

Norfolk Boreas Offshore Wind Farm

Consultation Report

Appendix 9.20 Norfolk Boreas Socio- economics and Tourism and Recreation outgoing documents

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Norfolk Boreas Offshore Wind Farm

Environmental Impact Assessment

**Socio-economics and Tourism and
Recreation Method Statement**

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Author: Royal HaskoningDHV
Applicant: Norfolk Boreas Ltd
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This method statement has been prepared by Royal HaskoningDHV on behalf of Norfolk Boreas Limited in order to build upon the information provided within the Norfolk Boreas Environmental Impact Assessment (EIA) Scoping Report. It has been produced following a full review of the Scoping Opinion provided by the Planning Inspectorate. All content and material within this document is draft for stakeholder consultation purposes, within the Evidence Plan Process.

Many participants of the Norfolk **Boreas** Evidence Plan Process will also have participated in the Norfolk **Vanguard** Evidence Plan Process. This document is presented as a complete standalone document however in order to maximise resource and save duplication of effort, the main areas of deviation from what has already been presented through the Norfolk Vanguard Evidence Plan Process and PEIR or in the Norfolk Boreas Scoping Report are presented in orange text throughout this document.

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1 INTRODUCTION

1. The purpose of this method statement is to build upon the information provided within the Norfolk Boreas Environmental Impact Assessment (EIA) Scoping Report and propose how the potential impacts highlighted in that report should be assessed.
2. This method statement and the consultation around it form part of the Norfolk Boreas Evidence Plan Process (EPP). The aim is to gain agreement on this Method Statement from all members of the Socio economic and Tourism and recreation Expert Topic Groups (ETG). The method statement is supported by an Agreement Log which will be used to log agreement and disagreement about the process proposed.
3. This method statement has been produced following a full review of the Norfolk Boreas Scoping Opinion provided by the Planning Inspectorate. The approach uses the baseline information provided within the Norfolk Boreas EIA Scoping Report and that amassed for the Norfolk Vanguard PEIR (including consultation through the Evidence Plan Process (EPP)) and responses to the Norfolk Vanguard PEIR.
4. Although socio-economics and tourism and recreation are interlinked it is considered that due to a number of factors including the proximity of the Norfolk Boreas project to the North Norfolk Coast AONB, the assessments will be split in to two chapters as stated in the Norfolk Boreas Scoping Report, as follows:
 - The Tourism and Recreation chapter will focus on the effect of the project on tourism businesses and people that use the surrounding area for recreational purposes; and
 - The Socio-economics chapter will focus on the effect on employment and the social impacts on communities due to construction or operational activities.
5. The National Policy Statement for Renewable Energy Infrastructure EN-3 (DECC, 2011) has already determined that a significant global benefit will be created by generating energy without greenhouse gas emissions. Therefore, the argument around UK development (at a National Scale) of offshore wind will not be revisited.
6. The chapter will aim to determine impacts at a large (regional and county level) scale through employment and expenditure; and a local scale through construction and immigration. As such it will form part of a wider process of social engagement that Vattenfall Wind Power Ltd (VWPL) is currently undertaking across both the Norfolk Boreas and Norfolk Vanguard projects.
7. Information provided in this Method Statement is a draft for stakeholder consultation only and is provided in confidence. It is recognised that Norfolk Vanguard ETG meetings are being held in January 2018 and that agreements will be

made during those meetings which are not reflected in this document. However due to certain project “Mile Stones” which have been set by the Crown Estate, Norfolk Boreas must progress on a programme which requires consultation on the Norfolk Boreas Method Statements prior to the conclusion of the Norfolk Vanguard EPP. Therefore, the material provided in this document represents the best available information at the time of writing.

1.1 Background

8. A Scoping Report for the Norfolk Boreas EIA was submitted to the Planning Inspectorate on the 9th May 2017. Further background information on the project can be found in the Scoping Report which is available at:

<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010087/EN010087-000015-Scoping%20Report.pdf>

9. The Scoping Opinion was received on the 16th June 2017 and can be found at:

<https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010087/EN010087-000013-Scoping%20Opinion.pdf>

1.2 Norfolk Boreas Programme

10. This section provides an overview of the planned key milestone dates for Norfolk Boreas.

1.2.1 Development Consent Order (DCO) Programme

- EIA Scoping Request submission - 09/05/17
- Preliminary Environmental Information (PEI) submission - Q4 2018
- Environmental Statement (ES) and DCO submission - Q2 2019

1.2.2 Evidence Plan Process Programme

11. The Evidence Plan Terms of Reference (Royal HaskoningDHV, 2017a) provides an overview of the Evidence Plan Process and expected logistics, below is a summary of meetings held to date and those anticipated in the future :

- Agreement of Terms of Reference - Q3 2017
- Post-scoping Expert Topic Group meetings
 - Discuss method statements and Project Design Statement - Q1 2018
- Expert Topic Group and Steering Group meetings as required - 2018
 - To be determined by the relevant groups based on issues

raised

- PEI Report (PEIR) Expert Topic Group and Steering Group meetings - Q4 2018/
- Q1 2019
 - To discuss the findings of the PEI (before or after submission)
- Pre-submission Expert Topic Group and Steering Group meetings - Q1/Q2
2019
 - To discuss updates to the PEIR prior to submission of the ES

1.2.3 Consultation to Date

12. Norfolk Boreas is the sister project to Norfolk Vanguard (See section 2 for further details). A programme of consultation has already been undertaken for the Norfolk Vanguard EPP which is of relevance to Norfolk Boreas as listed below:

- EIA Scoping Request submission - 03/10/16
- Receipt of Scoping Opinion - 11/11/16
- Steering Group meeting - 21/03/16
- Steering Group meeting - 20/09/16
- Post-scoping Expert Topic Group meetings to discuss Method Statements and Project Design Statements - 24/01/2017

13. Since October 2016 Norfolk Boreas and Norfolk Vanguard staff and project team members have been actively engaging with local people, varied organisations and businesses in Norfolk and particularly within the onshore cable corridor. To date this has included:

- Distribution of around 100,000 newsletters to local households;
- Convened 31 public events (including staffed exhibitions, workshops and pop up information points);
- Presented information to local parish councils, convened briefings with local MPs and many deliberative meetings with statutory stakeholders, training sessions with schools and colleges, and seen participation among those normally considered “harder to reach” increase;
- Spoken with over 2,500 people attending public information events;
- Received over 1,200 responses providing written feedback to local events (both informal as well as formal consultation associated with the Norfolk Vanguard project);

- Received and responded to many hundreds of emails from local people and stakeholders; and
 - Provided information leaflets, reports and consultation materials responding to local interests, information needs and requests plus many contributions to local media channels (broadcast and print); maintained a proactive social media campaign.
14. Norfolk Boreas and Norfolk Vanguard have a Local Liaison Officer, and Skills And Education Champion based full time in Norfolk. As well as support from a Norwich based Public Relations agency. Both projects continue to deepen and broaden their engagement with organisations who support and represent the interests of people and businesses local to onshore works and in the region.
15. Norfolk Boreas and Norfolk Vanguard skills and education work to date has included working with local primary schools and developing a 3D modelling programme. This is aimed at providing an interactive learning experience for older students which provides insights into the considerations, constraints and opportunities associated with assessing the feasibility of offshore wind farm development. These programmes will be built upon and rolled out further to local students, including in partnership with University of East Anglia during 2018.

