Triton Knoll Offshore Wind Farm

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Annex C: Non Material Amendment Screening Review of Potential Impacts

Document in reference to The Triton Knoll Offshore Wind Farm Order (2013)

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CONTENTS

TABLE OF TABLES

TABLE OF FIGURES

1 INTRODUCTION

1.1 Background to the Project

Triton Knoll Offshore Wind Farm (TKOWF) is located off the east coast of England, approximately 32km from the Lincolnshire coast and 50km from the coast of north Norfolk, with the export cable landfall located at Anderby Creek on the Lincolnshire coast (Figure 1). The footprint of the consented development area is approximately 145km^2. TKOWF has progressed through two separate consent applications, the Triton Knoll Offshore Wind Farm Array (TK Array) which was granted development consent on 11 July 2013[1], and Triton Knoll Electrical System (TK Electrical System), which was granted development consent on 5 September 2016[2]. The TK Array and the TK Electrical System are being brought forward as a single development by Triton Knoll Offshore Wind Farm Ltd (TKOWFL).

The TK Array DCO allows for up to 288 wind turbine generators (WTGs) fixed to the seabed by one of five foundation types (monopile, jacket, tripod, suction bucket monopod and gravity base), with an installed capacity of up to 1,200 MW. The TK Array DCO also specifies up to eight offshore substations (comprising up to four collector substations and up to four High Voltage Direct Current (HVDC) substations), up to four meteorological stations and a network of underground cables between the offshore elements of the development.

The DCO for the TK Electrical System allows for up to six seabed export cables to transfer the electricity to shore, together with infrastructure to connect the offshore and onshore cables and the associated onshore infrastructure required to transport the power for connection to the National Grid.

In January 2014, following detailed technical and commercial optimisation studies undertaken by TKOWFL, the generating capacity of TKOWF was reduced to a maximum of 900 MW. Further project optimisation work continued post-consent and TKOWF was awarded a Contract for Difference (CfD) by the UK Government on the 11th September 2017 for a generating capacity of 860 MW.

1.2 Purpose of this Report

This Screening Review of Potential Impacts document has been produced to inform the Non-Material Change Application (NMC Application) to the Triton Knoll Offshore Wind Farm Order 2013 (the TK Array DCO). The NMC Application seeks a reduction to the wind farm capacity, the number of turbines and the number of collector offshore substations consented by the Array DCO. It also seeks the removal of the meteorological stations and the option for any HVDC substations. No changes are being requested to the Triton Knoll Electrical System DCO. This Report summarises the impacts assessed as part of the original Environmental Statement for the TK Array DCO and considers how the proposed changes to the Array DCO would alter those conclusions.

[1] https://infrastructure.planninginspectorate.gov.uk/projects/east-midlands/triton-knoll-offshore-wind-farm/
[2] https://infrastructure.planninginspectorate.gov.uk/projects/east-midlands/triton-knoll-electrical-system/

