Hornsea Offshore Wind Farm

Project Two

Tabular Review of EIA Conclusions in response to the amendments to the Project Design Envelope

Appendix R to the Submission of 10 December 2015

Application Reference: EN010053

10 December 2015

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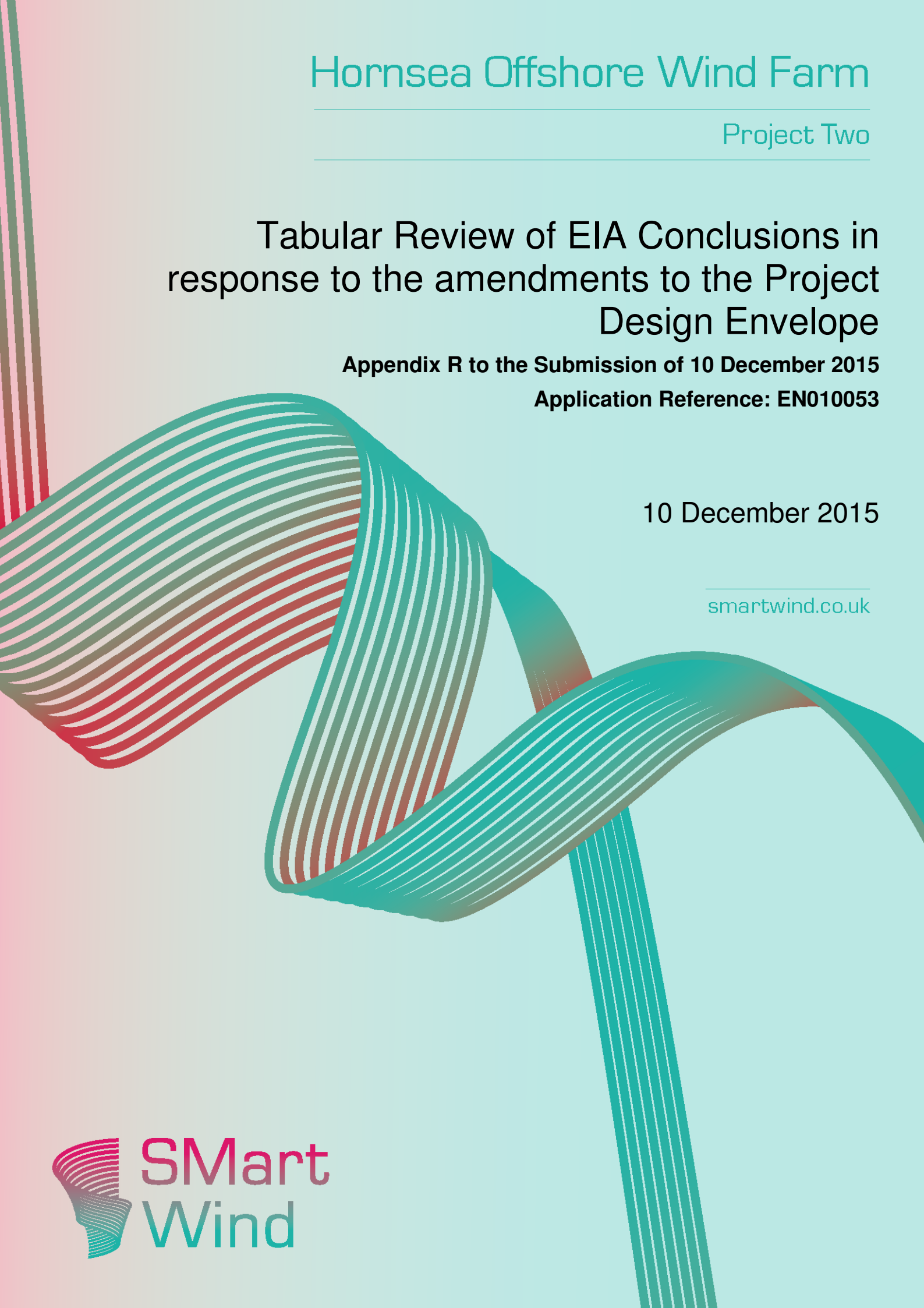

SMart Wind

Review of EIA conclusions in response to the amendments to the Project Design Envelope

As noted in the Applicant's sumission of 4 December 2015, the Applicant has committed to a number of reductions in the Project's design envelope, specifically:

- The removal of the 5 MW wind turbine generator (WTG) option (the smallest capacity is now a 6 MW WTG);
- Increasing the minimum blade tip height from 26 m relative to lowest astronomical tide (LAT) to 34.97 m relative to LAT; and
- Reduction in the maximum rotor diameter from 250 m to 241.03 m.