1.2.4 Survey Programme

16. It is proposed that a field survey is undertaken in collaboration with the Local Liaison Officer, and Skills and Education Champion. This will aim to identify and map the location of local businesses, tourism, and community assets in relation to the onshore project infrastructure and construction transport routes. This will take approximately two days and will be undertaken in Q2 of 2018. This exercise will build on the existing and on-going work being undertaken by Norfolk Boreas and Norfolk Vanguard's Local Liaison Officer and communications team.
17. Details of the proposed data collection exercise are included in section **Error! Reference source not found..**

2 PROJECT DESCRIPTION

2.1 Context and Scenarios

18. Norfolk Boreas is the sister project to Norfolk Vanguard. VWPL is developing the two projects, which are both 1,800MW, in tandem, and is planning to co-locate the export infrastructure for both projects in order to minimise overall impacts. This co-location strategy applies to the offshore and onshore parts of the export cable route, the cable landfalls, cable relay stations, and onshore substations.
19. The Norfolk Boreas project follows the Norfolk Vanguard project by approximately 12 months in the Development Consent Order (DCO) process. As such, the Norfolk Vanguard team is leading on site selection for both projects. Although Norfolk Boreas is the subject of a separate DCO application, the project will adopt these strategic site selection decisions.
20. As described above, VWPL is adopting a strategy of co-location of onshore construction works in order to minimise impacts associated with the two projects. The aim is to carry out enabling works for both Norfolk Boreas and Norfolk Vanguard under the Norfolk Vanguard DCO. This covers the installation of buried ducts along the onshore cable route, from the landfall to the onshore substation, modifications at the Necton National Grid substation, visual screening works access road construction, utility connections (water, electricity and phone) and site drainage.
21. However, there is a possibility that the Norfolk Vanguard project would not be constructed. In order for Norfolk Boreas to stand up as an independent project, this scenario must be provided for within the Norfolk Boreas DCO. Thus, there are two alternative scenarios to be considered in the context of the EIA and this method statement:

- **Scenario 1:** Norfolk Vanguard consents and constructs transmission infrastructure which would be used by Norfolk Boreas. This includes, cable ducts, access routes to jointing pit locations, extension of the Necton National Grid substation, overhead line modification at the Necton National Grid substation and any site drainage, landscaping and planting schemes around co-located infrastructure. Under Scenario 1 Norfolk Boreas will seek to consent the HDD at landfall, jointing and transition pits onshore project substation, cable relay station and the installation of cables in the ducts through a process of cable pulling’.
- **Scenario 2:** Norfolk Vanguard is not constructed and therefore Norfolk Boreas will seek to consent and construct all required project infrastructure including: HDD at landfall, transition and jointing pits, cable ducts, cable installation, cable relay station

(if required), onshore project substation, 400kV interface works (between the onshore project substation and the Necton National Grid substation), extension to the Necton National Grid substation, overhead line modification and any site drainage and landscape and planting schemes. For the purpose of clarity, the Norfolk Boreas project would, under Scenario 2, involve the construction and installation of all onshore infrastructure necessary for a viable project.

22. Appendix 1 contains a set of figures showing the current proposed onshore infrastructure locations for the Norfolk Boreas Project and Appendix 2 contains a comparison of what would be required under each Scenario.
23. The two scenarios may have different effects on the people, communities, and businesses in the area surrounding the onshore infrastructure of Norfolk Boreas, as described below:
 - In Scenario 1 the lower requirement for onshore construction would reduce the impacts on people. On the one hand, this would mean that less onshore construction is required than Norfolk Vanguard to create the same return in terms of energy generation. This would mean that impacts experienced locally as a result of construction disturbance would be of lower magnitude and duration compared to scenario 2. On the other hand, this would reduce the opportunity for further employment during construction. However, as the offshore assets are of a similar size a similar number of jobs may be created during the operational phase.
 - In Scenario 2 increased construction activity would be required to build Norfolk Boreas and therefore the magnitude and duration of disturbance would be greater from the project in isolation. Therefore, there would also be greater opportunity to for employment under Scenario 2. However;
 - The cumulative impacts would be greater under Scenario 1 as under Scenario 2 Norfolk Vanguard would not be constructed.

2.2 Site Selection Update

24. A detailed programme of site selection work has been undertaken by VWPL to refine the locations of the onshore infrastructure for both the Norfolk Vanguard and Norfolk Boreas projects. The Norfolk Vanguard EIA Scoping Report presented search areas for the onshore infrastructure which were identified following constraints mapping to avoid or minimise potential impacts (e.g. noise, visual, landscape, traffic, human health and socio-economic impacts). Further data review has been undertaken to understand the engineering and environmental constraints within the search areas identified. This process has been informed by public drop in exhibitions (October 2016, March and April 2017), along with the Scoping Opinion for Norfolk Vanguard and the feedback from the Expert Topic Groups. Details of the site

selection process are provided in Chapter 4 of the Norfolk Vanguard Preliminary Environmental Information Report (Royal HaskoningDHV, 2017c).

2.3 Infrastructure Parameters

25. The following sections set out the current predicted parameters for consideration in the socio-economic and tourism and recreation EIA. These will be used to define the worst case scenario for the various impacts; this has been done conceptually in section 2.5. The Norfolk Boreas PEIR and the ES will provide further detail on the Project Description and the predicted supply chain. The ES will describe the final project design (also known as Rochdale) envelope for the DCO application.
26. The parameters discussed in this section are based on the best available information for Norfolk Boreas at the time of writing and are subject to change as the project progresses.
27. HVAC and HVDC electrical solutions are currently being considered for Norfolk Boreas. Both electrical solutions would have implications for the required onshore infrastructure. Typically the HVAC solution involves a greater area of land take and additional infrastructure, and therefore is considered to form the worst case scenario, unless it is stated otherwise throughout this Method Statement.

2.3.1.1 Landfall

28. The landfall compound zone denotes the location where up to six Norfolk Boreas offshore export cables would be brought ashore. These would be jointed to the onshore cables in transition pits located within the eastern most “trenchless crossing technique” area (Appendix 1). Norfolk Boreas would share the landfall area with Norfolk Vanguard at Happisburgh South (Under Scenario 1). Works associated at landfall would be the same under both scenarios.

2.3.1.2 Cable Relay Station

29. A cable relay station would be required for a HVAC electrical solution but not a HVDC solution. Therefore, the HVAC solution is the worst case scenario for this element of the onshore infrastructure. The cable relay station would be constructed by Norfolk Boreas under both Scenarios 1 and 2 and would be located within one of the two sites identified (Appendix 1).
30. When constructing the cable relay station a temporary construction compound area would be required, the location of which has not yet been identified. However, this will be identified and will be presented within the Norfolk Boreas PEIR.

2.3.1.3 Onshore cable route

31. The onshore cable route would contain the main 220kV HVAC or ± 320 kV HVDC export cables housed within ducts and 400kV HVAC interface cables connecting the onshore project substation with the Necton National Grid substation. The main export cable onshore corridor connects the landfall to the onshore project substation.
32. Under Scenario 1, Norfolk Vanguard would install cable ducts and undertake supporting works (e.g. running track, accesses, landscaping etc.) for Norfolk Boreas along the entire length of the onshore cable corridor. Therefore, all excavations (except jointing pits and associated temporary construction compounds) and crossings would have already been undertaken. In addition, the ducts would be installed and ground reinstated by Norfolk Vanguard. Norfolk Boreas would then need to reinstate or retain approximately 20% of the running track used by Vanguard to access jointing pit locations. Jointing pits would then be excavated and cables jointed within them. There would be up to 60 jointing pit locations along the cable route with up to six jointing pits at each location.
33. Under Scenario 2, Norfolk Boreas would be responsible for installing all onshore cable route infrastructure required for the project, including installing ducts along the entire cable route and reinstating land. Under this scenario the cable route would also require installation of a running track, trenches to be excavated to accommodate the ducts, cable pulling operations to install the electrical circuits, installation of mobilisation areas and storage areas for topsoil and subsoil and the creation of side accesses to access the cable route.
34. Further detail on what would be required under the two different scenarios and the different electrical solutions is provided in Appendix 2.

