

Norfolk Boreas Offshore Wind Farm

Chapter 31

Socio-economics

Environmental Statement

Volume 1

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Appendices (Volume 3)

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Glossary of Acronyms

BEIS	Department for Business, Energy & Industrial Strategy
BRES	Business Register and Employment Survey
CBI	Confederation of British Industry
CfD	Contract for Difference
CORE	Centres for Offshore Renewable Engineering
DCO	Development Consent Order
DECC	Department of Energy and Climate Change
EEA	European Economic Area
EEEGR	East of England Energy Group
EIA	Environmental Impact Assessment
EN-1	Overarching National Policy Statement for Energy
ES	Environmental Statement
EPP	Evidence Plan Process
ETG	Expert Topic Group
EU	European Union
FTE	Full Time Equivalent
GDP	Gross Domestic Product
GP	General Practitioner
GVA	Gross Value Added
GW	Gigawatts
HDD	Horizontal Directional Drilling
HM	Her Majesty's (Government)
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IAIA	International Association for Impact Assessment
IOI	Intervention or Investment
LEP	Local Enterprise Partnership
LSOA	Lower Super Output Area
MSOA	Middle Super Output Area
MW	Megawatt
NGET	National Grid Electricity Transmission
NOMIS	ONS service providing Official Labour Market Statistics
NPS	National Policy Statement
NUTS	Nomenclature of Territorial Units for Statistics
O&M	Operations and Maintenance
ONS	Office for National Statistics
PEIR	Preliminary Environmental Information Report
PRoW	Public Right of Way
SIG	Special Interest Group
STEM	Science, technology, engineering and mathematics
UK	United Kingdom
VWPL	Vattenfall Wind Power Limited

Glossary of Terminology

Cable pulling	Installation of cables within pre-installed ducts from jointing pits located along the onshore cable route.
Ducts	A duct is a length of underground piping, which is used to house electrical and communications cables.
Gross Domestic Product (GDP)	A measure of the total value of market goods produced and services provided in the country in one year. It should be noted that GDP was developed to measure the market production of a nation and, as such, does not capture the value from non-market goods such as services provided by nature and non-salaried services provided by households.
Gross Value Added (GVA)	A measure of the value of goods and services produced in an area, industry or sector of an economy. It is a component of GDP growth and, similarly, does not capture value added from non-market goods such as services provided by nature and non-salaried services provided by households.
Job density	Job density is defined as the number of jobs in an area divided by the resident population aged 16 to 64 in that area (e.g. a job density of 1 would mean that there is one job for every working age resident)
Landfall	Where the offshore cables come ashore at Happisburgh South.
Local Enterprise Partnerships (LEPs)	Voluntary partnerships between local authorities and businesses set up in 2011 by the Department for Business, Innovation and Skills to help determine local economic priorities and lead economic growth and job creation within the local area.
Lower Super Output Areas (LSOAs) and Middle Super Output Areas (MSOAs)	<p>LSOAs and MSOAs are a geographic hierarchy designed to improve the reporting of small area statistics in England and Wales following the 2001 Census. These are built from groups of contiguous Output Areas and have been automatically generated by the Office for National Statistics.</p> <p>LSOAs have a population of 1,000 to 3,000 and from 400 to 1,200 households.</p> <p>MSOAs have a population of 5,000 to 15,000 and from 2,000 to 6,000 households.</p>
Mobilisation area	Areas approx. 100 x 100m used as access points to the running track for duct installation. Required to store equipment and provide welfare facilities. Located adjacent to the onshore cable route, accessible from local highways network suitable for the delivery of heavy and oversized materials and equipment.
New Anglia LEP	New Anglia Local Enterprise Partnership which works with businesses, local authority partners and education institutions across the counties of Norfolk and Suffolk.
Nomenclature of Territorial Units for Statistics	Nomenclature of Territorial Units for Statistics (NUTS) are statistical divisions of areas of the United Kingdom (UK) based on population. Within the UK, NUTS1 is generally regional. NUTS2 is generally at a county level. NUTS3 is generally at a grouped local authority and district level.
Non-market goods	Most environmental goods and services, such as clean air and water, and healthy fish and wildlife populations, are not traded in markets. Their economic value (i.e. how much people would be willing to pay for them) and societal value (i.e. how much they contribute to society) is not captured in market prices.
Norfolk Vanguard	Norfolk Vanguard offshore wind farm, sister project of Norfolk Boreas.
Offshore cable corridor	The corridor of seabed from the Norfolk Boreas site to the landfall site

	within which the offshore export cables will be located.
Offshore export cables	The cables which transmit power from the offshore electrical platform to the landfall.
Onshore cable route	The up to 35m working width within a 45m wide corridor which will contain the buried export cables as well as the temporary running track, topsoil storage and excavated material during construction.
Onshore cables	The cables which take power and communications from landfall to the onshore project substation.
Onshore project area	The area of the onshore infrastructure (landfall, onshore cable route, accesses, trenchless crossing zones and mobilisation areas; onshore project substation and extension to the Necton National Grid substation and overhead line modifications).
Onshore project substation	A compound containing electrical equipment to enable connection to the National Grid. The substation will convert the exported power from HVDC to HVAC, to 400kV (grid voltage). This also contains equipment to help maintain stable grid voltage.
Productivity	Productivity is an economic measure of output per unit of input. Inputs include labour and capital, while output is typically measured in revenues and other gross domestic product components such as business inventories.
Productivity gap	A comparison between the productivity of an area and the national average.
Running track	The track along the onshore cable route which the construction traffic would use to access workfronts.
The Applicant	Norfolk Boreas Limited
The Norfolk Boreas site	The redline boundary of Norfolk Boreas which will contain the wind turbines, offshore platforms and array cables (does not contain the export cable corridor)
The project	Norfolk Boreas Wind Farm including the onshore and offshore infrastructure.
Trenchless crossing zone (e.g. horizontal directional drilling (HDD))	Areas within the onshore cable route which will house trenchless crossing entry and exit points.

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31 SOCIO-ECONOMICS

31.1 Introduction

1. This chapter of the Environmental Statement (ES) presents the socio-economic assessment for the proposed Norfolk Boreas Offshore Wind Farm (herein ‘the project’). The approach to the assessment uses the project design as currently defined in chapter 5 Project Description to provide the basis of analysis.
2. Chapter 2, Need for the Project highlights the national benefits of the project. In accordance with the Overarching National Policy Statement for Energy (EN-1) (Department of Energy and Climate Change (DECC), 2011), this chapter will describe the potential for socio-economic impacts relating to the creation of jobs and the potential impact on community infrastructure at a regional and local level.
3. Vattenfall Wind Power Limited (VWPL) (the parent company of Norfolk Boreas Limited) is also developing Norfolk Vanguard, a ‘sister project’ to Norfolk Boreas. In order to minimise impacts associated with onshore construction works for the two projects, Norfolk Vanguard are seeking to obtain consent to undertake enabling works for both projects at the same time. However, Norfolk Boreas needs to consider the possibility that Norfolk Vanguard may not proceed to construction.
4. The Environmental Impact Assessment (EIA) will therefore be undertaken using the following two alternative scenarios (further details are presented in Chapter 5 Project Description) and an assessment of potential impacts has been undertaken for each scenario:
 - **Scenario 1:** Norfolk Vanguard proceeds to construction, and installs ducts and other shared enabling works for Norfolk Boreas.
 - **Scenario 2:** Norfolk Vanguard does not proceed to construction and Norfolk Boreas proceeds alone. Norfolk Boreas undertakes all works required as an independent project.
5. The assessment includes the construction, operation and decommissioning phases of the project for both scenarios. The purpose of this is to consider impacts and benefits on local and regional communities.
6. The supply chain for the construction and operation of the project would be developed at the post consent stage. Therefore, at this stage, an assessment of the likely location of supply chain businesses is used to provide a high-level assessment of the potential for direct and indirect regional job creation due to the onshore and offshore construction and operation phases.
7. It is assumed that potential impacts of decommissioning would be no worse than construction and will be assessed as such. The decommissioning methodology would

need to be finalised nearer to the end of the lifetime of the project so as to be in line with current guidance, policy and legislation at that point. The decommissioning works could be subject to a separate licencing approach.

8. Potential socio-economic impacts are interrelated with other topics. These are referenced within this chapter where relevant and include:
 - Chapter 14 Commercial Fisheries;
 - Chapter 24 Traffic and Transport;
 - Chapter 25 Noise and Vibration;
 - Chapter 27 Human Health;
 - Chapter 29 Landscape and Visual Impact Assessment; and
 - Chapter 30 Tourism and Recreation.
9. This chapter is supported by Appendix 31.1 that shows information, derived from Office for National Statistics (ONS) data, displayed graphically.

31.2 Legislation, Guidance and Policy

10. The offshore wind sector in the New Anglia Local Enterprise Partnership (LEP) is currently undergoing significant development and growth. An overview of the local and regional policy supporting this sectoral development and an overview of this growth is included in Appendix 31.3.
11. This section describes policy at a national, regional, and local level that has been reviewed to inform the socio-economic impact assessment.

31.2.1 National Legislation and Policy

12. Table 31.1 describes the requirements of the Overarching National Policy Statement (NPS) for Energy (EN-1), Regulation 5(2) and Schedule 4 of The Infrastructure Planning (EIA) Regulations 2017.