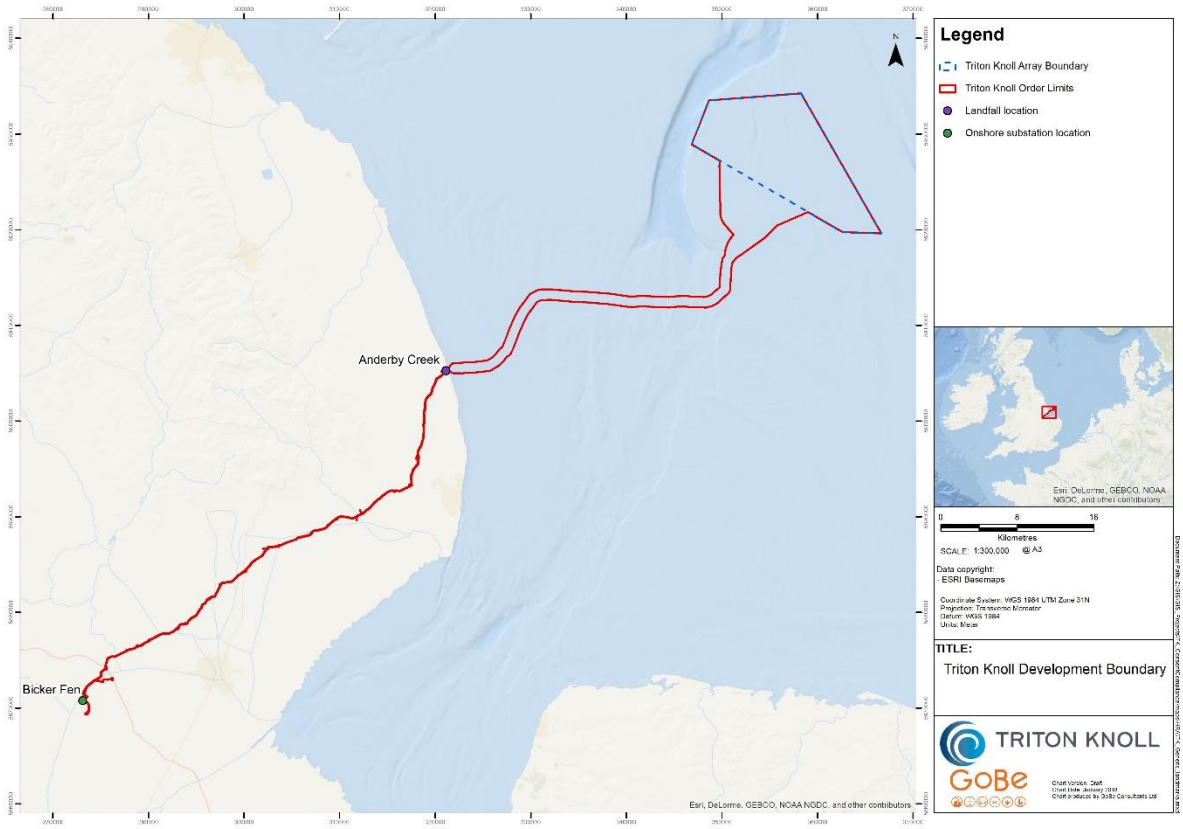

Figure 1 Location of the Triton Knoll Offshore Wind Farm and Triton Knoll Electrical System

1.3 Approach

All topics and potential impacts as set out in the Environmental Statements for the TK Array and the TK Electrical System (as relevant) were screened against the refined project design parameters of the NMC Application. This involved consideration of the environmental impacts of the proposed changes and whether these impacts could result in a different level of effect to that identified in the existing Environmental Statement assessments. As the changes did not affect any parameter associated with the TK Electrical System DCO, the assessment of the implications of the reduced capacity for TKOWF focused solely on those of the TK Array DCO.

Where the significance of the effect would be unchanged or reduced from the TKOWF Project alone assessment, it is considered that the significance of any cumulative impacts would also be unchanged or reduced.

All of the proposed changes to the TKOWF project design parameters for the NMC Application relate to reductions, principally in the total number of structures and associated activities, and this is considered to apply across all phases of TKOWF; construction, operation and maintenance and decommissioning works. For all relevant topics, this assessment identified a reduction in the magnitude of impacts and consequently no change (i.e., no increase) in the significance of any effects. Please see Table 1 for the revised project parameters for the NMC Application applicable to the reduction in capacity to 900MW, and Table 2 for the screening assessment of Environmental Statement topics. It should be noted that predicted impact levels are presented with mitigation applied where applicable.

Table 1 Revised project parameters for the TKOWF NMC Application

Project Component	As Consented	Refined Project Design for NMC Application
Capacity	1,200MW	Up to 900MW
Number of WTGs	288 (333 assessed within the ES)	Up to 90
Offshore Substation Platforms (OSPs)	Up to eight OSPs, including up to four offshore collector stations and up to four HVDC substations.	Two OSPs, no HVDC substations.
Meteorological stations	Up to 4 meteorological stations.	No meteorological stations.