2.3.1.4 Onshore Project Substation

35. The onshore project substation would consist of either a HVAC substation or HVDC substation¹, dependant on the electrical solution utilised. Under either solution (HVAC or HVDC) only one project substation would be required for Norfolk Boreas. Further detail on the different options is provided in Appendix 2.
36. The location of the onshore project substation (Appendix 1) was determined by an optioneering process which is explained in Chapter 4 site selection and alternatives of the Norfolk Vanguard PEIR (Royal HaskoningDHV, 2017c).

¹ Also referred to as a HVDC converter station. For the purposes of consistency both HVAC and HVDC solutions will be referred to as the onshore project substation.

37. The largest equipment within the HVAC onshore project substation would be the 400/220kV transformers with an approximate height of 10m, all other equipment would not exceed a height of 6m. The total land requirement for the HVAC onshore substation to the perimeter fence is 250m x 300m.
38. The largest equipment within the HVDC onshore substation would be the reactor halls with an approximate height of 19m. The tallest structure would be the lightning protection masts at a height of 25m. All other equipment would not exceed a height of 10m. The total land requirement for the HVDC onshore substation to the perimeter fence would be 250m x 300m. Therefore in terms of visibility the HVDC onshore project substation would represent the worst case scenario.
39. During construction of the onshore project substation, a temporary construction compound would be established to support the works. The compound would be formed of hard standing with appropriate access to the A47 to allow the delivery and storage of large and heavy materials and assets, such as power transformers. In Scenario 1, this access would be shared with the onshore project substation for Norfolk Vanguard; in Scenario 2, the access would need to be constructed as part of Norfolk Boreas.
40. The compound would be of dimensions 200m x 100m and would accommodate construction management offices, welfare facilities, car parking, workshops and storage areas. Water, sewerage and electricity services would be required at the site and supplied either via mains connection or mobile supplies such as bowsers, septic tanks and generators. The location of this compound area has not yet been identified, however a defined location will be determined and presented within the Norfolk Boreas PEIR.
41. Construction activities would be undertaken during working hours of 7am-7pm. Evening or weekend working might be required to maintain programme progress and for specific time critical activities such as transformer oil filling and processing; however, these would be kept to a minimum. Perimeter and site lighting would be required during the winter months and a lower level of lighting would remain overnight for security purposes.
42. The construction programme for the onshore substation would be 18 months.
43. Under Scenario 1, a number of pre-construction activities would be undertaken by Norfolk Vanguard. These include:
 - Landscaping to reduce noise and visual impacts;
 - Access roads; and

- Site drainage infrastructure.

44. Under Scenario 2, all preconstruction works would be undertaken by Norfolk Boreas.

2.3.1.5 Necton National Grid Substation Extension (Scenario 1 and Scenario 2)

45. The existing Necton National Grid substation which would be the connection point for both Norfolk Vanguard and Norfolk Boreas would be required to be extended to accommodate the two projects. The proposed footprint of this extension is provided in **Appendix 1**. In addition to the Necton National Grid substation itself, modifications to the existing overhead lines in parallel to the substation would be required to provide a double turn-in arrangement.

Scenario 1

46. Under Scenario 1 the majority of these works would be undertaken by Norfolk Vanguard for both projects. All extension enabling works would be completed including access roads, earthworks, foundations, buildings and all civil engineering works would be completed (see **Appendix 2** for further details). All overhead line modification would also have been carried out under the Norfolk Vanguard project.

47. However, the electrical busbar extensions and other electrical equipment required for Norfolk Boreas would be installed under the Norfolk Boreas DCO.

Scenario 2

48. Under Scenario 2 all extension works to the Necton National Grid Substation and overhead line modification would be undertaken by Norfolk Boreas (see **Appendix 2** for further details). The substation extension and overhead line modification works would be conducted within the areas identified within **Appendix 1** as National Grid Overhead Line Works, National Grid substation extension and National Grid temporary works.

2.3.2 Construction Programme

49. Currently it is expected that the Norfolk Boreas project would be constructed in one, two or three phases. Error! Reference source not found.1 summarises the main construction activities and sequence associated with installation of the Norfolk Boreas project onshore infrastructure under a ‘three-phased’ approach (as this represents the worst-case scenario in terms of duration of impact). Separate time lines are discussed for both Scenario 1 and 2.

Table 2.1 Construction programme

Date	Scenario 1		Scenario 2	
2022			Pre-construction works	
2023			<ul style="list-style-type: none"> Road modifications Hedge and tree removal (season dependant) Ecological preparations (e.g. displacement of water voles, fencing of areas for newts, etc.) Preconstruction drainage (at cable relay station and substation locations) 	
2024	Pre-construction works <i>(landfall, cable relay station and onshore project substation only)</i> <ul style="list-style-type: none"> Ecological preparations (e.g. displacement of water voles, fencing of areas for newts, etc.) Preconstruction Drainage at cable relay station and substation locations 	Substation and Cable Relay Station Construction <ul style="list-style-type: none"> Main works (drainage, foundations and buildings) 	Main duct installation works <ul style="list-style-type: none"> Enabling works Duct installation Reinstatement works 	Substation and Cable Relay Station Construction <ul style="list-style-type: none"> Main works (drainage, foundations and buildings)
2025				
2026			Cable installation	Substation and Cable Relay Station Construction
2027	Cable pulling <ul style="list-style-type: none"> Installed in three phases (2027, 2028 & 2029) 	Substation and Cable Relay Station Construction <ul style="list-style-type: none"> Plant installation (to tie in with cable pull) 	<ul style="list-style-type: none"> Installed in three phases (2026, 2027 & 2028) 	<ul style="list-style-type: none"> Plant installation (to tie in with cable pull)

2.4 Onshore study area

50. Two separate study areas will be considered for the both the socio-economic and tourism and recreation assessments:

- A study area for Construction and decommissioning impacts; and
- A study area for Operational impacts

2.4.1 Construction and decommissioning impacts study area

51. For impacts during the construction (see **Table 2.2**) and decommissioning periods, a standard Norfolk Boreas onshore study area will be used. This includes the footprint of all onshore infrastructure as well as an area 250m around temporary infrastructure and 500m around permanent infrastructure, to allow for receptor identification and the undertaking of environmental surveys. In addition to this, the following study areas will be defined:

- The study area for impacts relating to employment and expenditure will be defined by the commuter distances following the traffic and transport assessments; and
- The study area for impacts on community or tourism assets relating to physical disturbances such noise, vibration, or traffic, the study area will be defined following relevant assessments to determine which communities will be impacted.

2.4.2 Operational impacts study area

52. It is expected that a significant proportion of socio-economic impacts will be as a result of employment in the operations and maintenance centres which would not be located within the footprint of the onshore infrastructure. The construction of these centres will be subject to a separate planning application and will not be considered within construction impacts. However, as employment will be created during the operational phase of Norfolk Boreas the study area will be expanded to ensure that any associated potential impact is captured within the assessment.

53. The tourism and recreation study area for the operation phase will focus around the footprint of the project infrastructure and the zones of theoretical visibility which will be identified through the Landscape and Visual impact assessment.