Table 1 below has been produced in response to the design envelope amendments to establish (where the maximum number of turbines, the lower blade tip height or the maximum rotor diameter was a relevant parameter) any potential effect on the conclusions of the assessment. The Applicant confirms that these amendments do not increase the worst case scenarios presented within the Project's ES and HRA, nor alter the assessment conclusions presented therein. The Applicant can also confirm that the mitigation commitments will not result in the prediction of any significant effects where none had previously been identified.

Table 2: Consequence of the removal of the 5 MW turbine option, increase the minimum blade tip height to 34.97 m relative to LAT and to decrease the maximum rotor diameter to 241.03 m (C = Construction, O&M = Operation & Maintenance, D = Decommissioning).

Potential Impact	C	O&M	D	Consequence
Volume 2, Chapter 1: Marine processes (Doc ref No 7.2.1)				
Potential for jack-up barges used during construction, and operation and maintenance activities to affect the sediment regime.	✔	✔		The assessment considered a maximum adverse scenario of sediment disturbance from jack-up operations associated with the installation and maintenance operations of up to 360, 5 MW, turbines. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of jack-ups per turbine and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). This change results in no change to the magnitude of the impact and therefore no alterations to the conclusions of the assessment. The sediment regime is not considered to be a receptor and therefore a significance of effect is not predicted. The significance of effect on the receptor chapters is therefore considered below (under benthic subtidal and intertidal ecology, fish and shellfish ecology, marine mammals, marine archaeology and ordnance, and infrastructure and other users).

Potential Impact	C	O&M	D	Consequence
Potential for the presence of turbines to affect the tidal regime.		✔		The assessment considered a maximum adverse scenario of up to 360, 5 MW, gravity base foundation turbines. This presents the maximum blockage, and hence the greatest influence on the tidal and wave regime. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the largest foundation type (i.e., gravity base foundation) with the minimum spacing and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alterations to the conclusions of the assessment. The tidal regime is not considered to be a receptor and therefore a significance of effect is not predicted. The significance of effect on the receptor chapters is therefore considered below (under benthic subtidal and intertidal ecology, fish and shellfish ecology, marine mammals, marine archaeology and ordnance, and infrastructure and other users). With regards to the shoreline and sandbanks, the reduction in the design envelope does not alter the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
Potential for the presence of turbines to affect the wave regime, with associated potential impacts along adjacent shorelines.				
Potential for the presence of turbines to affect the wave regime, with associated potential impacts on offshore sandbanks.				

Potential Impact	C	O&M	D	Consequence
Cutting off jacket foundations below the seabed surface has the potential to increase SSC within the water column and deposit material on the seabed.			✔	The assessment considered a maximum adverse scenario of the removal of up to 360, 5 MW, turbines (either jacket or gravity base foundations). This presents the maximum potential disturbance of the seabed, and hence the greatest potential to increase the suspended sediment concentration with the water column and subsequently deposit material on the seabed. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines to be decommissioned and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300) to decommission. There is no change to the magnitude of the impact and therefore no alterations to the conclusions of the assessment. Suspended solids in the water column and deposition on the seabed are not considered to be a receptor and therefore a significance of effect is not predicted. The significance of effect on the receptor chapters is therefore considered below (under benthic subtidal and intertidal ecology, fish and shellfish ecology, marine mammals, marine archaeology and ordnance, and infrastructure and other users).
Potential for removal of gravity base foundations to increase suspended sediment concentration within the water column and deposit material on the seabed.			✔	

