptors is therefore required.

Ecological Receptors

The following designated ecological sites, considered potentially sensitive to vessel emissions, are located within 1km of potential nearshore vessel movements generated by the Project (locations illustrated in Volume 1, Chapter 19: Onshore Air Quality Figure 19.5):

- Greater Wash Special Protection Area (SPA);
- Sea Bank Clay Pits Site of Special Scientific Interest (SSSI); and
- Several non-statutory Local Wildlife Sites (LWS) / Lincolnshire Wildlife Trust (LWT) Reserves – Chapel Six Marshes LWS/LWT; Wolla Bank Reedbed LWT; Wolla Bank Pit LWT; Chapel Pit LWT; Anderby Marsh LWT; Marsh Yard to Anderby Creek Dunes LWS; Wolla Bank South LWS; Chapel Point Dunes, North LWS; Chapel Pit Nature Reserve LWS; Anderby Gravity Outfall LWS; and Anderby Creek Sand Dunes LWS.

As such, further assessment in relation to ecological receptors is therefore required.

2.3.2 Construction Phase Assessment

The LAQM.TG22 screening criteria relates to the number of large ship movements per year; however, the extent of predicted construction vessel numbers for the Project provided in Volume 1, Chapter 3: Project Description relates to the total number of round trips for the whole construction phase. In order to derive the number of vessel movements for the construction phase, the total number of vessels movements (round trips) has been multiplied by two.

This is believed to be conservative, as the screening thresholds relate to the number of vessel movements in an annual period and the duration of the construction phase is greater than one-year. However, to present a precautionary screening exercise and minimise the use of assumptions, the total number of construction vessel movements estimated to occur throughout the whole construction phase has been used. Actual annual movements associated with the Project are therefore expected to be lower than those values used for screening.

Construction vessel movements detailed within Volume 1, Chapter 3: Project Description have been categorised based upon their likelihood to occur within 250m or 1km of onshore sensitive receptors within the study area, consistent with the LAQM.TG22 screening thresholds. Outcomes of this exercise are documented within Table 2-2.

Table 2-2 – Extent of Construction Vessels and Likelihood to Interact with Onshore Sensitive Receptors

Activity	Associated Vessels by Type	Vessel Movements Likely to Occur Within 250m of an Onshore Sensitive Receptor?	Vessel Movements Likely to Occur Within 1km of an Onshore Sensitive Receptor?
WTG Installation	Installation Vessels	No	No
	Support Vessels	No	No
	Transport Vessels	No	No
WTG Foundation Installation	Installation Vessels	No	No
	Support Vessels	No	No
	Transport / Feeder Vessels	No	No
	Anchored Transport / Feeder Vessels	No	No
Offshore Platform Installation	Installation Vessels	No	No
	Support Vessels	No	No
	Transport Vessels	No	No
Offshore Platform Foundation Installation	Installation Vessels	No	No
	Support Vessels	No	No
	Transport Vessels	No	No
Inter-array and Offshore Interconnector Cable Installation	Main Cable Laying Vessels	No	No
	Main Cable Burial Vessels	No	No
	Support Vessels	No	No
Offshore Export Cable Installation	Main Cable Laying Vessels	Yes	Yes
	Main Cable Jointing Vessels	Yes	Yes
	Main Cable Burial Vessels	Yes	Yes
	Support Vessels	Yes	Yes

The majority of activities detailed in Table 2-2 are offshore activities, involved in the construction of offshore infrastructure. The offshore array area is located approximately 54km off the coast of Lincolnshire, and therefore vessel movements associated with such activities are highly unlikely to occur within 250m and/or 1km of onshore sensitive receptor locations at the offshore and onshore interface.

Of the activities detailed in Table 2-2, only vessel movements associated with 'Offshore Export Cable Installation' have the potential to occur within 250m and/or 1km of sensitive onshore receptors (at the location of the offshore and onshore interface) as this includes the installation of cables near or at the landfall. The extent of vessel movements associated with this activity are detailed in Table 2-3, for comparison against the LAQM.TG22 screening thresholds to determine whether further assessment is required.

It should be acknowledged that the LAQM.TG22 screening thresholds relate explicitly to large ship movements which comprise cross-channel ferries, roll on-roll off ships, bulk cargo, container ships and cruise liners. For the purposes of facilitating an assessment, it has been assumed that all vessels associated with the Project will comprise large ships. However, vessels used to facilitate the construction of onshore infrastructure (within 250m and/or 1km of the offshore and onshore interface) are unlikely to represent large ships, given the nature and location of works. Use of this assumption is therefore considered to be conservative and ensures a precautionary assessment.

Table 2-3 – Number of Construction Vessel Movements Within Proximity of an Onshore Receptor

Vessel Type	Vessel Movements (Round Trips)	Vessel Movements ^(A)
	HVAC	HVAC
Main Cable Laying Vessels	20	40
Main Cable Jointing Vessels	16	32
Main Cable Burial Vessels	16	32
Support Vessels	256	512
Total	308	616
LAQM.TG22 Screening Criteria	Exposure Within 250m	5,000
	Exposure Within 1km	15,000
Note: (A) The total number of vessels movements (round trips) has been multiplied by two to calculate the total number of movements (one ship generating two movements).		