Table 31.1: National planning policy and 2017 EIA regulations relevant to socio-economics

Paragraph	Description	Response
National Policy Statements (NPS) for Energy (DECC, 2011)		
5.12.1	The construction, operation and decommissioning of energy infrastructure may have socio-economic impacts at local and regional levels. Parts 2 and 3 of this NPS set out some of the national level socio-economic impacts.	Parts 2 and 3 of NPS EN-1 set out the national level socio-economic impacts. As this assessment considers local and regional impacts and benefits these sections of the NPS will not be considered further within this assessment.
5.12.2	Where the project is likely to have socio-economic impacts at local or regional levels, the applicant should undertake and include in their application an assessment of these impacts as part of the ES.	In combination with Chapter 27 Human Health and Chapter 30 Tourism and Recreation, this chapter responds to this overarching statement. The assessment is found in section 31.7.

Paragraph	Description	Response
5.12.3	This assessment should consider all relevant socio-economic impacts, which may include:	
	the creation of jobs and training opportunities;	Potential job creation is considered in sections 31.7 and 31.8.
	the provision of additional local services and improvements to local infrastructure, including the provision of educational and visitor facilities;	Effects on community infrastructure are considered in 31.7.5.1.4 and 31.7.6.2.
	effects on tourism;	Potential impacts are considered in Chapter 30 Tourism and Recreation.
	the impact of a changing influx of workers during the different construction, operation and decommissioning phases of the energy infrastructure	As discussed in Chapter 27 Human Health potential impacts have been scoped out due to the low number of in-migrant workers in comparison to the regional population, that incoming workers are expected to be distributed across the region, and are expected to return to their permanent residence over the weekend.
	cumulative effects	Cumulative impacts, inter-relationships, and interactions are considered in sections 31.8, 31.9, and 31.10.
5.12.4	Applicants should describe the existing socio-economic conditions in the areas surrounding the proposed development and should also refer to how the development's socio-economic impacts correlate with local planning policies	See Table 31.2 for a review of overarching regional and local policy. The existing environment is described in section 31.6.
National Planning Policy Framework (MHCLG, 2018)		
Section 6 Building a strong, competitive economy		
80	Planning policies and decisions should help create the conditions in which businesses can invest, expand and adapt. Significant weight should be placed on the need to support economic growth and productivity, taking into account both local business needs and wider opportunities for development.	This chapter of the Environmental Statement (ES) specifically focusses on understanding the employment opportunity created by the project, whether the local labour market would be able to supply this, and if work is ongoing to develop the labour market to enable the supply. This is covered in sections 31.6.1.3, 31.7.5.1, and 31.7.6.1.
83	Supporting a prosperous rural economy Planning policies and decisions should enable the sustainable growth and expansion of all types of business in rural areas, sustainable rural tourism and leisure developments; and the retention and development of accessible local services and community facilities.	Between this chapter and Chapter 30 Tourism and Recreation, the effect of the project on supply chain businesses and tourism businesses is assessed. Community infrastructure assessment is included in section 31.7.5.2.
Section 8 Promoting healthy and safe communities		
92	To provide the social, recreational and cultural facilities and services the community needs, planning policies and decisions should guard against the unnecessary loss of valued facilities and services, particularly where this would reduce the community's ability to meet its day-to-day needs.	Community infrastructure assessment is included in section 31.7.5.2.

Paragraph	Description	Response
The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017		
5(2)(a)	The EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors— (a) population and human health.	In combination with Chapter 27 Human Health and Chapter 30 Tourism and Recreation, this chapter responds to this requirement. The assessment is found in section 31.7.
SCHEDULE 4.4	A description of the factors specified in regulation 5(2) likely to be significantly affected by the development: population, human health....	In combination with Chapter 27 Human Health and Chapter 30 Tourism and Recreation, this chapter responds to this requirement. The assessment is found in section 31.7.

13. The Offshore Wind Sector Deal (BEIS, 2019) includes a number of key drivers and opportunities to improve the offshore wind sector, including a drive to increase productivity and export capacity. Norfolk Boreas would aim to develop the labour market to help meet the supply needed as described in sections 31.6.1.3, 31.7.5.1, and 31.7.6.1.

31.2.2 Regional and local policy review

14. In response to the requirements under 5.12.4 of EN-1 (DECC, 2011), Table 31.2 describes the relevant goals from the regional and local policy context.

Table 31.2: Regional and local policy review

Paragraph	Description	Response
The regional economic strategy for the East of England (2004)		
GOAL ONE: A skills base that can support a world-class economy	<p>Increasing employability and participation in the labour market, especially for disadvantaged communities</p> <p>Increasing numbers of young people participating in vocational, science, technology, engineering and mathematics (STEM) options</p>	Potential job creation is considered in section 31.8. This section details both the work that Norfolk Boreas Limited is doing to create an employment pipeline and supply chain plan, as well as the number of Full Time Equivalent (FTE) jobs likely to be created in the New Anglia LEP region.
GOAL TWO: Growing competitiveness, productivity and entrepreneurship	<p>Levels of new enterprise and business growth comparable to those of a leading global region</p> <p>Regional businesses achieving their potential through support from high quality, accessible and integrated business support, training and development structures</p> <p>Increasing levels of participation in the national and international economy by East of England businesses, with particularly strong relations with a number of other leading global regions</p>	The Norfolk Boreas project represents a significant investment in to the region that will create a supply chain to support its implementation and operation. This is covered in section 31.7.

Paragraph	Description	Response
GOAL EIGHT: An exemplar for the efficient use of resources	Be a centre for sources of renewable energy with a nationally significant growth and expertise in associated businesses. Have a nationally significant cluster of environmental goods and services businesses.	The Norfolk Boreas project represents a significant proportion of the region's response to achieving this goal. The potential cumulative effect on employment is considered in section 31.8.
The strategy and the five drivers of productivity	These are outlined as: <ul style="list-style-type: none"> • Skills • Enterprise • Innovation • Competition • Investment 	Section 31.7.2 describes the additional enhancement being undertaken as part of the project to support these drivers of productivity.
New Anglia LEP Strategic Economic Plan (2017)		
Chapter 1 Introducing our economy Paragraph 1.15	Building on the aims of the UK Industrial Strategy (which has a strong focus on sector prioritisation and support), the LEP has identified five high impact sectors which are highlighted throughout our plan as a particular focus for targeted interventions: <ul style="list-style-type: none"> • Advanced Manufacturing and Engineering • Agri-tech • Energy • ICT and Digital Creative • Life Sciences 	Norfolk Boreas represents a significant contribution to the High Impact sector of 'Energy'
Chapter 2 Sectors Paragraph 2.30	The New Anglia area is well placed to capitalise on the rapid technological and market growth in renewable and low carbon sectors, along with significant investments in offshore wind and has already undertaken a number of successful steps to promote the sector.	Norfolk Boreas represents a significant proportion of the cumulative regional investment required to capitalise on rapid technological and market growth.
Chapter 3 Green Economy Pathfinder Paragraph 3.1 and 3.2	The LEP was selected by Government in 2011 to lead the UK's transition to a green economy across three focus areas: low carbon, natural capital and social capital. Our ambition is to strengthen the New Anglia economy by creating more productive jobs. We will do this by building on our distinctive competitive economic and environmental advantages to ensure our area is home to businesses playing a prime role in driving the sustainable growth of the UK economy.	Norfolk Boreas is a low carbon renewable energy project. Section 31.7, Chapter 27 Human Health, and Chapter 30 Tourism & Recreation consider all three focus areas.
Chapter 5 Skills Paragraph 5.3	Our key challenge is that our resident workforce is ageing, low skilled and low paid. As a result, many of the available high value jobs go to an imported workforce. This will continue to happen if we cannot increase our higher and graduate level skills in the workforce. Concurrently, worklessness and a lack of social mobility reduce the prospects for individuals.	Section 31.7 describes how the Norfolk Boreas project is engaging with local supply chains and educational facilities with the aim of enhancing local procurement and the development of a local employment pipeline.

Paragraph	Description	Response
North Norfolk Core Strategy (2008)		
Policy SS5 Economy	At least 4,000 additional jobs will be provided between 2001 and 2021 in line with the indicative targets set out in the East of England Plan.	Section 31.7 describes the potential employment during construction and operation. Both of which have the potential for people to be resident in North Norfolk.
Policy SS5 Economy	The tourist industry will be supported by retaining a mix of accommodation and encouraging new accommodation and attractions which help diversify the offer and extend the season. Proposals should demonstrate that they will not have a significant detrimental effect on the environment, and cycling, walking and heritage tourism will be encouraged by promoting and enhancing long distance walking and cycling routes and heritage trails.	Chapter 30 Tourism & Recreation considers the impact on the tourism economy. This includes an assessment of impacts on environment, cycling, walking and heritage tourism.
Breckland Local Plan, Pre-Submission, August (2017)		
Breckland Council is currently consulting on a review of the Local Plan under the Joint Core Strategy outlined below.		
Section 6 Economy and Employment	This section primarily focusses on the development of employment land in Attleborough, Dereham, Swaffham, Thetford, and Snetterton.	Chapter 4 Site Selection and Alternatives shows that these towns are not affected by the project.
5.73	Renewable energy is central to the economic, social and environmental dimensions of sustainable development. In meeting the challenge and to help increase the use and supply of renewable and low carbon energy, the Council recognises the need to have a positive strategy to promote renewable energy generation, whilst at the same time ensuring that the adverse impacts are addressed satisfactorily, including the cumulative landscape and visual impacts.	All other chapters of the ES focus on the environmental dimension of sustainability. Chapter 27 Human Health, Chapter 30 Tourism & Recreation, and this chapter consider various social dimensions of sustainability. Chapter 29 Landscape and Visual impact consider the cumulative landscape and visual impacts.
6.1	The size and dispersed nature of the area's population presents significant challenges for the Council in delivering balanced economic growth. Breckland's strategic position is emphasised by the good road communications	Chapter 24 Transport and Traffic includes a detailed assessment of the impact to the road network. Chapter 27 Human Health and Chapter 30 Tourism and Recreation both translate this to understand social impacts. It is also included in section 31.7 to understand impacts on community infrastructure.
6.3	Employment space in the District is dominated by industrial uses and tends to be concentrated around Breckland's larger towns. The rural economy also accommodates important hubs of economic activity, particularly with regards to small scale office and workshop space.	Section 31.7 includes assessment of impacts to community infrastructure. The exact location of small offices and workspaces is not available but it is reasonable to assume that these generally correlate to similar locations to community infrastructure. Chapter 4 Site Selection and Alternatives shows