Potential Impact	C	O&M	D	Consequence
Volume 2, Chapter 2: Benthic subtidal and intertidal ecology (Doc ref No 7.2.2)				
Temporary habitat loss/disturbance due to seabed preparation works for gravity base foundation installation, maintenance operations and decommissioning activities may affect benthic ecology.	✔	✔	✔	The assessment considered a maximum adverse scenario of temporary habitat disturbance from the installation (seabed preparation and jack up barge operations) and decommissioning of up to 360, 5 MW, gravity base foundation turbines and from the maintenance operations of up to five jack-up barge operations for up to 360 turbines. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360), the maximum seabed preparation area per turbine and the maximum number of jack-ups per turbine which resulted in the greatest spatial impact and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alterations to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
Long term loss of seabed habitat through presence of foundations resulting in potential effects in benthic receptors.		✔		The assessment considered a maximum adverse scenario of long term habitat disturbance from the presence of up to 360, 5 MW, gravity base foundation turbines. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest spatial impact and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.

Potential Impact	C	O&M	D	Consequence
Colonisation of turbines may affect benthic ecology and biodiversity.		✔		The assessment considered a maximum adverse scenario of the maximum surface area from the presence of up to 360, 5 MW, gravity base foundation turbines. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest area for colonisation and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
Alteration of seabed habitats arising from changes in the sediment transport and wave regimes (physical processes) resulting in potential effects on benthic ecology.		✔		As noted in the marine processes section above, the assessment considered a maximum adverse scenario of up to 360, 5 MW, gravity base foundation turbines. This presents the maximum blockage, and hence the greatest influence on the tidal and wave regime. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the largest foundation type (i.e., gravity base foundation) with the minimum spacing and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.

Potential Impact	C	O&M	D	Consequence
Potential reduction in fishing pressure within Subzone 2, resulting in an increase in fishing pressure outside Subzone 2, may affect benthic ecology.		✔		The assessment considered a maximum adverse scenario of the presence of up to 360, 5 MW, gravity base foundation turbines. The assessment assumed that fisheries will not be excluded from Subzone 2 but due to logistical constraints, fishing pressure may be reduced. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest potential reduction in fishing pressure and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.

Potential Impact	C	O&M	D	Consequence
Temporary increases in suspended sediment concentrations and deposition from removal of foundations resulting in potential effects on benthic ecology.			✔	The assessment considered a maximum adverse scenario of the removal of up to 360, 5 MW, turbines. This presents the maximum potential disturbance of the seabed, and hence the greatest potential for the release of sediments and associated increases in suspended sediment concentrations (and contaminants) within the water column and subsequently the deposition of material on the seabed.
Seabed disturbances during decommissioning leading to the release of sediment contaminants and potential effects on benthic ecology.			✔	The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines to be decommissioned and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300) to decommission. There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
Removal of foundations leading to loss of species/habitats colonising these structures.			✔	The assessment considered a maximum adverse scenario of the removal of up to 360, 5 MW, gravity base foundation turbines. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines to be decommissioned and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300) to decommission. There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.

Potential Impact	C	O&M	D	Consequence
Permanent habitat loss due to presence of scour protection left in situ post decommissioning, and potential effects on benthic ecology.			✔	The assessment considered a maximum adverse scenario of scour protection, associated with 360, 5 MW, gravity base foundation turbines, remaining in situ post decommissioning. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest spatial impact and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
Volume 2, Chapter 3: Fish and shellfish ecology (Doc ref No 7.2.3)				
Temporary habitat loss/disturbance from foundation installation, maintenance operations and decommissioning activities resulting in potential effects on fish and shellfish receptors.	✔	✔	✔	The assessment considered a maximum adverse scenario of temporary habitat disturbance from the installation (seabed preparation) and decommissioning of up to 360, 5 MW, gravity base foundation turbines and from the maintenance operations of up to five jack-up barge operations for up to 360 turbines. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) and the maximum number of jack-ups per turbine which resulted in the greatest spatial impact and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.