Table 2 Screening assessment of topics

EIA Topic	Change in Project Parameter	Change in Impact	Change in Effect Significance
Physical Processes (TK Array ES; Volume 2, Chapter 2)	A reduction in number of WTGs from the consented 288 in the DCO to up to 90, reducing the number of foundations to be installed and the overall infrastructure footprint (both on the seabed and through the water column); and A reduction in number of offshore ancillary structures from eight OSPs and four met masts, to two OSPs and no met masts.	Impacts identified on physical processes associated with the construction, operation and decommissioning of TKOWF within the ES included: • Increased suspended sediment concentrations and deposition of material on the seabed; • changes to seabed morphology hydrodynamics and sediment regime; and • changes to tidal and wave regime. As all proposed changes to the TKOWF project parameters relate to reductions in the total number of structures and activities, there will be a reduction in the magnitude of any associated impacts.	The impacts identified are caused by the physical presence of the WTG and substation foundations and the activities associated with their installation, operation and maintenance and decommissioning. The potential impacts to physical processes associated with the wind farm construction, operation and decommissioning were found to be of negligible to minor significance. The changes to TKOWF comprise a reduction in the number of structures, all of which will be within the dimensions set out within the DCO/dMLs and the TKOWF Order Limits. There is also an associated reduction in activities across all phases of the TKOWF project. Overall, there will be a reduction in the magnitude of potential impacts and no change to the nature or sensitivity of the environmental receptors. **There is therefore no change (no increase) in effect significance and**

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			predicted impacts remain of negligible to minor significance.
Benthic Subtidal and Intertidal Ecology (TK Array ES; Volume 2, Chapter 3)	A reduction in number of WTGs from the consented 288 in the DCO (noting the benthic and intertidal ecology assessment was carried out on 333 turbines) to up to 90, reducing the number of foundations to be installed and the overall infrastructure footprint (both on the seabed and through the water column); and A reduction in number of offshore ancillary structures from eight OSPs and four met masts to two OSPs and no met masts.	Impacts identified on benthic subtidal and intertidal ecology associated with the construction, operation and decommissioning of TKOWF within the ES included: • Increased suspended sediment concentrations and deposition; • temporary habitat disturbance and loss; • long term habitat loss; • introduction of new habitat; and • habitat disturbance via changes to hydrodynamic regime. As all proposed changes to the TKOWF project parameters relate to reductions in the total number of structures and activities, there will be a reduction in the magnitude of any associated impacts.	The impacts identified are caused by the physical presence of the WTG and substation foundations and the activities associated with their installation, operation and maintenance and decommissioning. The potential impacts to benthic ecology associated with the wind farm construction, operation and decommissioning were found to be of negligible to slight significance. The proposed changes to TKOWF comprise a reduction in the number of structures, all of which will be within the dimensions set out within the DCO/dMLs and the TKOWF Order Limits. There is also an associated reduction in activities across all phases of the TKOWF project. Overall, there will be a reduction in the magnitude of potential impacts and no change to the nature or sensitivity of the environmental receptors. **There is therefore no change (no**

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			increase) in effect significance and predicted impacts remain of negligible to slight significance.
Fish and Shellfish Ecology (TK Array ES; Volume 2, Chapter 4)	A reduction in number of WTGs from the consented 288 in the DCO (noting the fish and shellfish ecology assessment was carried out on worst case assumptions, including up to 333 WTG foundations) to up to 90, reducing the number of piles to be installed and the overall installation activity duration (including piling) required; and A reduction in number of offshore ancillary structures from 8 OSPs and 4 met masts to two OSPs and no met masts.	Impacts identified on fish and shellfish ecology associated with the construction, operation and decommissioning of TKOWF within the ES included: • Increased suspended sediment concentrations, sediment deposition and scour; • underwater noise disturbance; • temporary habitat disturbance; • long term habitat loss; • electric and magnetic field emissions from subsea cables; and • introduction of new habitat. As all proposed changes to the TKOWF project parameters relate to reductions in the total number of structures and activities, there will be a reduction in the magnitude of any associated impacts.	The impacts identified are caused by the physical presence of the WTG and substation foundations and the activities associated with their installation, operation and maintenance and decommissioning. The potential impacts to fish and shellfish ecology associated with the wind farm construction, operation and decommissioning were found to be of negligible to minor significance. The proposed changes to the TKOWF comprise a reduction in the number of structures, all of which will be within the dimensions set out within the DCO/dMLs and the TKOWF Order Limits. There is also an associated reduction in activities across all phases of the TKOWF project. Overall, there will be a reduction in the magnitude of potential impacts and no change to the nature or sensitivity of the environmental receptors.