2.5 Indicative Worst Case Scenario

54. The worst case scenario for social impacts, economic impacts, tourism impacts and recreation impacts are different due to the drivers of the impacts. A worst case scenario is normally defined by measuring change against a single baseline. However, under Scenario 1 there would be a change to the baseline due to the construction of Norfolk Vanguard. Also under Scenario 1, there will be less construction activity to be considered in the assessment as Norfolk Vanguard would have completed enabling works. In Scenario 2, more construction activities will be considered in this assessment as no enabling works would have been undertaken by Norfolk Vanguard.
55. In order to comprehensively capture the above in the assessment, it is proposed that within the impacts section of the PEIR chapter impacts from Scenario 1 and Scenario 2 will be assessed under separate headings in the chapter. Under Scenario 1 impacts associated with the construction of Norfolk Boreas alone will be assessed. Then under the CIA (section 5.6), cumulative impacts associated with the construction of Norfolk Vanguard and then Norfolk Boreas will be assessed. The CIA assessment will take into account how Norfolk Vanguard is likely to change the baseline against which the impacts will then be assessed. Under Scenario 2 impacts will be assessed against the existing baseline.
56. Economic impacts are primarily driven by employment. Therefore, a scenario that has potentially lower employment rates would be the worst case. But this would normally consist of less construction which would be a better scenario from social impact perspective.
57. Social impacts are driven by disturbance to communities from sources such as increased noise, light, traffic, or obstruction due to construction. Therefore, a scenario that requires a higher level of construction would be the worst case but this would generate more employment which would be a better scenario from an economic impact perspective.
58. Tourism and recreation impacts are driven by the availability of tourism assets to tourists. A large incoming workforce may displace tourists from accommodation which would lead to less tourists in the area and subsequent expenditure. Or, as with social impacts, the construction process may create disturbances which would discourage tourists from visiting or revisiting an area. Therefore, a scenario with a high level of incoming workforce and construction would be considered a worst case.
59. **Table 2.2** summarises which of the two scenarios would be the worst case scenario from which to measure potential social and economic impacts during construction.

Table 2.2: Comparison of Scenarios 1 and 2 with potential impacts

Potential impact on....	Scenario 1 – Norfolk Vanguard and Norfolk Boreas are constructed	Scenario 2 – Norfolk Boreas only is constructed
Employment opportunities and supply chain	Worst	Best
Demand for housing, accommodation and local services	Best	Worst
Community Infrastructure	Best	Worst
Available accommodation due to construction personnel	Best	Worst
Obstruction or disturbance to recreation / tourism assets including Public Rights of Way	Best	Worst

60. As can be seen in **Table 2.2**. The change against baseline is generally considered to be greatest in Scenario 2. This is because Norfolk Boreas would be building on “green field” rather than using the existing infrastructure and contracted companies for its construction.
61. It should also be noted that during the operational phase the planned change would be the same whether Norfolk Vanguard is in place or not. This is because it is assumed that O&M staff would be employed and supply chain jobs created based on the number of wind turbines in operation. Therefore, the potential operational impacts of the two projects are considered exclusively.

3 BASELINE ENVIRONMENT

3.1 Desk Based Review

62. The Norfolk Boreas EIA Scoping Report, Section 4.3 (Royal HaskoningDHV, 2017b) provides baseline information on socio-economics and tourism and recreation. Full information can be found in section 4.3.1 of the above report and is summarised as follows (statistics have been taken from official labour market statistics of NOMIS and checked in January 2018):
- Onshore scoping area lies in the county of Norfolk which has an estimated population of 892,900.
 - Norfolk's population has an older age profile than the rest of England, with 23.4% of Norfolk's population aged 65 and over, compared with 17.6% in England.
 - Average unemployment (aged 16+) in Norfolk is 4.1%, which is lower than the UK average (4.6%).
 - Some areas have unemployment levels which are greater than the national average. For example, Great Yarmouth has a 6.0% unemployment rate compared to 4.6% in the UK.
 - Of the people claiming benefit principally for the reason of being unemployed the highest proportion are aged 18 to 24. Although the level of young claimants in Norfolk (2.3%) is higher than in the East of England (2.0%) it is lower than the UK average (2.7%).
 - The majority (88.4%) of businesses in Norfolk can be classified as 'Micro' with 0 to 9 employees, which is slightly lower than the East of England (90%).
 - The Job Density for Norfolk (0.82 jobs per person) is slightly lower than the East of England (0.83) and the UK (0.84).
 - Norfolk Limited's annual business survey (published in April 2017 by Grant Thornton) showed that of the seven sectors it considered, six saw growth but Oil, Gas & Energy declined by 16.4%.
 - Whereas they recorded strong growth in Services (10.8%), Motor Retail & Motor Services (7.9%) and Manufacturing & Construction (5.8%).
 - New Anglia Local Enterprise Partnership (LEP) suggests that the offshore wind industry provides an important opportunity for economic growth in the region of Norfolk and Suffolk, especially as the oil and gas sector recedes.
 - The Great Yarmouth and Lowestoft area is one of six Centres of Offshore Renewable Engineering in the UK, designated due to the presence of relevant engineering skills.

3.1.1 Available Data

63. The study area for the impact assessment remains the Norfolk region for the onshore infrastructure as well as the waters in and around the offshore project area.

64. The assessment will also use the findings from the Norfolk Vanguard PEIR (Royal HaskoningDHV, 2017c) chapter 30 Tourism and Recreation and chapter 31 Socio-economics
65. With regards socio-economic data, sources that will be reviewed during the EIA include:
- The Office for National Statistics (ONS) data on regional and local labour market and trends (including education levels), local and regional population and trends, local and regional employment and trends, and local and regional health statistics.
 - New Anglia LEP data on the local economy, including growth areas and constraints / focus of funding (e.g. employment workforce training / upskilling).
 - Information and data from RenewablesUK, ReNews, EEEGR, and other industry bodies relating to the growth and UK Content of the Offshore Wind Industry;
 - Data on workforce, developments, and strategic planning in relation to socio-economic receptors from Local Authorities. As well as consultation with the following authorities during the Evidence Plan Process:
 - Norfolk County Council,
 - North Norfolk District Council,
 - Broadland District Council,
 - Breckland District Council, and
 - Great Yarmouth Council.
 - OS maps combined with ONS data (based on ONS census data grouped by 'lower level super output areas'). This data will be used to identify detailed community and population data in the substation locations.
 - Project specific estimates of the potential regional content of the Norfolk Boreas supply chain.
66. With regards to tourism and recreation data, sources that will be reviewed during the EIA include:
- Data on workforce, developments and strategic planning in relation to tourism and recreation receptors for the following authorities:
 - Norfolk County Council,
 - Great Yarmouth Council,
 - North Norfolk District Council,
 - Broadland District Council, and
 - Breckland District Council.
 - Online letting agents and tourist information for quantities of temporary and rented accommodation supply and trends.

- Visit Norfolk, Sport England, and numerous tourist information sites will be searched to locate any recreational and tourist sites. This will include the Council Public Rights of Way Department (separate to, or within, their Highways Department) where use numbers for Public Rights of Way will also be requested as well as a copy of the definite footpath map.

3.2 Survey Data

3.2.1 Planned Data Collection

67. In addition to the data outlined above, a field visit is planned to determine the number and location of local businesses, community assets, and tourism assets within the study area. As described in section 1.2.4, the locations visited will be determined in collaboration with the Local Liaison Officer, and Skills and Education Champion. The traffic assessment will be interrogated to determine which communities may potentially be affected by the construction process. The route will be reviewed developed using GIS data and a field visit will be undertaken to gather further information about location of assets with regards impact pathways.

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4 IMPACT ASSESSMENT METHODOLOGY

68. The methodology has been developed following best practice guidance from academia and international organisations. This will be applied to both Scenario 1 and Scenario 2 as separate assessments. The primary reason for using guidance from academia and international organisations is due to the lack of defined or recommended procedure within legislation for determining socio-economic impacts of a DCO development.