Potential Impact	C	O&M	D	Consequence
Long term habitat loss due to presence of turbine foundations with potential effects on fish and shellfish ecology.		✔		The assessment considered a maximum adverse scenario of long term habitat disturbance from the presence of up to 360, 5 MW, gravity base foundation turbines. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest spatial impact and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
Underwater noise as a result of operational turbines resulting in potential effects on fish and shellfish receptors.		✔		The assessment considered a maximum adverse scenario of underwater noise from the operation of up to 360, 5 MW, turbines. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest operational noise impact and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.

Potential Impact	C	O&M	D	Consequence
Introduction of turbine foundations (hard substrates and structural complexity) leading to effects on fish and shellfish receptors by creating reef habitat.		✔		The assessment considered a maximum adverse scenario of the maximum surface area from the presence of up to 360, 5 MW, gravity base foundation turbines. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest area for colonisation and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
Potentially reduced fishing pressure within Subzone 2 offering some protection and possible local enhancement within Subzone 2 and potentially increased fishing pressure outside Subzone 2.		✔		The assessment considered a maximum adverse scenario of the presence of up to 360, 5 MW, gravity base foundation turbines. The assessment assumed that fisheries will not be excluded from Subzone 2 but due to logistical constraints, fishing pressure may be reduced. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest potential reduction in fishing pressure and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.

Potential Impact	C	O&M	D	Consequence
Temporary increases in suspended sediment concentrations from removal of turbine foundations resulting in potential effects on fish and shellfish receptors.			✔	The assessment considered a maximum adverse scenario of the removal of up to 360, 5 MW, turbines. This presents the maximum potential disturbance of the seabed, and hence the greatest potential for the release of sediments and associated increases in suspended sediment concentrations (and contaminants) within the water column and subsequently the deposition of material on the seabed.
Sediment deposition as a result of removal of turbine foundations resulting in potential effects on fish and shellfish receptors.			✔	The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines to be decommissioned and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300) to decommission. There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
Seabed disturbance leading to release of sediment contaminants with potential for effects on fish and shellfish ecology.			✔	
Decommissioning activities producing subsea noise resulting in potential effect on fish and shellfish receptors.			✔	The assessment considered a maximum adverse scenario of the subsea noise generated from the removal of up to 360, 5 MW, turbines. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines to be decommissioned and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300) to decommission. There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.

Potential Impact	C	O&M	D	Consequence
Effects on fish and shellfish receptors due to removal of foundations leading to loss of hard substrates and structural complexity and reinstatement of commercial fishing activity.			✔	The assessment considered a maximum adverse scenario of the removal of up to 360, 5 MW, turbines. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines to be decommissioned and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300) to decommission. There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
Permanent habitat loss/alteration due to presence of scour/cable protection left in situ post decommissioning with potential effects on fish and shellfish ecology.			✔	The assessment considered a maximum adverse scenario of permanent habitat loss/alteration associated with scour protection for 360, 5 MW, gravity base foundations. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest spatial impact and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.

Potential Impact	C	O&M	D	Consequence
Volume 2, Chapter 4: Marine mammals (Doc ref No 7.2.4)				
The operating noise of turbines may result in potential effects on marine mammals.		✔		The assessment considered a maximum adverse scenario of underwater noise from the operation of up to 360, 5 MW, turbines. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest operational noise impact and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
Underwater noise from turbine removal may cause disturbance to marine mammals.			✔	The assessment considered a maximum adverse scenario of the subsea noise generated from the removal of up to 360, 5 MW, turbines. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines to be decommissioned and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300) to decommission. There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.

Potential Impact	C	O&M	D	Consequence
Increased suspended sediments may impair the foraging ability of marine mammals.			✔	The assessment considered a maximum adverse scenario of the removal of up to 360, 5 MW, turbines. This presents the maximum potential disturbance of the seabed, and hence the greatest potential for an increase in the suspended sediment concentration with the water column. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines to be decommissioned and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300) to decommission. There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
Volume 2, Chapter 5: Ornithology (Doc ref No 7.2.5)				
The impact of physical displacement from an area around turbines and other ancillary structures during the operational phase of the development may result in effective habitat loss and reduction in survival or fitness rates.		✔		The assessment considered a maximum adverse scenario of up to 360, 5 MW, turbines. The maximum adverse scenario considered turbines spaced approximately evenly across Subzone 2 and orientated in straight lines within the array and a dense perimeter. This presents the maximum potential area of displacement. For sensitive species, the wind farm as a whole will be avoided, whereas for others only individual turbines will be avoided while within the wind farm. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum Project area which resulted in the greatest potential for displacement and, as there is no change to the Project area, there is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.