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Marine Mammals (TK Array ES; Volume 2, Chapter 5)	A reduction in number of WTGs from the consented 288 in the DCO (noting the marine mammal assessment was carried out on 333 turbines) to up to 90, reducing the number of piles to be installed and the overall duration of piling required; and A reduction in number of offshore ancillary structures from 8 OSPs and 4 met masts to two OSPs and no met masts.	Impacts identified on marine mammals associated with the construction, operation and decommissioning of TKOWF within the ES included: • Underwater noise; • collision risks from increased vessel traffic; • changes to prey resources; and • electric and magnetic effects from subsea cables. As all proposed changes to the TKOWF project parameters relate to reductions in the total number of structures and activities, there will be a reduction in the magnitude of any associated impacts.	The impacts identified are caused by the installation of the WTG and substation foundations and the physical presence of the structures, together with the activities associated with operation and maintenance as well as the decommissioning of TKOWF. The potential impacts to marine mammals associated with the wind farm construction, operation and decommissioning were found to be of negligible to moderate significance. The proposed changes to TKOWF comprise a reduction in the number of structures, all of which will be within the dimensions set out within the DCO/dMLs and the TKOWF Order Limits. There is also an associated reduction in activities across all phases of the TKOWF project. Overall, there will be a reduction in the magnitude of potential impacts and no change to the nature or sensitivity of the environmental

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			receptors. **There is therefore no change (no increase) in effect significance and predicted impacts will remain of negligible to moderate significance**.
Ornithology (TK Array ES; Volume 2, Chapter 6)	A reduction in number of WTGs from the consented 288 in the DCO (noting the ornithology assessment was carried out on 333 turbines) to up to 90, reducing the number of WTGs and the effective swept area of the TKOWF that is a key parameter for bird collision, barrier effect and displacement risks. A reduction in number of offshore ancillary structures from 8 OSPs and 4 met masts to two OSPs and no met masts.	Impacts identified on ornithology associated with the construction, operation and decommissioning of TKOWF within the ES included: • Disturbance-displacement impacts; • habitat loss; • collision mortality; • barrier effects; and • indirect effects associated with impacts on prey items. As all proposed changes to the TKOWF project parameters relate to reductions in the total number of structures and activities, there will be a reduction in the magnitude of any associated impacts.	The impacts identified are caused by the physical presence of the WTG and substation foundations and the activities associated with their installation, operation and maintenance and decommissioning. The potential impacts to ornithology receptors associated with the wind farm construction, operation and decommissioning were found to be of moderate significance. The proposed changes to TKOWF comprise a reduction in the number of structures, all of which will be within the dimensions set out within the DCO/dMLs and the TKOWF Order Limits. There is also an associated reduction in activities across all phases of the TKOWF project. Overall, there will be a reduction in the magnitude of potential impacts and no change to the nature or

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			sensitivity of the environmental receptors. **There is therefore no change (no increase) in effect significance and predicted impacts remain of moderate significance**.
Nature Conservation (TK Array ES; Volume 2, Chapter 7)	A reduction in number of WTGs from the consented 288 in the DCO to up to 90, reducing the number of structures and the duration of piling activity to install the foundations as well as reducing the number of WTGs and the effective swept area of the TKOWF and the overall duration of piling required; and A reduction in number of offshore ancillary structures from 8 OSPs and 4 met masts to two OSPs and no met masts.	No significant impacts were predicted on any UK designated sites with benthic ecology, fish and shellfish, marine mammal or ornithological features within the TKOWF ES arising from the construction, operation and maintenance or decommissioning phases of TKOWF. As all proposed changes to the TKOWF project parameters relate to reductions in the total number of structures and activities, there will be a reduction in the magnitude of any associated impacts.	The proposed changes to TKOWF comprise a reduction in the number of structures, all of which will be within the dimensions set out within the DCO/dMLs and the TKOWF Order Limits. There is also an associated reduction in activities across all phases of the TKOWF project. The potential impacts to nature conservation receptors associated with the wind farm construction, operation and decommissioning were found to be of negligible to moderate significance. Overall, there will be a reduction in the magnitude of potential impacts and no change to the nature or sensitivity of the environmental receptors. **There is therefore no change (no increase) in effect significance and**