Paragraph	Description	Response
		how towns have been avoided and section 31.7 describes how potential indirect impacts will be mitigated.
Broadland, Norwich and South Norfolk Joint Core Strategy (2014)		
Paragraph 2.6	<p>The grand challenges that our Strategy has to address between 2008-2026 are:</p> <p>Jobs: securing another 27,000 new jobs of all types and levels in all sectors of the economy and for all the workforce</p> <p>Place making: maximising the high quality of life we currently enjoy and respecting the patterns of living which characterise the area</p> <p>Infrastructure: ensuring that essential infrastructure, services and community facilities are provided</p>	<p>Job creation is considered in section 31.8.</p> <p>This considers the contribution to the construction sector and long term employment opportunities.</p>
Policy 5: The economy	<p>The local economy will be developed in a sustainable way to support jobs and economic growth both in urban and rural locations. This will:</p> <ul style="list-style-type: none"> provide for a rising population and develop its role as an engine of the wider economy; facilitate its job growth potential with a target of at least 27,000 additional jobs in the period 2008-2026; and increase the proportion of higher value, knowledge economy jobs while ensuring that opportunities are available for the development of all types and levels of jobs in all sectors of the economy and for all the workforce 	Section 31.7 describes how the Norfolk Boreas is engaging with local supply chains, educational facilities and considers long term employment opportunities.
Policy 5: The economy	<p>Opportunities for innovation, skills and training will be expanded through:</p> <ul style="list-style-type: none"> facilitating the expansion of, and access to, vocational, further and higher education provision; and encouraging links between training or education provision, and relevant business concentrations including co-location where appropriate 	Section 31.7 describes how the Norfolk Boreas is engaging with local supply chains and educational facilities.
Policy 7: Supporting communities	Provision will be made to ensure equitable access to new and improved community halls, including new provision on major developments. This will provide facilities for use by a wide range of groups, including faith communities. Expanded library provision will be made including through new or expanded facilities in major growth locations.	Sections 31.7 considers potential impacts to community infrastructure.
Policy 7: Supporting communities	Integration and cohesion within and between new and existing communities will be promoted including through support for community development workers and the early engagement of existing communities in the design process.	Sections 31.7 considers potential impacts to community infrastructure.

31.3 Consultation and Engagement

15. Consultation and engagement with stakeholders and communities is a key driver of the EIA process, and is ongoing throughout the lifecycle of the project, from the initial stages through to consent and post-consent. Full details of the project consultation process to date are presented in the Consultation Report (Document reference 5.1), which has been submitted with the development consent order (DCO) application.
16. As discussed in section 31.1 VWPL are progressing both the Norfolk Boreas and Norfolk Vanguard projects and as such engagement and consultation responses have been gathered and due regard taken in relation to both projects.

31.3.1 Community Engagement

17. In line with best practice for managing social impacts outlined by the International Association for Impact Assessment (IAIA) (Vanclay et al, 2015) and their own Principles of Engagement¹, VWPL have undertaken community engagement to inform the development of both the Norfolk Vanguard and Norfolk Boreas projects. This allowed early identification of socio-economic assets that were important to people so that the project could avoid impacts on these as part of the design process.
18. Since October 2016 consultation has been undertaken with local communities, varied organisations and businesses within Norfolk and particularly within the footprint of the onshore cable route. To date this has included the following activities:
 - Drop in Exhibitions held at locations within and adjacent to the onshore project area;
 - October 2016;
 - March and April 2017;
 - November 2017; and
 - November 2018.
 - Report summarising community feedback shared with all registered participants, key local and community stakeholders, and on the project website²;
 - Hearing your Views, I, II, III and IV;
 - Community engagement events (see Table 31.3);
 - Newsletters distributed throughout the Scoping Area (October 2017), and

¹ Available on the Vattenfall Wind Power Limited corporate website at:
<https://corporate.vattenfall.co.uk/globalassets/uk/communities/principles-of-engagement.pdf>

² <https://corporate.vattenfall.co.uk/norfolkvanguard>

subsequently provided to those within a more focussed area closer to the onshore project area. These newsletters were distributed on the following dates:

- October 2016;
 - March 2017;
 - June 2017;
 - June 2018;
 - October 2018; and
 - February 2019
- Provision of a dedicated project website².
 - The Southern North Sea Conference and Exhibition 2018; an event held by East of England Energy Group (EEEGR) was attended by Norfolk Boreas Limited representatives.
 - With the assistance of the EEEGR and Norfolk Chamber of Commerce VWPL held two “meet the buyer events” in March and May 2018 for both Norfolk Boreas and Norfolk Vanguard projects.
 - In March 2018 VWPL (for both projects) launched and promoted a Supply Chain Information Pack and request for information, which seeks interest and information from potential local suppliers to the projects. In addition, in September and December 2018 held Skills and Supply Chain workshops.
19. The project has employed a Local Liaison Officer who is also the Skills and Education Champion, based full time in Norfolk. The project has continued engagement with organisations that represent the interests of people, communities and businesses local to the onshore project area, and more generally within the region. This has been enabled through meetings and events held by the LLO and other team members as described in Table 31.3.
20. Early meetings introduced the projects and then provided updates. 106 of the meetings had the explicit objective of exploring how skills can be developed to enable local people to gain employment with the project. Approximately half of the meetings targeted groups that are categorised as hard to reach.

Table 31.3 Meetings to date with regards Norfolk Boreas and Norfolk Vanguard

Period	Stakeholder type	Number	Number that are “Hard to Reach”	Description
Q1 2017 to Q4 2018	County and District Councils	16	4	Introduction, Updates, approach to engagement and Business, Skills, and Tourism
Q3 2017 to Q1 2019	Parish Councils	32	0	Discussions and Project Description Updates
Q1 2017 to Q2 2018	Other community groups and academic forum	52	9	Project update and exploration

Period	Stakeholder type	Number	Number that are “Hard to Reach”	Description
Q1 2017 to Q2 2019	Skills and Education meetings	106	105	Exploration and development of skills programme
Q1 2017 to Q4 2018	Individuals or representatives	34	4	Individual discussion and response to concerns
Q1 2018 to Q4 2018	Supply Chain	16	0	Discussions and responses to concerns
Q1 2017 to Q2 2019	Total	256	122	

21. Skills and education work to date has included working with local primary schools, the University of East Anglia and in support of the New Anglia Energy Sector Skills Plan discussed in Appendix 31.3.
22. The evidence above demonstrates that the project has been implementing a comprehensive process of effective community engagement with communities who may be affected by the project and a process of logging and considering the project related social issues raised during the consultation.
23. It is likely that this trend in community engagement will continue as part of the construction process. This would support the various management practices relating to the mitigation of potential socio-economic impacts.

31.3.2 Technical Consultation

24. To date, consultation regarding the socio-economic impact assessment presented in this chapter has been conducted through:
 - Norfolk Vanguard Expert Topic Group (ETG) meetings held in 2017;
 - Norfolk Boreas specific consultation on a Method Statement undertaken in February 2018; and
 - The Norfolk Boreas Scoping Report (Royal HaskoningDHV, 2017) which was provided to all relevant stakeholders by the Planning Inspectorate for comment in May 2017.
 - The Norfolk Boreas Preliminary Environmental Information Report (PEIR) (Norfolk Boreas Limited, 2018).
25. Full details of the project Technical Consultation process are presented within Chapter 7 Technical Consultation.
26. In addition to the Statutory Consultation taken specifically in relation to Norfolk Boreas, a programme of pre-application consultation was undertaken by Norfolk Vanguard and Norfolk Boreas. As the majority of the onshore infrastructure for the projects are co-located the consultation is relevant to both projects and has

informed the approach to both EIA. This chapter also includes information provided during the Norfolk Vanguard Examination up to Deadline 5 of the Examination (20th March 2019).