Potential Impact	C	O&M	D	Consequence
The impact of indirect effects due to changes to physical processes and habitat from operational infrastructure and fisheries may lead to changes in habitat for prey species.		✔		The assessment considered a maximum adverse scenario of long term habitat disturbance from the presence of up to 360, 5 MW, turbines. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest potential indirect impact for prey species and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
The impact of collisions with rotating turbine blades may result in direct mortality of an individual.		✔		The assessment considered a maximum adverse scenario of up to 360, 5 MW turbines. This presents the maximum potential for collisions with rotating turbine blades. The reduction in the design envelope to remove the 5 MW turbine option and to increase the minimum blade tip height to 34.97 m relative to LAT, reduces the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) with the minimum blade tip height which resulted in the greatest potential for collisions with rotating turbine blades. As a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300) with a greater minimum blade tip height. There is no change to the magnitude of the impact for all species and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.

Potential Impact	C	O&M	D	Consequence
The impact of barrier effects caused by the physical presence of turbines and ancillary structures may prevent clear transit of birds between foraging and breeding sites, or on migration.		✔		The assessment considered a maximum adverse scenario of up to 360, 5 MW turbines. The maximum adverse scenario considered turbines spaced approximately evenly across Subzone 2 and orientated in straight lines within the array and a dense perimeter. This presents the maximum potential for barrier effects. The reduction in the design envelope to remove the 5 MW turbine option and to increase the minimum blade tip height to 34.97 m relative to LAT, does not increase the maximum adverse scenario. This is because the assessment was based on the maximum Project area which resulted in the greatest potential for barrier effects and, as there is no change to the Project area, there is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
The impact of attraction to lit structures by migrating birds in particular may cause disorientation, reduction in fitness and possible mortality.		✔		The assessment considered a maximum adverse scenario of up to 360, 5 MW, turbines. The maximum adverse scenario considered turbines spaced approximately evenly across Subzone 2 and orientated in straight lines within the array and a dense perimeter. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest number of lit structures and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.

Potential Impact	C	O&M	D	Consequence
The impact of disturbance and displacement due to underwater noise may stop birds from accessing important foraging and habitat areas.			✔	The assessment considered a maximum adverse scenario of the removal of up to 360, 5 MW, turbines. This presents the maximum potential disturbance of the seabed. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines to be decommissioned and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300) to decommission. There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
The impact of disturbance and displacement due to underwater noise may stop prey species accessing important foraging and habitat areas.			✔	
The impact of changes to physical processes and removal of structures, may lead to changes in habitat available for prey species.			✔	

Potential Impact	C	O&M	D	Consequence
Volume 2, Chapter 6: Commercial fisheries (Doc ref No 7.2.6)				
Subzone 2 construction activities, physical presence of wind farm infrastructure and decommissioning activities leading to reduction in access to, or exclusion from, potential and/or established fishing grounds.	✔	✔	✔	The assessment considered a maximum adverse scenario of the construction and physical presence of up to 360, 5 MW, turbines. This presents the maximum potential reduction in access to, or exclusion from, potential and/or established fishing grounds and the subsequent displacement from Subzone 2 leading to gear conflict and increased fishing pressure on adjacent grounds. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest potential for displacement and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
Displacement from Subzone 2 leading to gear conflict and increased fishing pressure on adjacent grounds.	✔	✔	✔	
Subzone 2 construction activities, physical presence of wind farm infrastructure and decommissioning activities leading to longer steaming distances to alternative fishing grounds.	✔	✔	✔	The assessment considered a maximum adverse scenario of up to 360, 5 MW, turbines, spaced approximately evenly across Subzone 2 and orientated in straight lines within the array and a dense perimeter. This presents the maximum potential for longer steaming distances. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest potential for an increase in steaming distances and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.