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Commercial Fisheries (TK Array ES; Volume 2, Chapter 8)	A reduction in number of WTGs from the consented 288 in the DCO to up to 90, reducing the number of foundations to be installed and the overall infrastructure footprint (both on the seabed and through the water column); and A reduction in number of offshore ancillary structures from eight OSPs and four met masts to two OSPs and no met masts.	Impacts identified on commercial fisheries associated with the construction, operation and decommissioning of TKOWF within the ES included: • Exclusion from fishing grounds; • displacement; • gear snagging; • economic effects; and • ecological effects upon target species. As all proposed changes to the TKOWF project parameters relate to reductions in the total number of structures and activities, there will be a reduction in the magnitude of any associated impacts.	The impacts identified are caused by the physical presence of the WTG and substation foundations and the activities associated with their installation, operation and maintenance and decommissioning. The potential impacts to commercial fisheries associated with the wind farm construction, operation and decommissioning were found to be of negligible to minor significance. The proposed changes to TKOWF comprise a reduction in the number of structures, all of which will be within the dimensions set out within the DCO/dMLs and the TKOWF Order Limits. There is also an associated reduction in activities across all phases of the TKOWF project. Overall, there will be a reduction in the magnitude of potential impacts and no change to the nature or sensitivity of the environmental receptors. **There is therefore no change (no**

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Seascape and Visual Impact (TK Array ES; Volume 2, Chapter 9)	A reduction in number of WTGs from the consented 288 in the DCO (noting the seascape and landscape visual impact assessment was carried out on 333 turbines) to up to 90, reducing the number of piles to be installed and the overall duration of piling required; and A reduction in number of offshore ancillary structures from 8 OSPs and 4 met masts to two OSPs and no met masts.	Impacts identified on seascape and visual resources, operation and decommissioning of TKOWF within the ES included: • Presence of construction vessels and visible construction activities during construction phase; • a change (impact) to the seascape character; and • a change (impact) to the current visual scenario experienced by visual receptors. As all proposed changes to the TKOWF project parameters relate to reductions in the total number of structures and activities, there will be a reduction in the magnitude of any associated impacts.	The impacts identified are caused by the physical presence of the WTG and substation foundations and the activities associated with their installation, operation and maintenance and decommissioning. The potential impacts to seascape and visual impact receptors associated with the wind farm construction, operation and decommissioning were found to be of negligible to major significance (significance of effect was negligible for all visual receptors excepting recreational sailing for which the effect significance was moderate to major). The proposed changes to TKOWF comprise a reduction in the number of structures, all of which will be within the dimensions set out within the DCO/dMLs and the TKOWF Order Limits. There is also an associated reduction in activities across all phases of the TKOWF project.

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Shipping and Navigation (TK Array ES; Volume 2, Chapter 10)	A reduction in number of WTGs from the consented 288 in the DCO (noting the shipping and navigation impact assessment was carried out on 333 turbines) to up to 90, reducing the number of piles to be installed and the overall duration of piling required; and A reduction in number of offshore ancillary structures from 8 OSPs and 4 met masts to two OSPs and no met masts.	Effects identified on shipping and navigation associated with the construction, operation and decommissioning of TKOWF within the ES included: • Displacement of commercial shipping, fishing vessels and recreational vessels leading to an increased vessel to vessel and/or vessel to wind farm structure collision risk. As all proposed changes to the TKOWF project parameters relate to reductions in the total number of structures and activities, there will be a reduction in the magnitude of any associated impacts.	The impacts identified are caused by the physical presence of the WTG and substation foundations and the activities associated with their installation, operation and maintenance and decommissioning. The potential impacts to shipping and navigation associated with the wind farm construction, operation and decommissioning were found to be of minor significance. The proposed changes to TKOWF comprise a reduction in the number of structures, all of which will be within the dimensions set out within the DCO/dMLs and the TKOWF Order Limits. There is also an associated reduction in activities across all phases of the TKOWF project.