27. A summary of the technical consultation that has informed this assessment is provided in Table 31.4.

Table 31.4 Technical Consultation

Stakeholder	Date, Document	Comment	Response
Norfolk Boreas Consultation			
Secretary of State	June 2017, Scoping Opinion	The Scoping Report refers to guidance documents for the assessment; however has not set out the methodology for assessing impacts. It is noted and welcomed that the approach will be discussed as part of the Evidence Plan Process (EPP). The methodology should be set out within the ES.	The methodology is set out in section 31.4
Norfolk County Council	June 2017, Scoping Opinion	Economic development - It would be helpful if the EIA/PEIR could provide accurate figures of those likely to be employed both during construction and once the Wind Farm is fully operational. There should also be a statement as to whether the labour would be sourced from local firms or if expertise would need to be imported to the region.	This is considered in section 31.7
ETGs (Norfolk County Council, Breckland Council, Broadland District Council, North Norfolk District Council)	January 2018, Method Statement	No comments received on methodology.	No further action required.
Norfolk County Council	November 2018, PEIR	There are potentially significant economic benefits that may arise from the Boreas proposal in terms of: <ul style="list-style-type: none"> Local employment creation; Business sectors affected by construction; and Operations and Maintenance (O&M) of the wind turbines. <p>2.17. County Council officers have had good engagement with Vattenfall in terms of maximising the wider economic benefits from the project. The County Council fully expect and</p>	More information will be published on the Applicant's approach to operations and maintenance once a number of contributing factors are realised, these include a positive DCO consent decision; contract for difference (CfD) award; final investment decision (FID); other regulatory or planning considerations and further engagement with the logistics supply chain.

Stakeholder	Date, Document	Comment	Response
		would support the longer term operations and maintenance benefits to be experienced locally. In addition the County Council would be keen for the project to enable/encourage manufacturing to be attracted to Norfolk. Discussion to date with Vattenfall would suggest that they are looking to develop not just an O&M presence in the County but also a manufacturing base. The PEIR suggests that the Norfolk Boreas and Norfolk Vanguard projects will in total create up to 481 jobs during construction and up to 175 jobs during operation.	
Norfolk County Council	November 2018, PEIR	The County Council strongly welcome, on economic development grounds and supporting the Norfolk economy Vattenfall's decision to use the Port facilities at Great Yarmouth for: <ul style="list-style-type: none"> • Construction; assembly and manufacture of windfarm components; and • Operations and maintenance. 	As above, more information will be published on the Applicant's approach to operations and maintenance once a number of contributing factors are realised.
Norfolk County Council	November 2018, PEIR	It is felt that the given the scale of this proposal and potential disruption it may cause to local communities and business that there should be suitable local community benefits arising and appropriate compensation for local businesses.	Only mitigation which addresses impacts directly associated with the Project should be considered in the planning and DCO process; therefore, wider community benefits should not be taken into account. The mitigation measures(described in sections 31.7.1 and 31.7.2) will avoid or reduce residual adverse effects on the socio-economic receptors to non-significant levels, as summarised in Table 31.54. Continued efforts to address wider benefits will be undertaken separately and outside of the DCO process.
Norfolk County Council	November 2018, PEIR	"Vattenfall should set out clearly in the following application stage (Section 56 submission) and the accompanying Environmental Statement (ES): how local communities impacted by the onshore construction (e.g. Cable	Mitigation is considered in section 31.7.1 and additional enhancements are addressed in section 31.7.2. A Community Benefit Fund or equivalent, is not a material planning condition, as it does not

Stakeholder	Date, Document	Comment	Response
		Route, CRS and Substation) can have such impacts mitigated; and (b) the need for a “local community fund” to assist the wider community affected by the proposal."	deliver mitigation in relation to specific project impacts and therefore, it is not a relevant consideration of the DCO process.
Norfolk County Council	November 2018, PEIR	Vattenfall should, given the potentially long timescales for construction address the cumulative impact/s on local businesses and communities and provide appropriate compensation for those businesses and communities adversely affected by the construction works.	<p>Only mitigation which addresses impacts directly associated with the project should be considered in the planning and DCO process.</p> <p>Cumulative impacts are considered in section 31.8 and with the application of best working practices, cumulative, effects on the socio-economic receptors are at non-significant levels.</p>
N2RS	November 2018, PEIR	<p>"As you know N2RS is in favour of an HVDC transmission system for both Norfolk Vanguard and Norfolk Boreas and as such the design for both these projects is acceptable, provided there is absolutely no deviation from this commitment.</p> <p>However we would like to make a few points – also made for Vanguard:</p> <p>a) We support the village of Ridlington’s requests in terms of location and lighting of the mobilisation compound to the east of Ridlington village.</p> <p>b) Due regard should be given to homes and businesses which are still directly affected by the wider plans - and loss in property value and quality of life should be taken into account. It should not fall upon individuals to bear the brunt of schemes like this and those affected must be properly compensated. This would include owners of holiday businesses who will lose trade during construction and possibly suffer longer-term loss of reputation. It is a concern that construction of the cable route at and near landfall might take place in the summer months when it is least</p>	<p>Only mitigation which addresses impacts directly associated with the Project should be considered in the planning and DCO process;</p> <p>The mitigation measures(described in sections 31.7.1 and 31.7.2) will avoid or reduce residual adverse effects on the socio-economic receptors to non-significant levels, as summarised in Table 31.54.</p>

Stakeholder	Date, Document	Comment	Response
		convenient and conducive to that industry."	
Norfolk Vanguard Consultation			
Secretary of State	November 2016, Scoping Opinion	The Secretary of State welcomes the proposed socio-economics assessment. The types of jobs generated should be considered in the context of the available workforce in the area; this applies equally to the construction and operational stages.	This is considered in section 31.7
Norfolk County Council	November 2016, Scoping Opinion	It would be helpful if the EIA/PEIR could provide accurate figures of those likely to be employed both during construction and once the Wind Farm is fully operational. There should also be a statement as to whether the labour would be sourced from local firms or if expertise would need to be imported to the region.	This is considered in section 31.7
Necton Parish Council	November 2016, Scoping Opinion	A socio-economic assessment of the 3KM site selection area, which identifies the impact on community infrastructure, local businesses and residents. This assessment must include home-workers as a category and the impact on the local house price index.	<p>Neither the NPS nor the agreed scope of the assessment identified a requirement to consider the impact on home-workers or impacts on local house prices.</p> <p>Home-workers are not identified as a discrete category within available socio-economic datasets and so it is not possible to undertake a meaningful assessment of impacts to that sector.</p> <p>However, potential impacts on home-workers have been assessed in relation to impacts to residential receptors i.e. potential noise, visual and air quality impacts are assessed in the respective chapters. This has been assessed by applying a buffer zone and identifying the areas that may be affected within it.</p> <p>House price assessments fall outside of the scope of this study.</p>

Stakeholder	Date, Document	Comment	Response
Necton Parish Council	November 2016, Scoping Opinion	We would welcome a commitment from the applicant to consider a compensation scheme for homeowners who find their sale prices are adversely affected by the presence of substations. We would wish to understand the enduring economic legacy this development would provide to the sub-station area.	A search of the research Journal of Property Investment & Finance ³ shows little evidence to establish a quantifiable link between house prices and renewable energy infrastructure. House price assessments fall outside of the scope of this study.
Planning Inspectorate	January 2019, Written Questions	Various comments, questions and requests for clarification have been made through the examination process to date	Following written questions received from the Planning Inspectorate during Norfolk Vanguard's Examination Process small amendments have been made to Table 31.10, paragraph 159, section 31.7.5.2 and Table 31.43 of this Chapter of the ES. These updates should help provide clarification where needed.

31.4 Assessment Methodology

28. This section describes the approach taken to assessing socio-economic impacts and expands on the process outlined in Chapter 6 EIA Methodology.
29. This assessment is compliant with the EIA Regulations 2017. As such it aims to follow the EIA approach of defining the receiving environment, and then based on the project information assessing likely significant impacts.
30. Tourism impacts are included in Chapter 30 Tourism and Recreation. Impacts to commercial fisheries are considered in Chapter 14 Commercial Fisheries. Social change as a determinant of health outcomes is considered in Chapter 27 Human Health.
31. General concerns and comments from community engagement events and correspondence have been included as part of the evaluation (see section 31.3.1). However, specific attitudinal survey responses are not included in this chapter, for the reasons described in the Norfolk Boreas Health Method Statement (Royal HaskoningDHV, 2018, unpublished).

³ The most relevant research related to onshore wind farms. This stated that *"The analysis of transaction data found some correlation between distance from a wind farm, and value. However, the data were insufficiently detailed to draw any sound conclusions."* Sally Sims and Peter Dent (2007) "Property stigma: wind farms are just the latest fashion", Journal of Property Investment & Finance, Vol. 25 Issue: 6, pp.626-651, <https://doi.org/10.1108/14635780710829315>

31.4.1 Review of Available Data and Information

32. The following types of data and information have been reviewed:

- Quantitative data from the ONS (Table 31.7) has been used to understand the current socio-economic condition of the study area (as defined in paragraph 66) and relevant historic trends;
- National, regional, and local strategy and policy (Table 31.5) has been reviewed to confirm that the project is in line with statutory stakeholder’s ambitions;
- Industry report and analysis (Table 31.6) have been reviewed to indicate the ambitions and potential within the study area with regards the development of the offshore wind sector; and
- Table 31.6 also includes relevant guidance on best practice, such Her Majesty’s Government (HM) Treasury Green Book (2018) and Homes & Communities Agency Additionality Guide (2014) that have been used to inform the assessment methodology.