4.1 Socio-economic impact definition and guidance

69. The socio-economic chapters of an EIA relate to the human aspects of sustainable development. Glasson (2017) defines socio-economic impacts as the “people impacts’ of development,” and states that, “Socio-economic impact assessments focus on the human dimension of environments, seeking to identify the impacts on people, including who benefits and who loses.”

70. Best practice will be taken from two sources:

- Guidance developed by Professor John Glasson and Andrew Chadwick of Oxford Brookes University published by Riki Therivel and Graham Wood in the Fourth Edition of Methods of Environmental and Social Impact Assessment (Natural and Built Environment Series) (2017); and
- The International Association for Impact Assessment’s (IAIA) Social Impact Assessment: Guidance for assessing and managing the social impacts of projects (2015)

4.2 Outcomes of a socio-economic impact assessment

71. This assessment will consider overall socio-economic impacts using the theory of “Utilitarianism”, which has been developed by Ainger and Fenner (2014) for the Institution of Civil Engineers. In their theory they define sustainability principles relevant to infrastructure within global environmental limits. These are then linked to the following fundamental principles of sustainability as follows:

- The Environmental Limits Impact is a function of:
- The number of people served;
- Their level of affluence; and
- The way, and the efficiency, with which technology is used to supply the service.

72. The main technology (energy generation using offshore wind turbines) is being developed in order for the Secretary of State to meet requirements set within the Climate Change Act 2008, which is “to ensure that the net UK carbon account for the year 2050 is at least 80% lower than the 1990 baseline.” Therefore, when considered

at a global level, this is an efficient form of technology application for the purpose of national energy generation.

73. Specific environmental impacts of technology application will also be considered in all other chapters of the ES. This is to ensure that the application of technology will be as environmentally efficient for the local context as it is for the global context.

74. Therefore, the outcome of the socio-economic assessment will be to determine whether the Norfolk Boreas creates benefits for the majority of people, minimises the negative impact for the minority of people; thus supporting sustainable development of the UK.

4.3 Methodology for assessing impacts

75. The methodology used to assess impacts on or to socio-economic receptors will adopt the standard source-pathway-receptor model approach. The method for determining impact significance under this approach are described in section 4.3.1.

76. Socio-economic assessments are often criticised for either being too broad without enough detail to be useful, or too detailed with too many assumptions to be viable. To counter this assessment will consider impacts in two ways.

77. Both Scenario 1 and Scenario 2 will be considered separately for socio-economic and social impacts using the same methodology.

4.3.1 Economic impacts

78. **Plate 4.1** illustrates the linkages between economic impacts for a wind farm project. The Economic impacts associated with employment and expenditure will be considered quantitatively for national and regional receptors. There are three main economic impacts that will be considered:

- Short-term employment during construction and the subsequent effects that this in-migration may cause on local services and accommodation. It should be noted that (based on the PIER for Norfolk Vanguard) the volume of in-migration is expected to be relatively small;
- Long-term employment during operation; and
- Expenditure on local goods and the development of a supply chain.

79. These impacts stem from employment estimates and multipliers will be used to estimate the correlation between employment and local expenditures, as well as direct employment and supply chain employment.

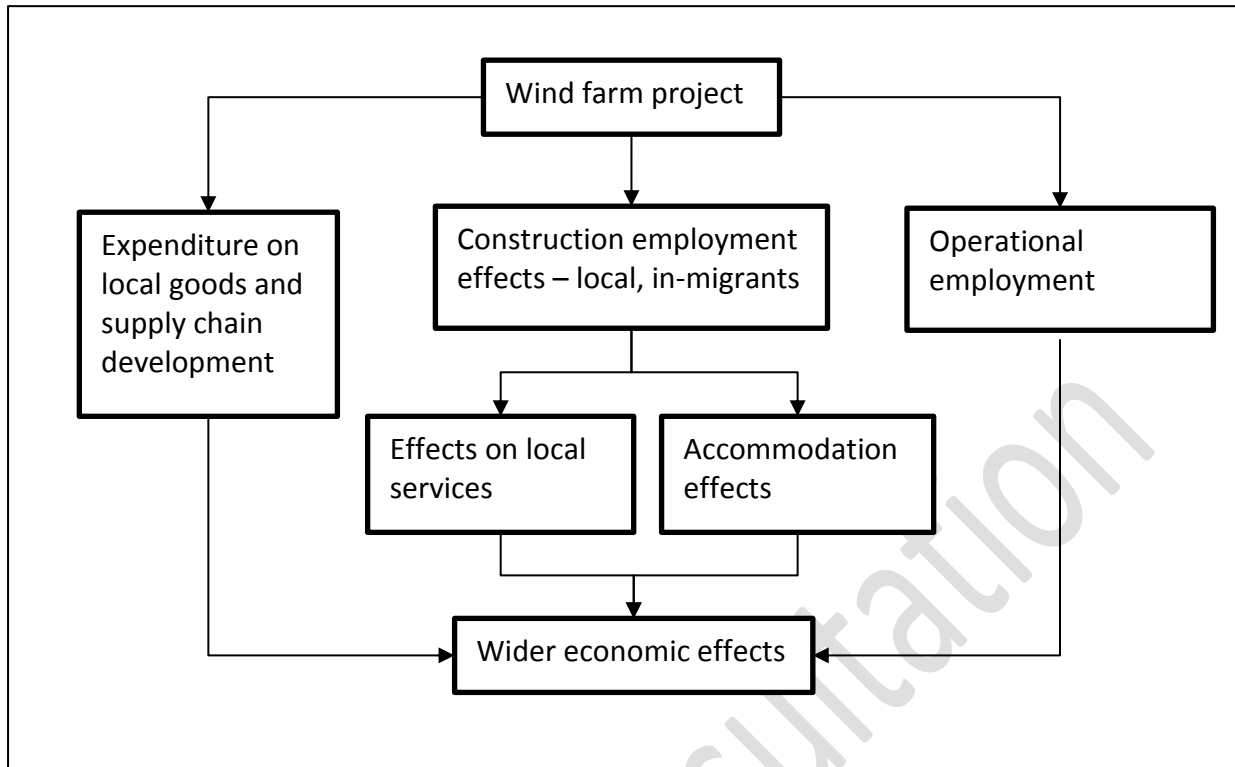


Plate 4.1 Linkages between economic impacts for a wind farm project (adapted from Glasson, 2017)

4.3.2 Social impacts

80. Social impacts can develop directly from social change due to the immigration of people or indirectly from physical change of the surrounding environment. Plate 4.2 illustrates the potential pathways of physical and social change to create social impacts.
81. Social impacts arising from physical change (both temporary and permanent) due to construction or operation activities will be considered qualitatively with regards communities of receptors. A precautionary approach will be taken and these will not be linked to economic change. The rationale for this is because substantive evidence is not available to indicate such change within communities due to infrastructure development.
82. In line with the IAIA's guidance, the social impact assessment is considered as a process underpinned by transparency rather than a product made of a single assessment. Therefore, this will support future mitigation strategies for the relevant impact sources.