Potential Impact	C	O&M	D	Consequence
Physical presence of Subzone 2 leading to gear snagging.		✔		The assessment considered a maximum adverse scenario of the physical presence of up to 360, 5 MW, turbines. This presents the maximum potential for gear snagging with Project infrastructure. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest potential for gear snagging and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
Volume 2, Chapter 7: Shipping and Navigation (Doc ref No 7.2.7)				
Physical presence of partially and fully constructed wind turbine array within Subzone 2 may displace operators' own vessels, commercial shipping, fishing vessels and recreational vessels leading to an increased vessel to vessel collision risk.	✔	✔	✔	The assessment considered a maximum adverse scenario of up to 360, 5 MW, turbines, spaced approximately evenly across Subzone 2 and orientated in straight lines within the array and a dense perimeter. This presents the maximum potential for displacement leading to an increased vessel to vessel collision risk. The reduction in the design envelope to a maximum of 300 turbines does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest potential for vessel to vessel collision risk and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.

Potential Impact	C	O&M	D	Consequence
Physical presence of partially and fully constructed wind turbine array in previously open sea areas within Subzone 2 will increase allision risk to vessels not under command (NUC) including commercial vessels, recreational users and commercial fishing vessels in an emergency situation (including machinery related problems or navigational system errors).	✔	✔	✔	The assessment considered a maximum adverse scenario of the physical presence of up to 360, 5 MW, turbines. This presents the maximum potential for allision risk to vessels. The reduction in the design envelope to a maximum of 300 turbines does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest potential for allision risk and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
Physical presence of partially and fully constructed wind turbine array within Subzone 2 may cause additional allision risk for commercial vessels, recreational craft and commercial fishing vessels.	✔	✔	✔	

Potential Impact	C	O&M	D	Consequence
Construction, operation and maintenance, and decommissioning activities associated with Project Two may diminish emergency response capability (including SAR) within the southern North Sea during construction.	✔	✔	✔	The assessment considered a maximum adverse scenario of the physical presence of up to 360, 5 MW, turbines. This scenario presents the maximum potential demand for emergency response, and pollution and salvage response services, and presents the maximum potential access restrictions for emergency responders. The reduction in the design envelope to a maximum of 300 turbines does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest potential for access restrictions for emergency responders and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
Construction, operation and maintenance, and decommissioning activities associated with Project Two may diminish pollution and salvage response capability for emergency responders.	✔	✔	✔	
Physical presence of wind turbine array within Subzone 2 may require deviations to commercial routes.		✔		The assessment considered a maximum adverse scenario of up to 360, 5 MW, turbines, spaced approximately evenly across Subzone 2. This presents the maximum potential deviations for commercial vessels on existing commercial routes. The reduction in the design envelope to a maximum of 300 turbines does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest potential for deviations to commercial routes and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.

Potential Impact	C	O&M	D	Consequence
Physical presence of wind turbine array within Subzone 2 may displace commercial shipping, fishing vessels and recreational vessels leading to an increased vessel to oil and gas platform collision risk.		✔		The assessment considered a maximum adverse scenario of up to 360, 5 MW, turbines, spaced approximately evenly across Subzone 2 and orientated in straight lines within the array and a dense perimeter. This presents the maximum potential for displacement leading to an increased vessel to oil and gas platform collision risk. The reduction in the design envelope to a maximum of 300 turbines does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest potential for vessel to oil and gas platform collision risk and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
Volume 2, Chapter 8: Aviation, Military and Communications (Doc ref No 7.2.8)				
The physical presence of wind turbines may interfere with existing offshore microwave and other communication links.		✔		The assessment considered a maximum adverse scenario of up to 360, 5 MW, turbines, spaced approximately evenly across Subzone 2. This presents the maximum potential obstruction to communication systems. The reduction in the design envelope to a maximum of 300 turbines does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest potential for interference with existing offshore microwave and communication links and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.