Table 31.5 Strategy and policy used for this assessment

Geographic scale	Reports, Research, and Strategies
National	<p>Department of Energy & Climate Change, 2011, Overarching National Policy Statement for Energy (EN-1)</p> <p>Department for Business, Energy & Industrial Strategy, 2017, The UK’s Industrial Strategy</p> <p>Department for Business, Energy & Industrial Strategy, 2017, Building our Industrial Strategy: green paper</p> <p>Department for Business, Energy & Industrial Strategy, 2017, Low Carbon Innovation Fund – East of England</p> <p>Confederation of British Industry (CBI), 2017, Unlocking Regional Growth</p> <p>HM Revenues & Customs, 2016, Apprenticeship Levy</p> <p>Department for Business, Innovation & Skills and Department of Energy & Climate Change, 2013, Offshore wind industrial strategy: business and government action</p> <p>Department of Energy & Climate Change, 2009, UK Low Carbon Transition Plan</p>
Regional and Local Enterprise	<p>New Anglia LEP, 2017, The > East, A Strategy for Growth and Opportunity</p> <p>New Anglia LEP, 2017, The > East, Economic Strategy Evidence Plan</p>
District and County Council	<p>North Norfolk Core Strategy, 2008</p> <p>Norfolk County Council, 2012, Norfolk Growth Strategy</p> <p>Suffolk County Council, 2013, Suffolk Growth Strategy</p> <p>Suffolk County Council, 2013, Suffolk Coastal District Local Plan - Core Strategy & Development Management Policies</p> <p>Suffolk County Council, East Suffolk Growth Plan 2014 to 2025</p> <p>Great Yarmouth Borough Council, 2014, The Plan 2015-2020</p> <p>Department for Business, Innovation & Skills and Department of Energy & Climate Change, 2011, CORE: Centres for Offshore Renewable Engineering</p> <p>Breckland Local Plan, Pre-Submission, 2017</p>

Table 31.6 Research and guidance

Geographic scale	Guidance, research and reports
International	<p>International Association for Impact Assessment, 2015, Social Impact Assessment: Guidance for assessing and managing the social impact of projects</p> <p>Therivel and Wood, 2017, Methods of Environmental and Social Impact Assessment (Natural and Built Environment Series) Fourth Edition. Taylor and Francis.</p> <p>Chapter 13: Glasson J. Socio-economic impacts 1: Economic Impacts</p> <p>Chapter 14: Chadwick A. and Glasson J. Socio-economic impacts 2: Social Impacts</p>
National	<p>BVG Associates, 2016, Strategic review of UK east coast staging and construction facilities</p> <p>BVG Associates, 2015, UK Content of the Offshore Wind Industry</p> <p>Homes & Communities Agency, 2014. Additionality Guide, Fourth Edition.</p> <p>HM Treasury, 2018, The Green Book, Central Government Guidance on Appraisal and Evaluation</p> <p>Office for National Statistics (2017), UK National Accounts, The Blue Book: 2017</p> <p>Productive Seas Evidence Group, 2015, Social and Economic Assessment Requirements for Development Projects Affecting the Marine Environment</p> <p>Office for National Statistics (2010), Measuring the Economic Impact of an Intervention or Investment</p> <p>RenewableUK, 2017, Offshore Wind Industry Investment in the UK</p> <p>Roberts A. and Westbrook S. (2017), A new economic impact methodology for offshore wind, BVG Associates and University of Highlands and Islands</p>
Regional	<p>Grant Thornton, 2017, Norfolk Limited</p> <p>Grant Thornton, 2018, Norfolk Limited</p>

Table 31.7 Sources of statistical data

Source	Link	Data
Office for National Statistics – Open Data	<p>http://geoportal.statistics.gov.uk/</p> <p>https://census.ukdataservice.ac.uk/</p>	<p>2011 Census data⁴</p> <p>Lower Layer Super Output Area (LSOA) boundaries</p> <p>Middle Layer Super Output Area (MSOA) boundaries</p> <p>Employment and employee types (split by LSOA and MSOA).</p> <p>Type I employment multipliers and effects by SU114 industry and sector (market, government and NPISH)</p>
NOMIS (an ONS service providing)	https://www.nomisweb.co.uk/	Labour Market Profile for New Anglia LEP, Norfolk, Breckland, Broadland, Great Yarmouth, King's

⁴ The ONS Census is updated every ten years. It is the only data source where location specific data can be accessed at LSOA and MSOA levels, making it the most accurate source for location specific needs. The census data has been checked against annual trends in NOMIS data to ensure that there are no trends which may result in the data no longer being representative.

Source	Link	Data
Official Labour Market Statistics (accessed February 2019)		Lynn and West Norfolk, Norwich, North Norfolk, and South Norfolk Origin-Destination data (also known as flow data).
English indices of deprivation 2015 ⁵	https://www.gov.uk/government/statistics/english-indices-of-deprivation-2015	File 1: Index of multiple deprivation File 7: all ranks, deciles and scores for the indices of deprivation, and population denominators File 8: underlying indicators File 10: local authority district summaries File 12: local enterprise partnership summaries.

31.4.2 Socio-Economic Definitions

33. The IAIA published Social Impact Assessment: Guidance for assessing and managing the social impacts of a project (Vanclay, 2015) defines a social impact assessment as *“the processes of analysing, monitoring and managing the intended and unintended social consequences, both positive and negative, of planned interventions (policies, programs, plans, projects) and any social change processes invoked by those interventions.”*
34. Glasson and Chadwick (Therivel and Wood, 2017) define social and socio-economic impacts as *“the ‘people impacts’ of development actions. Both social impact assessments and socio-economic impact assessments focus on the human dimension of environments, seeking to identify the impacts on people, including who benefits and who loses.”*
35. The Homes and Communities Agency (Dancer, 2014) describes economic impacts in terms of business output, Gross Value Added (GVA) to a region, personal income (including wages), or jobs. Any of these measures can be used as an indicator of economic well-being.

⁵ The English indices of deprivation were last updated in 2015 and as such are still the most up to date source available.

36. The Office for National Statistics produced a three paper series called Measuring the Economic Impact of an Intervention or Investment (IOI). The purpose of this is to provide, *“independent advice to regional users on the use of ONS and Government Statistical Service (GSS) statistics, including on technical issues, such as the use of statistics in monitoring performance against targets”*. (ONS, 2011a)
37. Section 5.1 of Paper One of this series considers the issues with using GVA to evaluate the economic impact of an investment at a company scale, it states that: *“GVA estimates from official sources are volatile at low geographical levels. Any approach to estimating GVA (whether or not using official data) should produce consistently robust estimates at the scale of the IOI. If this issue is ignored any such approach will be unreliable when assessing an IOI.”* (ONS, 2011b)
38. Section 3.10 of Paper Two of this series states that, *“The complex calculations and imputations used to produce GDP and regional GVA estimates cannot be applied at the firm level to produce IOI Value Added.”* (ONS, 2011c)
39. Section 8.4 of Paper Two states that, *“An alternate, holistic approach to the calculation of GVA estimates could be the use of a scorecard, composite or basket indicator approach combining factors known to affect GVA.”* (ONS, 2011c)
40. Based on these definitions the assessment has considered two distinct elements:
 - The economic element concerned with the direct and indirect potential for job creation (i.e. the labour demand) and the size of the labour market required to supply this (i.e. the labour supply) during the construction of the onshore cable route. As well as whether it is likely that a supply chain will be present within the New Anglia LEP to provide goods or services to the offshore construction and operation. These aspects are assessed by considering Full Time Equivalent (FTE) jobs and comparing them with a regional baseline. Additional enhancements that could contribute to a basket of indicators to improve GVA (due to pro-active supply chain development or efforts to increase skills locally to enable procurement) are considered qualitatively.
 - The social element has direct impacts due to nuisance or disturbance such as increased noise or traffic delays and indirect impacts due to in-migration of labour. In-migration of labour has been considered and consulted upon during Scoping and due to the low potential impact has been determined not to be significant. Therefore, the assessment will focus on disturbance of community infrastructure as an indicator of community wellbeing. This impact is created by the construction and operation of the project. Impact pathways are derived from Chapter 24 Traffic and Transport, Chapter 25 Noise and Vibration, Chapter 26 Air Quality, and Chapter 29 Landscape and Visual Impact Assessment. These

are compared with a local baseline of assets (defined below) that serve local communities.

31.4.2.1.1 *Community infrastructure definition*

41. Infrastructure is generally defined as the basic physical and organisational structures and facilities (e.g. buildings, roads, power supplies) needed for the operation of a society or enterprise. A formal definition of community infrastructure does not exist. Therefore, for the purposes of this assessment community infrastructure will be defined as the basic physical and organisational structures and facilities required for the cohesion of a local community. This will include:

- Educational – schools and training facilities serving the local population;
- Health – General Practitioner (GP) surgeries, dentists, and other facilities serving a local population;
- Community – public houses, town halls, public sports facilities, etc.;
- Financial and logistics – local bank branches, post offices, etc.; and
- General business – clustering of shops, garages, and other services people use on a day to day basis.

42. Recreational facilities, public rights of way (PRoW), and tourism assets such as theatres or theme parks that draw people to an area are assessed in Chapter 30 Tourism and Recreation. Assets of cultural importance such as churches and monuments are included in Chapter 28 Onshore Archaeology and Cultural Heritage.

31.4.3 Impact Assessment Methodology

43. The method generally follows that which is described in Chapter 6 EIA Methodology but has been adapted to focus on socio-economic factors where appropriate.

31.4.3.1 Sensitivity

31.4.3.1.1 *Employment*

44. As discussed above, the economic impact assessment will focus on onshore labour demand. Impacts here would be related to job creation from the project and labour supply from the regional labour market during the construction of the onshore cable route and more generally with regards the supply chain for the offshore construction and operation.