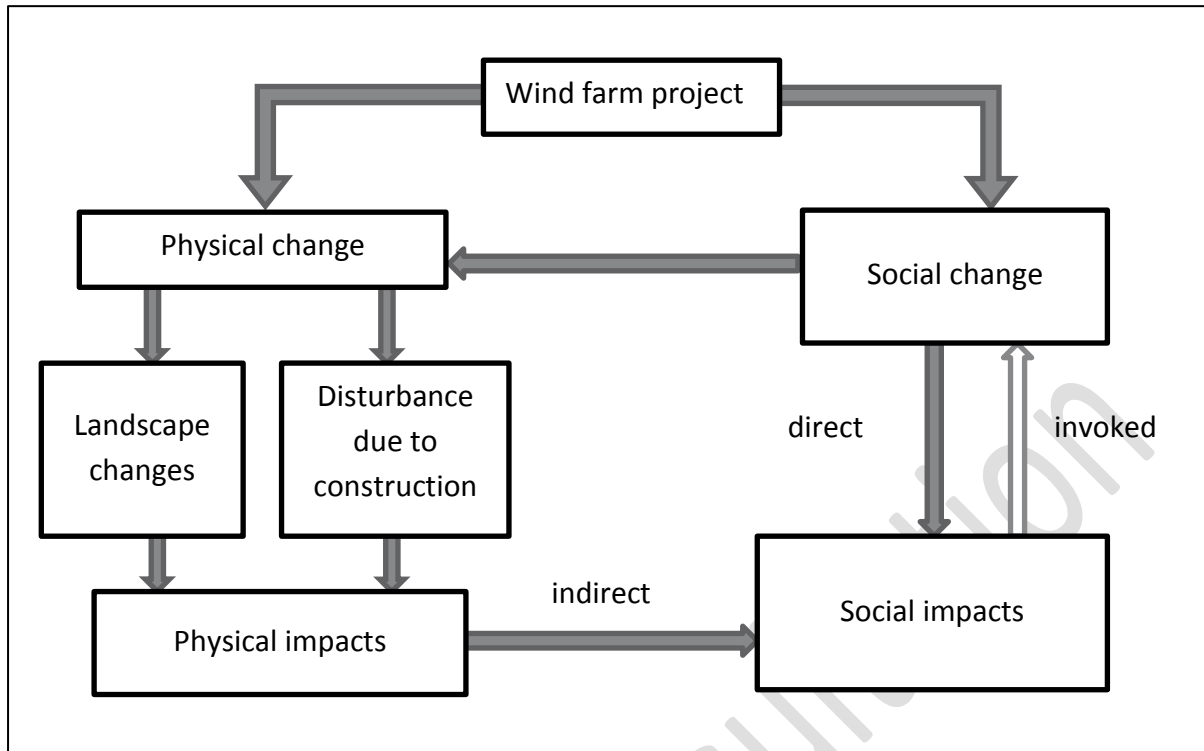


Plate 4.2: Pathways of physical and social change to create social impacts. Adapted from Slootweg, Vanclay, and Schooten (2001)

83. Immigration can create positive social impacts due to enriching society and creating diversity. However, a review of the PEIR for Norfolk Vanguard suggests that the projected volume of people entering the area and the duration of their stay would not result in social benefits other than expenditure, as described above.
84. It is considered that social impacts would predominantly be caused by physical sources of disturbance. Therefore, the source-pathway-receptor model for social impacts would be largely dependent upon the assessment of impacts due to:
- Landscape and visual;
 - Traffic and transport; and
 - Noise and vibration.
85. As the Norfolk Boreas assessment follows the Norfolk Vanguard assessment, relevant Norfolk Vanguard ES chapters will be used to initially understand if there are communities outside of the standard study area described above (see Section 2.1) where an accumulation of social impacts may affect them. It should be noted that these impacts would not individually be significant but, for a discrete time period, may accumulate to create a noticeable disturbance.

4.3.3 Sensitivity

86. Each receptor will be considered in light of its potential sensitivity to the effect resulting from the relevant source-element by which it is likely to be influenced. **Table 4.1** presents generic definitions which will be used, supported by technical expertise and professional knowledge to ascertain (and justify) the sensitivity.

Table 4.1 Example definitions of the different sensibility levels for a generic receptor (please define sensitivities appropriate to your topic)

Sensitivity	Definition
High	Receptor has <u>very limited</u> tolerance of effect
Medium	Receptor has <u>limited</u> tolerance of effect
Low	Receptor has <u>some</u> tolerance of effect.
Negligible	Receptor <u>generally</u> tolerant of effect.

4.3.4 Value

87. In addition, for some assessments the ‘value’ of a receptor may also be considered – for instance if a receptor is designated or has an economic value.
88. The socio-economic assessment for the Norfolk Vanguard PEIR (Royal HaskoningDHV, 2017c) showed that there are no effected assets that are predominantly more or less valuable than others. It is considered that community assets are equally important to the community that they serve. Therefore, for this project all values will be considered equally important and this element will be omitted from the assessment.

4.3.5 Magnitude

89. The magnitude of each effect on a socio-economic receptor (or class or group of receptors) will be determined and classified using the generic description presented in **Table 4.2**, on the basis of expert judgement. Justification will be provided within the chapter for the level of magnitude attributed to each impact.

Table 4.2 Example definitions of the magnitude levels for a generic receptor

Magnitude	Definition
High	Fundamental, permanent / irreversible changes, over the whole receptor, and / or fundamental alteration to key characteristics or features of the particular receptors character or distinctiveness.
Medium	Considerable, permanent / irreversible changes, over the majority of the receptor, and / or discernible alteration to key characteristics or features of the particular receptors character or distinctiveness.
Low	Discernible, temporary (throughout project duration) change, over a minority of the receptor, and / or limited but discernible alteration to key characteristics or features of the particular receptors character or distinctiveness.
Negligible	Discernible, temporary (for part of the project duration) change, or barely discernible change for any length of time, over a small area of the receptor, and/or slight alteration to key characteristics or features of the particular receptors character or distinctiveness.

4.3.6 Significance

90. Following the identification of receptor sensitivity and magnitude of the effect, it is possible to determine the significance of the impact. A matrix as presented in **Table 4.3** will be used where relevant. It is important that the matrix (and indeed the definitions of sensitivity and magnitude) is seen as a framework to aid understanding of how a judgement has been reached from the narrative of each impact assessment and it is not a prescriptive formulaic method.
91. Criteria, including sources and justifications, for quantifying the different levels of impact will be provided. Where possible, this is based upon quantitative and accepted criteria together with the use of value judgement and expert interpretation to establish to what extent an impact is significant.

Table 4.3 Impact Significance Matrix

		Negative Magnitude				Beneficial Magnitude			
		High	Medium	Low	Negligible	Negligible	Low	Medium	High
Sensitivity	High	Major	Major	Moderate	Minor	Minor	Moderate	Major	Major
	Medium	Major	Moderate	Minor	Minor	Minor	Minor	Moderate	Major
	Low	Moderate	Minor	Minor	Negligible	Negligible	Minor	Minor	Moderate
	Negligible	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

92. **Table 4.4** presents a definition of the impact significance identified through the matrix approach.

Table 4.4 Impact Significance Definitions

Impact Significance	Definition
Major adverse	Very large or large change in receptor condition, both adverse or beneficial, which are likely to be important considerations at a regional or district level because they contribute to achieving national, regional or local objectives, or, could result in exceedance of statutory objectives and/or breaches of legislation.
Moderate adverse	Intermediate change in receptor condition, which are likely to be important considerations at a local level.
Minor adverse	Small change in receptor condition, which may be raised as local issues but are unlikely to be important in the decision making process.
Negligible	No discernible change in receptor condition.
Minor beneficial	The impact is of minor significance, but has been assessed as having some environmental benefit.
Moderate beneficial	The impact is assessed as providing a moderate gain to the environment.
Major beneficial	The impact is assessed as providing a significant positive gain to the environment.

93. Note that for the purposes of the EIA, major and moderate impacts are usually deemed to be significant. In addition, whilst minor impacts are not significant in their own right, it is important to distinguish these from other non-significant impacts as they may contribute to significant impacts cumulatively or through interactions.
94. Embedded mitigation will be referred to and included in the initial assessment of impact. If the impact does not require mitigation (or none is possible) the residual impact will remain the same. If however, mitigation is required there will be an assessment of the post-mitigation residual impact.