Potential Impact	C	O&M	D	Consequence
Volume 2, Chapter 9: Marine archaeology and ordnance(Doc ref No 7.2.9)				
Construction, operation and maintenance, and decommissioning of wind turbine generators with gravity base foundations causing the removal or disturbance of sediments resulting in a potential effect on near-surface prehistoric land surfaces.	✔	✔	✔	The assessment considered a maximum adverse scenario of the installation of up to 360, 5 MW, gravity base foundation turbines. This presents the maximum potential for impacts to near-surface prehistoric land surfaces, shipwrecks and aircraft wrecks. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest spatial impact and therefore the greatest potential impacts to near-surface prehistoric land surfaces, shipwrecks and aircraft wrecks and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
Construction, operation and maintenance, and decommissioning of wind turbine generators with gravity base foundations resulting in a potential effect on shipwrecks and aircraft wrecks.	✔	✔	✔	

Potential Impact	C	O&M	D	Consequence
Construction of wind turbine generators with jacket (driven pile) foundations causing the removal or disturbance of sediments resulting in a potential effect on deeply buried prehistoric land surfaces.	✔			The assessment considered a maximum adverse scenario of the installation of up to 360, 5 MW, jacket (driven pile) foundation turbines. This presents the maximum potential for impacts to deeply buried prehistoric land surfaces. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest spatial impact and therefore the greatest potential impacts to deeply buried prehistoric land surfaces and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
Seabed preparation in connection with gravity base foundation installation causing sediment deposition on the seabed resulting in a potential effect on a variety of heritage assets.	✔			The assessment considered a maximum adverse scenario of the installation of up to 360, 5 MW, gravity base foundation turbines. This presents the maximum potential for impacts to near-surface prehistoric land surfaces, shipwrecks and aircraft wrecks. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest spatial impact and therefore the greatest potential impacts to deeply buried prehistoric land surfaces and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.

Potential Impact	C	O&M	D	Consequence
Volume 2, Chapter 10: Seascape and visual resources (Doc ref No 7.2.10)				
The existing present day seascape character may change through the introduction of new or uncharacteristic elements/features during the construction, operation and maintenance and decommissioning phases may cause direct or indirect effects.	✔	✔	✔	The assessment considered a maximum adverse scenario of the installation of up to 360, 5 MW, turbines, with a maximum blade tip height of 161 m relative to LAT. This presents the maximum potential intrusion on the existing and historic seascape character. The reduction in the design envelope to remove the 5 MW turbine option, results in a reduced number of 6 MW turbines (300) albeit with a greater blade tip height of 188.97 m relative to LAT. The change does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest intrusion on the existing seascape and historic seascape character and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
The existing Historic Seascape Character may change through the introduction of new or uncharacteristic elements/features during the construction, operation and maintenance and decommissioning phases may cause direct or indirect effects.	✔	✔	✔	

Potential Impact	C	O&M	D	Consequence
The day time visual scenario experienced by a variety of visual receptors during the operational phase may change.	✔	✔	✔	The assessment considered a maximum adverse scenario of the installation of up to 360, 5 MW, turbines, with a maximum blade tip height of 161 m relative to LAT. This presents the maximum potential intrusion on the day time visual scenario. The reduction in the design envelope to remove the 5 MW turbine option, results in a reduced number of 6 MW turbines (300) albeit with a greater blade tip height of 188.97 m relative to LAT. The change does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest intrusion on the day time visual scenario and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
The night time visual scenario experienced by a variety of visual receptors during the operational phase may change.	✔	✔	✔	The assessment considered a maximum adverse scenario of the installation of up to 360, 5 MW, turbines, with a maximum blade tip height of 161 m relative to LAT. The reduction in the design envelope to remove the 5 MW turbine option, albeit with a greater blade tip height of 188.97 m relative to LAT, does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines (360) which resulted in the greatest intrusion on the night time visual scenario and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as significant to not significant (depending on the location and type of the receptor) in EIA terms.