45. A labour market is considered sensitive if it has a low level of education and a high level of unemployment compared with the rest of the UK, as described in Table 31.8. This would suggest that although employment opportunities may be created the local labour market may not have the capacity to provide the labour unless further investment is made in skills training. Therefore, increased demand for local labour would result in pressure on available labour supply, increased labour and skills

shortages, wage inflation, and the import of labour to meet demand. Sensitivity has been assessed using:

- Education and Employment indices from the English Indices of Multiple Deprivation. This is a UK government qualitative study of deprived areas in England. It is a comparative index where a low rank indicates a high level of deprivation in comparison to the rest of the UK; and
- A comparison with Labour Market Profiles sourced online from NOMIS to show the most recent education and unemployment figures in comparison with UK averages.

Table 31.8 Definitions of sensitivity levels for labour market⁶

Sensitivity	Definition
High	The area receives a rank of 0 to 10 against the Index of Multiple Deprivation with regards Education and Employment. NOMIS data show high levels of unemployment and low level of skills compared to UK levels.
Medium	The area receives a rank of 10 to 20 against the Index of Multiple Deprivation with regards Education and Employment. NOMIS data shows equivalent levels of unemployment and skills compared to UK levels.
Low	The area receives a rank of 20 to 30 against the Index of Multiple Deprivation with regards Education and Employment. NOMIS data shows low levels of unemployment and higher skills compared to UK levels.
Negligible	The area receives a rank of 30 to 40 against the Index of Multiple Deprivation with regards Education and Employment. NOMIS data shows very low levels of unemployment and high skills compared to UK levels.

31.4.3.1.2 Community infrastructure

46. The assessment considers impacts on community infrastructure to be an indicator of community well-being. Therefore, it defines sensitivity based on the number of assets available to communities (Table 31.9).

⁶ Legislative guidance to assess the sensitivity of a labour market does not exist. Therefore, a comparative framework has been developed using the English Indices of Deprivation for Education and Employment. This compares the 40 LEPs in England to understand if the skills available in the labour market are low or high in comparison to other English LEPs.

Table 31.9 Definitions of sensitivity levels for community infrastructure⁷

Sensitivity	Definition
High	The area lacks alternative community infrastructure locations and people are required to travel significantly further (more than twice as far) to access this.
Medium	The area has a low level of alternative community infrastructure and people have to travel moderately further (up to twice as far) to access this.
Low	The area has alternative infrastructure but people still have to travel slightly (up to 1.5 times as far) further to access this.
Negligible	The area has abundant alternative infrastructure and people can readily access this by travelling the same distance as before.

31.4.3.2 Value of community infrastructure

47. The value of community infrastructure is based on the likelihood that people could relocate to use an alternative asset, therefore limited community assets such as schools are deemed to be of a higher value than more common assets such as shops (Table 31.10). The assets are defined as follows:

- Educational – schools and training facilities serving the local population;
- Health – GP surgeries, dentists, and other facilities serving a local population;
- Community – public houses, town halls, public sports facilities (e.g. swimming pools and publicly accessible sports grounds), etc.;
- Financial and logistics – local bank branches, post offices, etc.; and
- General business – clustering of shops, garages, and other services people use on a day to day basis.

Table 31.10 The definition of value of community infrastructure based on the availability of alternatives

Asset type	Value	Example to inform the assessment criteria
Educational	High value	It is very unlikely that people (and especially children or young people) would relocate midway through their education to avoid a project. Education is also the bedrock of continued development of people and, thus, society at large.
Health	Medium to high value	It is unlikely that people would visit a different GP or dentist due to a project. This is because people register at one GP at a time and it is inconvenient to visit a different one.
Community	Medium to low value	Other similar community facilities are available within the area. There are opportunities to use other community facilities at some distance. However, the access issues and a preference for local facilities is recognised.
Financial and logistics	Low value	Banking and post office facilities are widespread and common in the area. Whilst there may be groups with limited access the great majority of the community could use adjacent bank or post office facilities..

⁷ Legislative guidance to assess the sensitivity of community infrastructure does not exist. Therefore, indicative numeric definitions have been used to create a logical framework for assessment. The core assumption is that if a community cannot access alternative community assets then they would be very sensitive to a change in access.

Asset type	Value	Example to inform the assessment criteria
General businesses	Negligible value	Shops are common throughout the local area offering alternative shopping options.

31.4.3.3 Magnitude

31.4.3.3.1 Employment

48. A construction project is likely to employ a large number of contract workers that would maintain full time employment across multiple projects. Therefore, employment levels are converted to FTE so as to account for temporary contract workers associated with the project.
49. The change in employment is then considered against the labour market that is likely to supply workers. Definitions used to assess magnitude are set out in Table 31.11 based on levels recommended by Chadwick and Glasson (Therivel and Wood, 2017). Potential increases and decreases of employment are considered.

Table 31.11 Definitions of magnitude levels for employment

Impact	Definition
High	Change of + or – 2% or over of baseline employment in relevant labour market
Medium	Change of + or – 1% to 2% of baseline employment in relevant labour market
Low	Change of up to + or – 1% of baseline employment in relevant labour market
Negligible	No measurable change in local employment in relevant labour market

31.4.3.3.2 Community infrastructure

50. The magnitude level on community infrastructure will be described qualitatively as in Table 31.12. Due to the fact that the project is not proposing to create community infrastructure, only negative impacts will be considered in this regard.

Table 31.12 Definitions of magnitude levels for community infrastructure

Magnitude	Definition
High	Permanent loss or obstruction of community infrastructure e.g. if a village hall had to be demolished, it became a stranded asset without access, or operation creating another impact that rendered it unusable.
Medium	Temporary loss or obstruction of community infrastructure during construction or a permanent physical change to community infrastructure e.g. if access to a village hall was completely blocked during construction, significant noise was created in its vicinity during construction, or part of the village hall was restructured.
Low	Temporary nuisance to community infrastructure due to noise or visual impacts during construction.
Negligible	The construction project is temporarily within the vicinity of the community infrastructure but with negligible to zero impact due to noise, obstruction, or visual impacts.

31.4.3.4 Pathway

51. When considering socio-economic effects, it is important to consider whether the magnitude of change has a likely pathway to the receptor to create a significant impact.

31.4.3.4.1 *Employment*

52. The pathway for employment impacts is the supply chain approach of the project. A socio-economic assessment cannot guarantee how people will react to the creation of job opportunities but it can consider whether the project is creating a pipeline for local employment using evidence that is available. This evidence would not change the level of employment but it would change how the project employment will interact with the local or regional population.
53. The temporal scope of the employment should also be considered. If all employment is short term then the impact will be shorter term and potentially have less benefit to the local community than if employment is permanent. Whereas long term employment provides the opportunity for people to relocate and has the potential to increase socio-economic levels due to having income security.

31.4.3.4.2 *Community infrastructure*

54. As community infrastructure impacts are related to physical disturbance the pathway is the locality of the impact in comparison to that of the receptor. This is combined with the approaches proposed by the project to managing disturbances. The temporal scope is captured in the magnitude of the impacts as described in Table 31.12.

31.4.3.5 Impact significance

55. Following the identification of receptor value and sensitivity and magnitude of the effect, it is possible to determine the significance of the impact. A matrix is presented in Table 31.13.

Table 31.13 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

56. The impact significance categories are described as shown in Table 31.14. Association of an impact significance is guided by the matrix above and the categories below but is ultimately based on professional judgement.

Table 31.14 Impact significance definitions

Impact significance	Definition
Major	Very large or large changes in receptor condition, either 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	Intermediate changes in receptor condition, which are likely to be important considerations at a local level.
Minor	Small changes 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.

31.4.4 Cumulative Impact Assessment

57. A cumulative impact assessment has been undertaken for the project and is presented in section 31.8. This has taken account of the potential positive and negative impacts of constructing the project in the same construction period as other major infrastructure projects in the area.
58. A cumulative assessment for the operational phase has been based on a supply chain assessment undertaken by BVG Associates which draws on their analysis of UK Content undertaken with RenewableUK. A cumulative assessment for the decommissioning phase have been considered in section 31.8.4.

31.4.5 Transboundary Impact Assessment

59. The project is required to consider the possibility of significant transboundary impacts on other European Economic Area (EEA) member states under the Espoo

Convention (see Chapter 6 EIA Methodology). However, the assessment is undertaken using the Rochdale Envelope approach that accepts certain details of the project will not be available at early stages of development. The Planning Inspectorate have issued two Advice Notes that relate to this:

- Advice Note Nine, July 2018, Using the Rochdale Envelope: *“The challenge for applicants is to ensure that where uncertainty exists and flexibility is sought the following is achieved: that the likely significant environmental effects from the Proposed Development have been properly assessed and presented in the ES.”*
 - Advice Note Twelve, March 2018, Transboundary Impacts and Process, includes Annex 1, The Inspectorate’s long form transboundary screening proforma. This indicates that Transboundary Screening focusses on the impact pathways relating to use of natural resources; production of waste; pollution and nuisances; risk of accidents; and use of technologies. But primarily focusses on the impact on important environmental areas.
60. Both infrastructure and labour are likely to be procured from other EEA states. Particularly with regards elements of the offshore supply chain. Although this is known, until the procurement process is undertaken it is not possible to estimate what the specific non-UK input would be. Therefore, it is not possible to assess the characteristics outlined in Annex 1 of Advice Note 12 (The Planning Inspectorate, March 2018).
61. It is unlikely that employment as a result of international procurement would lead to indirect adverse socio-economic transboundary effects. Furthermore, the offshore supply chain is likely to originate in European Union (EU) countries such as Germany, the Netherlands, or Spain. As such environmental impacts as a result of manufacturing and employment are unlikely to be significant because they would be subject by relevant national regulations derived from EU Directives.
62. The onshore construction elements of the project are entirely present within the UK so it is not anticipated that significant direct adverse socio-economic effects on neighbouring countries will arise.
63. Given the above, transboundary impacts are therefore not considered further within this assessment. This approach has been agreed through consultation on the method statement with the ETG membership.