5 POTENTIAL IMPACTS

95. The following impacts have been recommended for assessment within the Norfolk Boreas Scoping Opinion (or as specific requests by consultees) and categorised as Economic or Social impacts (as defined in Section 4):
- Direct and supply chain job creation and available workforce in the area (both during construction and operation).
 - Impact on community infrastructure, local businesses, and residents (including home workers) particularly of the substation and cable relay station sites.
 - Impact on tourism and recreation assets including Bathing Water / Blue Flag beaches.
 - Impacts of workforce accommodation on tourism in the short, medium and long term.
 - Obstruction or disturbance to Public Rights of Way and other long distance routes.
 - Impact on other recreation / tourism assets.
 - Skills & training??
96. All of the above impacts will be considered separately under Scenario 1 and Scenario 2 within the impact assessment.

5.1 Potential Socio-economic Impacts during Construction

5.1.1 Economic Impact: on employment opportunities and supply chain

97. The construction of the onshore and offshore elements of Norfolk Boreas would result in increased (or continued, under Scenario 1) employment in a range of sectors and at a range of skill levels. This would arise from the construction and commissioning of the onshore elements of the project, in particular the cable relay station (if a HVAC solution is chosen), onshore project substation and National Grid extension. Based on the Norfolk Vanguard PEIR, construction of Norfolk Boreas under Scenario 2 would create in the region of 300 jobs at peak construction which, it is assumed, would largely be provided from across the New Anglia LEP and the rest of the UK. Scenario 1 would create fewer jobs; a prediction of potential numbers will be provided within the PEIR.
98. It is assumed that employment due to offshore construction would create more opportunity in areas outside of the study area due to the specialist nature of skills required. Therefore, this will not be included in the assessment but some impacts, for example those on fishing vessels will be covered in other chapters such as the Commercial Fisheries chapter and reference will be made to those assessments.

99. There would also be a concentration of supply chain activity and opportunity associated with the loadout port from its creation and during the significant offshore construction phase. However, as this will be developed under a separate planning application it will not be considered within the construction impacts of this assessment.

5.1.1.1 Approach to Assessment

100. The assessment will, as far as possible, quantify the level of resident and non-resident employment and assess the significance of this positive socioeconomic impact at the local, regional and national level, for both scenarios. This will follow guidance from Glasson and Chadwick (2017) as well as BVG Associates guidance for determining *UK Content* (2015) and *economic impact for offshore wind* (2017).
101. Significance will be apportioned in relation to the current unemployment levels at the local, regional and national levels. Increased employment would be temporary or permanent on the basis of the likely contractors to be used. However, it should be noted that the exact specification of the supply chain will not be available at this time and assumptions will be required. These will be developed in collaboration with Norfolk Boreas' Supply Chain Manager.
102. The approach to the assessment will be the same under each of the two Scenarios; due to the level of jobs created the significance of the impact may be different.

5.1.2 Economic Impact: on the demand for housing, accommodation and local services:

103. There is a perception that direct and indirect employment generated during the construction phase could increase demand for housing, accommodation and local services during construction. However, based on the Norfolk Vanguard PIER there would be, at most, 300 people employed at one time (under Scenario 2 and less employed under Scenario 1) for a duration of approximately 3 months during peak construction. Due to strict Health and Safety legislation these people would be of working age and generally physically fit.
104. Conversely, the Norfolk Boreas Scoping Report Baseline and the Norfolk Vanguard PEIR both found that the local age distribution is skewed towards the over 60s who are likely to provide a higher demand on the local health service than those at a working age. Therefore, it is considered that the relatively small number of incoming workers would not have a significant impact on the health of the population compared to the baseline demographic and therefore this impact will be omitted from the assessment.
105. Employment during construction would be temporary and therefore in-migrant workers would not be considering purchasing permanent accommodation.

Furthermore, as employment would be temporary worker's families are not expected to move to the area and would not increase demand for local services. These impacts will therefore be omitted from the assessment. Effects on temporary accommodation, such as hotels, hostels, and B&Bs will be considered in the Tourism and Recreation chapter.

5.1.3 Economic Impact: on offshore industries

106. It is possible that construction may have an impact on offshore industries. The Norfolk Boreas site selected contains existing oil and gas industries and is adjacent to commercial shipping lanes (although it has been located to avoid actual overlap). The Oil and Gas infrastructure is due to be decommissioned prior to construction of Norfolk Boreas and ongoing consultation with the owners of these assets will help inform the Assessment. The Shipping and Navigation assessment will be used to inform the potential economic impacts to shipping companies.
107. Furthermore, assessment under Norfolk Vanguard PEIR showed that the development was outside of the range of most recreational sailors. The same will apply to Norfolk Boreas as the project is further offshore than Norfolk Vanguard. Therefore, the only likely interaction would be with commercial fishing vessels. This will be considered within the Commercial Fisheries chapter and will not be included in the socio-economic assessment.

5.1.4 Social Impact: on community infrastructure

108. There is a perception that construction activities relating to the cable corridor, onshore project substation and (potentially) the cable relay station could impact on community infrastructure. This is because construction of infrastructure has the potential to create noise, vibration, dust, increased HGV traffic, and to physically change the surrounding environment.
109. Community infrastructure will be defined but in general these are considered as assets that serve a community. Examples could include health facilities, businesses, public transport, community buildings, etc.
110. As it is known that the Norfolk Boreas cable corridor would follow the same route as Norfolk Vanguard for both Scenario 1 and Scenario 2, it is also known that the majority of individual community assets have been avoided. However, there is a risk that an accumulation of minor impacts may create a more noticeable disturbance to select communities.

5.1.4.1 Approach to Assessment

111. The assessment will consider impacts at a community scale using a source-pathway-receptor model, for both Scenario 1 and 2. This will be accomplished by interrogating the Norfolk Vanguard PEIR Traffic and Transport; Noise and Vibration; and Landscape and Visual Impacts chapters. These impact sources will, as far as possible, be presented cartographically to determine which communities have the potential to be effected by multiple impacts and determine the percentage of communities that may be effected.

5.2 Potential Tourism and Recreation Impacts during Construction

5.2.1 Economic Impact: reduction in available accommodation due to construction personnel

112. The presence of a workforce during construction which is non-resident may result in a need for accommodation during some or the entire duration of the construction phase. Whilst there is a positive economic impact for accommodation providers in having high levels of occupancy there is also a potential negative impact on a reduction of available accommodation to serve the tourist industry. Reducing the available provision for tourist accommodation may result in temporary as well as potentially longer term impacts.

5.2.1.1 Approach to Assessment

113. Following determination of the level of accommodation available during baseline information gathering, an estimation of the workforce numbers requiring accommodation and the duration of this will be undertaken as the project design is further developed. This assessment will be made on the basis of a travel to work extent that will be discussed and agreed with our transport specialists, and agreed with stakeholders. The level of accommodation need will then be assessed against the current baseline availability. Any overlap will be assessed and mitigation measures discussed and agreed where relevant. As previously discussed, the number of workers and thus the demand for accommodation would be expected to be less under Scenario 1 than 2.

5.2.2 Social impact: obstruction or disturbance to recreation / tourism assets including Public Rights of Way

114. Potential effects on tourism and recreation could be created by noise and vibration impacts during the construction of onshore infrastructure and changes to local accommodation availability. It was recognised in the Norfolk Boreas Scoping Opinion that visual impacts on tourism assets of the offshore wind farm site could be scoped out. Given the distance from shore of the Norfolk Boreas site there are unlikely to be

significant direct impacts upon water sports or landscape impacts, however the Norfolk coastline provides a recognised tourism asset and there is potential for disturbance to occur during construction of landfall and cable relay stations.