The total number of vessels movements estimated to occur throughout the construction phase within 250m and/or 1km of onshore sensitive receptors (at locations of the offshore and onshore interface) are below the LAQM.TG22 screening thresholds, despite the overly conservative assessment methodology applied. Actual annual movements are believed to be lower than those values used for screening. Furthermore, offshore construction works are expected to last up to three-years, and as such impacts are believed to be temporary, with no long-term deterioration of conditions.

Furthermore, this is considered a worst-case figure, as it is considered unlikely that all vessel movements associated with ‘Offshore Export Cable Installation’ would occur within 1km of the offshore and onshore interface, rather at a distance greater than this, utilised for installation of the offshore ECC.

Whilst taking the above into account, in conjunction with baseline conditions discussed in Section 2.2, impacts from vessel emissions associated with the construction phase are considered to be negligible, and resultant effects ‘not significant’. Further assessment is therefore not required.

2.3.3 O&M Phase

In accordance with comments from The Inspectorate contained within the Scoping Opinion (The Inspectorate, 2022), an assessment of potential impacts on sensitive onshore receptors from offshore vessel movements during the O&M phase has been scoped out of the assessment. This is due to the low number of offshore vessel movements associated with the O&M phase, in comparison to the construction phase.

During the O&M phase, marine vessels will mainly be used for the maintenance of the offshore array area – located approximately 54km off the coast of Lincolnshire. The extent of nearshore vessel movements associated with the O&M phase will relate to maintenance activities including cable replacement at the onshore and offshore interface. However, these maintenance activities are believed to be infrequent and therefore no extensive nearshore activities are expected to be required in the O&M phase.

Furthermore, given the forecast improvements to air quality, any impacts would be lesser in comparison to those established for the construction phase. Further assessment in relation to the O&M phase is therefore not

required and effects are believed to be not significant – as agreed with The Inspectorate in the Scoping Opinion (The Inspectorate, 2022).

2.3.4 Decommissioning Phase

Details surrounding the decommissioning phase are yet to be fully clarified. In addition, it is also recognised that policy, legislation and local sensitivities evolve, which will limit the relevance of undertaking an assessment at this stage.

Decommissioning activities are expected to occur for up to three-years and are not anticipated to exceed the construction phase worst case criteria assessed. As such, any associated impacts are likely to be lesser in comparison, given the following:

- Landfall and cable infrastructure is expected to be left in situ where appropriate, to abate potential future impacts and minimise the extent of decommissioning activities;
- Vessel emission restrictions are expected to tighten in future years and in the interim before decommissioning activities occur (>25 years). This forecast is based on the introduction and availability of cleaner technologies and fuels, alongside legislation – as detailed in Section 2.2.1. Therefore, emission contributions from vessel emissions generated during the decommissioning phase are expected to be lower in comparison; and/or
- Air quality is expected to improve in future years, and in the interim before decommissioning activities occur (>25 years). This forecast is based on the introduction of policy and legislation, and availability of cleaner technologies. The likelihood of a significant effect arising during the decommissioning phase is therefore low.

These elements (alone and/or in combination) would result in a reduction in the level of significance in comparison to the assessment of construction effects. The outcomes of the construction phase assessment indicate that effects from vessel emissions on sensitive onshore receptors are not significant. Further assessment in relation to the decommissioning phase is therefore not required – and effects are believed to be not significant.

Nonetheless, the decommissioning methodology would be finalised nearer to the end of the lifetime of the Project, to be in line with current guidance, policy and legislation. Any such methodology would be agreed with the relevant authorities and statutory consultees. Furthermore, the DCO will include requirements for the submission of decommissioning programmes.

3.0 Helicopter Emissions

Consideration has been given to the extent of helicopter movements generated by the Project, during all stages, and the likelihood for a significant effect at onshore sensitive receptors to arise from associated emissions.

In all phases of the Project, helicopter movements that are required to interact with onshore works will use an existing onshore base/helipad; and all movements will be compliant with the relevant helipad's operational constraints and management plans. The increased number of helicopter movements at the existing onshore base/helipad will still likely be under the maximum assessed capacity.

A total of 375 two-way helicopter movements will be generated by the construction phase of the Project – which has a duration of up to 36-months. This equates to an average of approximately ten two-way helicopter movements per month. Impacts are therefore believed to be short-term and temporary, with no long-term deterioration of conditions.

During the O&M phase, it is anticipated that helicopters will only be required at the offshore array area for maintenance purposes, which is located approximately 54km off the coast of Lincolnshire.

During the decommissioning phase, helicopter movements are expected to be comparable to those associated with the construction phase. However, the extent of impacts associated with the decommissioning phase are likely to be lesser in comparison, given the potential for infrastructure to remain in situ, forecast improvements to air quality and the introduction of cleaner emission technologies.

In consideration of the above, the likelihood for potential effects to occur from helicopter emissions are considered unlikely given the frequency of use, transient exposure, and separation distances from emission sources (i.e., helicopters) to receptors. Further consideration of helicopter emissions has therefore been screened out for all phases of the Project, and effects can be concluded as not significant.

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