31.5 Scope

64. This section describes the geographic extent and the time period which have been considered. The data sources used for the assessment will be detailed before discussing the assumptions used for assessments and limitations of the assessment.

31.5.1 Topic Scope

65. This section describes the geographic extent and the time period which have been considered. The data sources used for the assessment will be detailed before discussing the assumptions used for assessments and limitations of the assessment.
66. The following socio-economic impacts are considered in Chapter 27 Human Health, Chapter 30 Tourism and Recreation, and Chapter 31 Socio-economics:
- As detailed in Chapter 27 Human Health, potential impacts due to the influx of workers have been scoped out because the number of in migrant workers are expected to be low in comparison to the regional population, accommodation is expected to be distributed across the region, and workers are expected to return to their permanent residence during the weekend;
 - Potential impacts on the tourism sector, in particular availability of accommodation, is considered in Chapter 30 Tourism and Recreation;
 - Potential impacts on the regional labour market due to job creation are considered in section 31.7; and
 - Effects on Community Infrastructure due to potential project impacts such as noise or traffic disturbance are also considered in section 31.7. The potential source-pathway-outcome model used to assess these effects is described in Table 31.15.

Table 31.15: Potential sources of impact leading to potential community infrastructure effects

Potential Source	Potential pathway	Potential Receptor	Relevant ES chapter
Construction			
Noise from excavation machinery and associated movements	Temporary nuisance	Community assets within 1km of the onshore project area.	Chapter 25 Noise and Vibration
Dust generated during construction Exhaust emissions and particulates from machinery	Temporary nuisance	Site specific communities within 200m of the onshore project area and localised populations within Norfolk County.	Chapter 26 Air Quality Chapter 24 Traffic and Transport
Temporary change to the landscape due to construction	Temporary nuisance	Community assets within 1km of the onshore project area.	Chapter 29 Landscape and Visual Impact
Temporary disturbance or obstruction of roads and footpaths due to road transportation of materials and equipment, workforce traffic, and construction areas	Disruption of access to services and amenities	Site specific populations and localised populations within Norfolk County	Chapter 24 Traffic and Transport

Potential Source	Potential pathway	Potential Receptor	Relevant ES chapter
Construction and operation			
Increases in employment and commercial opportunity	Increased wealth in populations	Population of New Anglia LEP	Section 31.7
Operation			
Change to the landscape due to the onshore project substation	Long term nuisance	Community assets within 1km of the onshore project substation.	Chapter 29 Landscape and Visual Impact
Noise from the onshore project substation	Long term nuisance	Community assets within 1km of the onshore project substation.	Chapter 25 Noise and Vibration

31.5.2 Study Area

67. As specified by the Overarching National Policy Statement for Energy (EN-1), Regulation 5(2) and Schedule 4 of The Infrastructure Planning (EIA) Regulations 2017, there are two scales of study area which reflect the two socio-economic elements defined in section 31.4.2.
68. Economic impacts are considered regionally due to the likely commuting distance assessed in Chapter 24 Traffic and Transport. Social impacts are considered locally due to the buffer zones outlined in Table 31.15.

31.5.2.1 Economic impact study area

69. Economic impacts are driven by potential for job creation. As the project cannot dictate where potential employees will be based the assessment must consider the area where they are likely to reside.
70. Chapter 24 Traffic and Transport shows three figures (Figure 24.9, Figure 24.10, and Figure 24.11) for employee distribution based on 45 minute drive to destination for in-migrant workers and a 90 minute drive to destination for resident workers. This shows that workers will likely be travelling from both Norfolk and Suffolk, therefore the study area for economic impacts will include the entire New Anglia LEP.

31.5.2.2 Social impact scale

71. Direct social impacts are due to nuisance caused by increased disturbances such as construction noise or traffic delays. These would be felt by local communities therefore the study area has been chosen to reflect the onshore project area and the communities around it. The buffer zone for community infrastructure has been informed by relevant chapters and drawn based on the parameters below:
- Direct impact – within the construction area of the onshore cable project area;
 - Indirect impacts:
 - Noise and visual – within 1km of the onshore project area red line boundary (see Chapter 25 Noise and Vibration);

- Dust – within 200m of the onshore project area red line boundary (See Chapter 26 Air Quality); and
- Traffic obstruction – visual assessment of routes and alternatives between settlements either side of the project area (see Chapter 24 Traffic and Transport).

31.5.3 Assumptions and Limitations

72. The main assumptions and limitations in using statistics from the ONS are:
- Information at small geographic level is provided using Census Data from 2011. This is reported by the ONS as Lower Super Output Area (LSOA) or Middle Super Output Area (MSOA). Although now eight years old this is assumed to still be representative and is the most accurate data available.
 - Information provided more recently is at a larger scale, either at Local Authority or Local Enterprise Level. Although this shows general trends in economic development it does not indicate the specific socio-economic levels at a local level.
 - At a larger scale, economic indicators can be distorted by areas that are more productive. For example, Norwich has a greater productivity than North Norfolk largely due to its increased density of population. As far as possible this has been accounted for in the assessment but cannot be completely removed from regional statistics.
73. Pathways from project impacts to socio-economic effects have been based on conclusions in other chapters such as Chapter 24 Traffic and Transport, Chapter 25 Noise and Vibration, and Chapter 26 Air Quality. Human health outcomes in Chapter 27 Human Health have been used as an indicator of effect on communities.

31.6 Existing Environment

74. The data described in Table 31.7 has been used to describe the key socio-economic receptors and context to provide the baseline environment against which impacts can be assessed. These include:
- Business performance and opportunity: the development of the offshore wind sector at a national and regional level has been described;
 - Economic: the area has been described using population, employment, and skill level indicators;
 - Social: the demographic structure of the area has been examined; and
 - Policy Context: planning, economic development and other relevant policy have been reviewed to identify related economic, social and regeneration objectives, which the proposed project may affect.

75. A review of national and regional development of the offshore wind industry has been included in Appendix 31.3. The baseline focusses on regional socio-economic conditions. The final section describes the socio-economic situation of the areas that are local to the landfall, onshore cable route and onshore project substation.

31.6.1 Regional Socio-Economic Baseline

76. This section discusses the socio-economic factors at the level of the New Anglia LEP level. The baseline assessment is primarily based on labour market statistics from NOMIS (Office for National Statistics. NOMIS, 2017), GVA trends based on ONS data (Office for National Statistics, 2017), and English Indices of Deprivation (GOV.UK, 2015)⁸.
77. The project, associated infrastructure, and regional supply chain will predominantly be located within the New Anglia LEP region. The working age population baseline for the New Anglia LEP and comparative baselines are presented in Table 31.16.

Table 31.16 Regional Population Baseline (Source: NOMIS New Anglia LEP)

	Total Population		Working Age Population	
	Number		Number	%
New Anglia LEP	1,655,400		977,800	59.1
East of England	6,168,400		3,779,400	61.3
National Average	66,040,200		41,545,600	62.9

78. Of the working age population, between October 2017 and September 2018, 80.3% of the New Anglia population were economically active compared with 78.5% Nationwide. This compares favourably to employment averages in the East of England and nationally, as shown in Table 31.17, and graphically in Appendix 31.1 Plate 1.1. Time series show a slight increase over average employment levels when compared to the rest of the UK up to 2004 (74%-75%), with a rise from mid-2014.

Table 31.17 Regional Employment Baseline (Source: NOMIS New Anglia LEP)

	New Anglia		East of England		Great Britain	
	Number	%	Number	%	Number	%
Employed	771,500	76.7	2,927,200	77.7	30,084,600	75.1
Employees	639,800	64.8	2,492,600	66.2	25,734,900	64.3
Self Employed	126,600	11.6	426,400	11.3	4,231,300	10.6
Unemployed	35,900	4.4	118,400	3.8	1,345,400	4.2

⁸ These data sets despite being several years old are currently the most recent. The update history of each data set can be found at the source, indicating the frequency of the updates.

79. Across New Anglia LEP between October 2017 and September 2018, the single highest employment category was ‘professional occupations’ 17.3%, which is below the national average as shown in Table 31.18.

Table 31.18 Regional Employment by Occupation (Source: NOMIS New Anglia LEP)

	New Anglia		East of England	Great Britain
	Numbers	%	%	%
Managers, Directors, Senior Officials	83,800	10.9	11.7	10.8
Professional Occupations	133,900	17.3	19.5	20.5
Associate Professional & Technical	95,100	12.3	14.7	14.7
Administrative & Secretarial	81,900	10.6	11.1	10.1
Skilled Trades Occupations	92,900	12.0	10.5	10.1
Caring, Leisure & other Service Occupations	74,800	9.7	9.0	9.1
Sales & Customer Service	60,800	7.9	7.1	7.6
Process Plant & Machine Operatives	60,800	7.9	6.4	6.4
Elementary Occupations	86,000	11.1	9.7	10.5

80. The job density in 2017 in New Anglia was 0.83 which is marginally below both the East of England average (0.85) and the national average (0.86). Time series data shows that there has been a steady rise in job density within New Anglia since the 2008 recession.
81. NOMIS data (2017) shows that the largest employment sector within New Anglia LEP is ‘Wholesale and retail trade; repair of motor vehicles and motorcycles’ as shown in Table 31.19. In relation to the skills the project will probably need; 5.2% work in construction (down from 5.8% in 2015); 9.9% in manufacturing (up from 9.5% in 2015); 6.4% in professional, scientific, and technical services (up from 5.5% in 2016, and 5.3% in 2015); 8.1% in accommodation; and 8.3% in education.