5.2.2.1 Approach to Assessment

115. Obstruction to recreation / tourism assets will be assessed on the basis of where obstruction or loss (from working area) takes place. The significance of the impact will be assessed on the basis of the asset affected and will initially be screened using impacts from relevant chapters of the Norfolk Vanguard PEIR (Royal HaskoningDHV, 2017c). Based on this, it is anticipated that the impacts would not be significant and therefore a further tourism baseline surveys are not warranted.
116. The two Scenarios will be considered separately. Under Scenario 1 obstruction or disturbance to recreation / tourism assets will be less than under Scenario 2 as works will cover less area and impacts will be focused around the cable relay station (if required) and the onshore project substation. Under Scenario the impacts will be similar to those predicted for Norfolk Vanguard.
117. The potential disturbance impacts on recreation / tourism assets will be quantified and assessed in the other chapters such as Noise, Air Quality, and Landscape. Using the outcome, the potential for discouragement of users will be reviewed, including views arising from the consultation being undertaken with stakeholders and communities. Overall, an estimation of the potential scale and duration of impact will be undertaken using previous studies, surveys, guidance and anecdotal findings, and the significance assessed.
118. The potential water quality impacts during construction on designated bathing beaches will be assessed in the Marine Water Quality assessment. Using this outcome, the potential for discouragement of users will be undertaken. This will incorporate any monitoring undertaken for other nearshore projects and responses from stakeholder and community consultation undertaken as part of the EIA and DCO application process for both Norfolk Vanguard and Norfolk Boreas.
119. The potential impacts on Public Rights of Way due to physically blocking or diverting them will be assessed cartographically and considered with respect to duration of closure or potential for temporary diversion.

5.3 Potential Socio-economic Impacts during Operation and Maintenance

120. Operational impacts will not contain separate assessments for the different Scenarios as these relate to the construction of the project. The presence of Norfolk Vanguard (Scenario 1) will be considered under cumulative impact assessment (see section 5.6).

5.3.1 Economic Impact: Employment opportunities and supply chain

121. There would be opportunities for direct employment as well as supply chain expenditure during the operation and maintenance phases of Norfolk Boreas. These would include opportunity for skilled operations and maintenance team members and approximately five to ten site managers over the 25 plus years operating life.

5.3.1.1 Approach to Assessment

122. The assessment will, as far as possible, quantify the level of employment and assess the significance of this positive socioeconomic impact at the local, regional and national level. This will follow guidance from Glasson and Chadwick (2017) as well as BVG Associates guidance for determining *UK Content* (2015) and *economic impact for offshore wind* (2017).
123. Significance will be apportioned in relation to the current unemployment levels at the local, regional and national levels. Evidence from similar offshore wind developments in the New Anglia LEP region will be considered where data is available.
124. Increased employment would be supported by wider skills development being undertaken by Vattenfall and this will be included qualitatively as part of the assessment. However, it should be noted that the exact specification of the supply chain will not be available at this time and assumptions will be required. These will be developed in collaboration with Norfolk Boreas' Supply Chain Manager.

5.3.2 Economic Impact: on the demand for housing, accommodation and local services

125. Direct and indirect employment generated during the operation and maintenance phase could increase demand for housing, accommodation and local services. However, as described under section 5.1.2 the volume of people is regarded to be too small to create a measurable change in demand for housing and the health of workers is assumed to be higher than the local demographic baseline. During the operation stage, the immigration would be much lower than during construction therefore the effects would be lower. Therefore, this impact will be omitted from the assessment.

5.3.3 Social Impact: on Community Infrastructure

126. There is a perception that the presence of the onshore project substation, National Grid extension and cable relay station could impact on community infrastructure, recreational and tourism infrastructure, local businesses, and residents (including home workers) during the lifetime of the wind farm.

5.3.3.1 Approach to Assessment

127. Although it is true that the presence of electrical infrastructure may affect the amenity value of an area it is not possible to make an objective link between this and quantifiable change, e.g. in economic terms.
128. Therefore, the source-pathway-receptor model will be applied by using the outputs from other chapters relating to noise, vibration, and visual impacts to assess the potential significance of this impact.

5.4 Potential Tourism and Recreation Impacts during Operation and Maintenance

5.4.1 Impact: on tourism and recreation activity and associated economic value

129. Potential impacts to tourism and recreation facilities may occur during operation and maintenance activities through noise or visual disturbance.

5.4.1.1 Approach to Assessment

130. Although it is true that the presence of electrical infrastructure may affect the amenity value of an area it is not possible to make an objective link between this and quantifiable change, e.g. in economic terms.
131. Therefore, the source-pathway-receptor model will be applied by using the outputs from other chapters relating to noise, vibration, and visual impacts to assess the potential significance of this impact.

5.5 Potential Impacts during Decommissioning

132. No decision has been made regarding the final decommissioning plans for the substation, as it is recognised that industry best practice, rules and legislation change over time.
133. A full EIA will be carried out ahead of any decommissioning works being undertaken. The programme for decommissioning is expected to be similar in duration to the construction phase of 18 months

5.6 Potential Cumulative Impacts

134. Due to its proximity to Norfolk Vanguard project cumulative impacts would occur for each of the impacts considered below. However under Scenario 2 Norfolk Vanguard would not be considered within the assessment as it would not have been constructed. This will be made clear in the PEIR and ES chapters.

5.6.1 Impact: Direct and Supply Chain Job Creation

135. There is potential for Norfolk Boreas to bring socio-economic benefits, for example by providing opportunities for business, jobs and training. The clustering of offshore wind farm development in the southern North Sea will, over time, provide longer term opportunities for the supply chain and skills sectors than a single development.

5.6.1.1 Approach to assessment

136. The assessment methodology will utilise data on the other projects (including East Norfolk Vanguard, East Anglia ONE North, East Anglia TWO and Hornsea Projects 1, 2, 3 and 4 and any relevant non offshore wind projects) their spatial locations and workforce numbers available in the relevant Environmental Statements and published through industry bodies such as RenewableUK. A programme will be developed to show the likely combined numbers and activities across the construction, operation, and decommissioning lifetime of each relevant project.

5.6.2 Impact: Effects on Community Infrastructure

137. There is a perception that substations and their construction and presence could impact on community infrastructure, recreational and tourism infrastructure, local businesses, and residents (including home workers).

5.6.2.1 Approach to assessment

138. The assessment will utilise data on the other projects including the spatial locations of substations and relevant permanent features, as well as the intermittent and temporary activities. The assessment will be supported by a spatial distribution map created to identify the areas and receptors likely to be cumulatively affected **for both scenarios (however it should be noted that under Scenario 2 Norfolk Vanguard would not be included in the assessment)**.

5.6.3 Impact: Reduction in Available Accommodation due to Construction Personnel

139. The presence of a non-resident workforce throughout the lifetime of the project and of the other wind farm and related large scale projects could result in a reduction in the provision of accommodation for visitors over the long-term.

5.6.3.1 Approach to assessment

140. The assessment methodology will use spatial locations and (non-resident) workforce numbers for other projects, available in the relevant Environmental Statements. A programme will be developed to show the likely combined numbers and activities across the construction, operation, and decommissioning lifetime of the project, **for**

both scenarios. The impact will then be assessed across the whole lifetime cumulatively.

5.6.4 Impact: Obstruction or Disturbance to Other Recreation / Tourism Assets

141. The construction and operation of a number of large scale wind farm and other relevant projects could result in obstruction or disturbance (noise, air and visual) to recreation / tourism assets (sites).

5.6.4.1 Approach to assessment

142. The assessment methodology will be the same as that described for construction, utilising data on the other projects including the spatial locations of the activities, and considering them in terms of the lifetime of the project.

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