Potential Impact	C	O&M	D	Consequence
Volume 2, Chapter 11: Infrastructure and other users (Doc ref No 7.2.11)				
Recreational users and recreational fishing				
Safety zones, recommended advisory safety zones and the physical presence of infrastructure within Subzone 2 may displace sailing, motor and other recreational craft and recreational fishing vessels resulting in a loss of recreational activity.	✔	✔	✔	The assessment considered a maximum adverse scenario of the construction and physical presence of up to 360, 5 MW, turbines. This presents the maximum potential displacement from Subzone 2. The reduction in the design envelope to a maximum of 300 turbines does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number turbines (360) which resulted in the greatest potential displacement of recreational craft and vessels and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
Safety zones and recommended advisory safety zones within Subzone 2 may result in displacement of recreational fishing vessels resulting in a loss of fishing area.	✔		✔	The assessment considered a maximum adverse scenario of the construction of up to 360, 5 MW, turbines. This presents the maximum potential displacement from Subzone 2. The reduction in the design envelope to a maximum of 300 turbines does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number turbines (360) which resulted in the greatest potential displacement of recreational fishing vessels and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.

Potential Impact	C	O&M	D	Consequence
Aggregate extraction, cables and pipelines				
Construction activities, safety zones and recommended advisory safety zones around Subzone 2, and decommissioning activities may cause a temporary loss of access to existing pipelines or cables for repair or maintenance.	✔	✔	✔	The assessment considered a maximum adverse scenario of the construction, maintenance and decommissioning of up to 360, 5 MW, turbines. This presents the maximum potential temporary loss of access to existing pipelines or cables for repair or maintenance. The reduction in the design envelope to a maximum of 300 turbines does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number turbines (360) which resulted in the greatest potential loss of access to existing pipelines or cables for repair and maintenance and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
Potential for the presence of wind turbines to affect sediment transport pathways and lead to a change in aggregate resource in aggregate extraction areas.		✔		The assessment considered a maximum adverse scenario of up to 360, 5 MW, gravity base foundation turbines. This presents the maximum blockage, and hence greatest influence on marine processes (including potential changes to sediment transport pathways). The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number turbines (360) which resulted in the greatest potential change to the sediment transport pathways leading to a change in aggregate resource in aggregate extraction areas and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.

Potential Impact	C	O&M	D	Consequence
Decommissioning of wind turbines has the potential to lead to increased suspended sediment concentrations and deposition, which could cause a change in aggregate resource in aggregate extraction areas.			✔	The assessment considered a maximum adverse scenario of the removal of up to 360, 5 MW, turbines. This presents the maximum potential disturbance of the seabed, and hence the greatest potential for an increase in the suspended sediment concentration with the water column and subsequent deposition of material on the seabed. The reduction in the design envelope to remove the 5 MW turbine option does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number of turbines to be decommissioned and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300) to decommission. There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.
Oil and gas, carbon capture and storage, and natural gas storage				
Construction, operation and maintenance and decommissioning activities may cause a reduction in potential seismic survey area.	✔	✔	✔	The assessment considered a maximum adverse scenario of up to 360, 5 MW, turbines. This presents the maximum potential reduction in seismic survey area. The change in the design envelope to a maximum of 300 turbines does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number turbines (360) which resulted in the greatest potential reduction in potential seismic survey area and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.

Potential Impact	C	O&M	D	Consequence
The presence of new wind turbines in previously open sea areas may cause interference with the performance of the REWS, located on oil and gas platforms.		✔		The assessment considered a maximum adverse scenario of the physical presence of up to 360, 5 MW turbines. This presents the maximum potential interference with the performance of the REWS located on oil and gas platforms. The reduction in the design envelope to a maximum of 300, 6 MW turbines, albeit with an increased minimum blade tip height of 34.97 m relative to LAT and an increased maximum blade tip height of 188.97 m relative to LAT, does not increase the maximum adverse scenario. This is because the assessment was based on the maximum number turbines (360) which resulted in the greatest potential interference with the performance of the REWS and, as a result of the proposed refinement to the Project's envelope, there would now be fewer turbines (a maximum of 300). There is no change to the magnitude of the impact and therefore no alteration to the conclusions of the assessment. The significance of the effect would therefore remain as not significant in EIA terms.