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Marine Archaeology (TK Array ES; Volume 2, Chapter 11)	A reduction in number of WTGs from the consented 288 in the DCO (noting the marine archaeology assessment was carried out on worst case assumptions, including up to 333 WTG foundations) to up to 90, reducing the number of piles to be installed and the overall duration of piling required; and A reduction in number of offshore ancillary structures from 8 OSPs and 4 met masts to two OSPs and no met masts.	Effects identified on marine archaeology and ordnance from the construction, operation and decommissioning of TKOWF within the ES included: • Permanent physical loss of material with potential; archaeological significance; and • damage to wreck sites. As all proposed changes to the TKOWF project parameters relate to reductions in the total number of structures and activities, there will be a reduction in the magnitude of any associated impacts.	The impacts identified are caused by the physical presence of the WTG and substation foundations and the activities associated with their installation, operation and maintenance and decommissioning. The potential impacts to marine archaeology associated with the wind farm construction, operation and decommissioning were found to be of negligible to minor significance. The proposed changes to TKOWF comprise a reduction in the number of structures, all of which will be within the dimensions set out within the DCO/dMLs and the TKOWF Order Limits. There is also an associated reduction in activities across all

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			phases of the TKOWF project. Overall, there will be a reduction in the magnitude of potential impacts and no change to the nature or sensitivity of the environmental receptors. **There is therefore no change (no increase) in effect significance and predicted impacts remain of negligible to minor significance**.
Other Marine Users (TK Array ES; Volume 2, Chapter12)	A reduction in number of WTGs from the consented 288 in the DCO (noting the other marine users assessment was carried out on worst case assumptions, including up to 333 WTG foundations) to up to 90, reducing the number of piles to be installed and the overall duration of piling required; and A reduction in number of offshore ancillary structures from 8 OSPs and 4 met masts to two OSPs and no met masts.	Impacts identified on other users from the construction, operation and decommissioning of TKOWF within the ES included: • Displacement of recreational vessels; • disturbance to existing pipelines; • disturbance to aggregate; dredging vessels and operations; and • disruption to oil and gas operations including helicopter transfers and telecommunications. As all proposed changes to the TKOWF project parameters relate to	The impacts identified are caused by the physical presence of the WTG and substation foundations and the activities associated with their installation, operation and maintenance and decommissioning. The wind farm construction, operation and decommissioning impacts on other marine users were found to be of negligible significance. The proposed changes to TKOWF comprise a reduction in the number of structures, all of which will be within the dimensions set out within the DCO/dMLs and the TKOWF Order Limits. There is also an associated reduction in activities across all

EIA Topic	Change in Project Parameter	Change in Impact	Change in Effect Significance
		reductions in the total number of structures and activities, there will be a reduction in the magnitude of any associated impacts.	phases of the TKOWF project. Overall, there will be a reduction in the magnitude of potential impacts and no change to the nature or sensitivity of the environmental receptors. **There is therefore no change (no increase) in effect significance and predicted impacts remain negligible**.
Aviation, Military and Communications (TK Array ES; Volume 2, Chapter 13)	A reduction in number of WTGs from the consented 288 in the DCO (noting the assessment was carried out on 333 turbines) to up to 90, reducing the number of piles to be installed and the overall duration of piling required; and A reduction in number of offshore ancillary structures from 8 OSPs and 4 met masts to two OSPs and no met masts.	Impacts identified on aviation, military and communications associated with the construction, operation and decommissioning of TKOWF within the ES included: • Disruption to civil and military radar cover; and • disruption to helicopter operations, including disruption to Helicopter Main Route 6. As all proposed changes to the TKOWF project parameters relate to reductions in the total number of structures and activities, there will be a reduction in the magnitude of any associated impacts.	The impacts identified are caused by the physical presence of the WTG and substation foundations and the activities associated with their installation, operation and maintenance and decommissioning. The potential impacts to aviation, military and communications receptors associated with the wind farm construction, operation and decommissioning were found to be of negligible significance. The proposed changes to TKOWF comprise a reduction in the number of structures, all of which will be within the dimensions set out within the DCO/dMLs and the TKOWF Order Limits. There is also an associated

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			reduction in activities across all phases of the TKOWF project. Overall, there will be a reduction in the magnitude of potential impacts and no change to the nature or sensitivity of the environmental receptors. **There is therefore no change (no increase) in effect significance and predicted impacts remain of negligible significance**.

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