Table 31.19 Regional Employee Jobs and Industry Source: NOMIS New Anglia LEP)

	New Anglia		East of England	Great Britain
	Number	%	%	%
Mining and Quarrying	1,250	0.2	0.1	0.2
Manufacturing	67,000	9.9	8.0	8.2
Electricity, Gas, Steam and Air Conditioning Supply	3,500	0.5	0.3	0.5
Water Supply; Sewerage, Waste Management and Remediation Activities	4,000	0.6	0.6	0.7
Construction	35,000	5.2	5.5	4.8
Wholesale and Retail Trade; Repair of Motor Vehicles And Motorcycles	113,000	16.7	17.1	15.2
Transportation and Storage	33,000	4.9	4.9	4.7
Accommodation and Food Service Activities	55,000	8.1	6.8	7.5
Information and Communication	17,000	2.5	3.6	4.4
Financial and Insurance Activities	21,000	3.1	2.4	3.5

	New Anglia		East of England	Great Britain
	Number	%	%	%
Real Estate Activities	9,000	1.3	1.5	1.7
Professional, Scientific and Technical Activities	43,000	6.4	9.3	8.4
Administrative and Support Service Activities	57,000	8.4	10.5	9.1
Public Administration and Defence; Compulsory Social Security	27,000	4.0	3.0	4.3
Education	56,000	8.3	8.8	8.9
Human Health and Social Work Activities	98,000	14.5	12.6	13.3
Arts, Entertainment and Recreation	21,000	3.1	2.7	2.6
Other Service Activities	12,000	1.8	1.9	2.0

82. Skills levels in the LEP have been increasing in line with national trends from 2006 to 2016 (from GCSE up to Higher Degree level). In 2018, the percentage of people with GCSEs or intermediate national qualifications are similar to national and regional averages in 2017 as shown in Table 31.20.

Table 31.20 Regional Qualifications (Source: NOMIS New Anglia LEP)

	New Anglia		East of England	Great Britain
	Number	%	%	%
NVQ4 And Above	295,100	30.9	34.7	38.6
NVQ3 And Above	505,300	53.0	53.7	57.2
NVQ2 And Above	686,000	71.9	73.3	74.7
NVQ1 And Above	816,900	85.7	86.5	85.4
Other Qualifications	59,400	6.2	6.3	6.9
No Qualifications	77,400	8.1	7.2	7.7

83. The gross average weekly pay for the New Anglia LEP in 2018 was £516.30. This is below the East of England average of £558.10 and the national average of £570.90.

31.6.1.1 Gross Value Added

84. The GVA is a measure of the goods and services produced in an area, industry, or sector of the economy. Appendix 31.1 Plate 1.3 shows the growth in GVA in New Anglia between 1997 and 2015, using the most up to date ONS data available. The main growth markets have been in the retail and finance sector followed by agriculture. However, Appendix 31.1 Plate 1.4 shows growth in both manufacturing and construction, with an expected dip during the recession in 2008.

31.6.1.2 Deprivation

85. With regard to deprivation, the New Anglia LEP is ranked 18 out of 39 local enterprise partnerships in the UK. A low rank (e.g. 5 of 39) indicates a high level of deprivation for a given indicator. The lowest ranked LEP (Liverpool City Region

ranked 1) is most deprived compared to the highest ranked LEP (Buckinghamshire Thames Valley ranked 39).

86. Appendix 31.1 Plate 1.2 presents the New Anglia LEP rankings for deprivation indicators for all of the local enterprise partnerships in the UK. Thus, education indicators show a relatively low level of education across New Anglia LEP (i.e. ranked 3rd of 39 for education deprivation in comparison to the rest of the UK), but all other indicators are moderate with crime levels relatively low (ranked 35 of 39).

31.6.1.3 New Anglia LEP Offshore wind sectoral development

87. As detailed in Appendix 31.3 the New Anglia LEP is currently undergoing a significant development period in line with the Industrial Strategy from the UK Government.
88. The Department for Business, Energy & Industrial Strategy (BEIS) intends for Britain to take a leading role in a new industrial revolution. This will be based on improvements in technical education, business collaboration, and affordable energy generation.
89. The Norfolk and Suffolk Economic Plan (New Anglia LEP, 2017) was produced by New Anglia LEP. This highlights clean energy as one of nine strategically important sectors for the New Anglia LEP. In particular this is facilitated by the transfer of offshore energy skills from oil and gas to the offshore wind farm sector.
90. The Plan points to the importance of developing the Clean Energy Cluster around Great Yarmouth and Lowestoft to serve the offshore wind farm sector. Priority places are highlighted as the Norfolk and Suffolk Energy coast including Bacton, Great Yarmouth, Lowestoft and Sizewell, with assets on and offshore.
91. As detailed in Table 31.48 of section 31.8.2, there are currently 12 offshore wind farms either in operation, construction, or planning. If all of these are commissioned that will lead to approximately 11.226 Gigawatts (GW) of generative capacity in the New Anglia LEP. Assuming that they operate for 40% of the year due to wind conditions then the New Anglia LEP has the potential to produce 39,336GWh of energy in a year⁹. This would be a significant portion of the 336,000GWh of energy generated in the UK in 2017 (BEIS, 2018).
92. To prepare for this potential growth in the offshore energy generation market the New Anglia LEP is developing an Energy Sector Skills Plan. This focusses on developing people as a foundation of securing a Sector Deal between the UK Government and the offshore wind sector. Norfolk Boreas Limited is a key stakeholder in the development of this plan.

cdx⁹ Calculated by multiplying 11.2GW by 8,760 hrs in a year by 40% average annual operation. It should be noted that some months the generation would be higher or lower due to weather conditions.

93. As part of this plan, the New Anglia LEP engaged employers in the offshore wind sector who provided the following insights:
- *“Overall the workforce demands for the offshore wind industry are project cycle based;*
 - *Employers indicate a 3:1 ratio between workforce needs at peak build compared to live running operations;*
 - *This leads to a transient, contractor based, workforce, with around 25% of the overall workforce being permanently employed by the main developers of offshore wind (i.e. Tier 1 companies);*
 - *Recruitment is generally done through national channels, often with contractors being brought in from previous or concurrent national projects;*
 - *Key skills needs include project management skills linked to heavily oriented project based work methods; and*
 - *The civil infrastructure investment stages require a mixture of key roles and trade based skills from across construction and civil engineering, including digging, cabling, piping and onshore new build for power transmission.”*
94. The plan recognises that *“the relationship that the Energy sector has with Construction is the most prominent crosscutting issue.”* Therefore, *“planning effectively for upscale and downscale stages, skills and labour supply will become critical elements to ensure the benefits of the investment are maximised for the local area.”*
95. To meet the challenge of developing skills in the energy sector, the New Anglia LEP outline the following priority areas:
- Mobilise industry leadership with a focus on securing co-investment through a Sector Deal combined with a new Careers Strategy;
 - Develop a higher technical engineering offering to supply local, graduate level, mechanical and electrical engineering skills;
 - Build ‘intra-industry’ and ‘inter-sector’ workforce transferability;
 - Address the overall “Energy Skills Fragility” by developing a suite of key skill sets that can be transferred across energy sectors;
 - Build inclusive local capacity and secure the future of the energy workforce through improved gender equality and as a coordinated approach to career development; and
 - Develop the apprenticeships and group training by using the apprenticeship levy to catalyse uptake in the supply chain of larger employers.
96. Therefore, the development of the offshore wind sector in the New Anglia LEP is strategically important for the UK’s ambitions both from an energy generation perspective and in meeting industrial goals. This presents a very positive opportunity

for the New Anglia LEP that is being addressed through economic and skills strategies in collaboration with energy sector stakeholders.

31.6.2 County Socio-Economic Baseline

97. The section defines the Norfolk County Council baseline. The county has seven districts: Breckland, Broadland, Great Yarmouth, King’s Lynn and West Norfolk, North Norfolk, Norwich, and South Norfolk.
98. In 2017 Norfolk had a resident population of 898,400, which represents 14.6% of the 6,168,400 East of England population and 1.4% of the 64,169,400 British population. The working age population is detailed in Table 31.21, of which 79.4% of people in Norfolk are economically active compared to 80.3% in the New Anglia LEP, 80.9% in the East of England Region and 78.5% in the UK.

Table 31.21 County Working Age Population Baseline (Source: NOMIS Norfolk LAP)

	Total Population		Working Age Population	
	Number		Number	Percentage
Norfolk	898,400		530,400	59.0
East of England	6,168,400		3,779,400	61.3
National Average	66,040,200		41,545,600	62.9

99. Between October 2017 and September 2018, 75.7% of people were in employment within Norfolk County as shown in Table 31.22. Time series show that employment in the region was around 73-74% on average since the 1980s and has increased since 2015.

Table 31.22 County Employment Baseline (Source: NOMIS Norfolk LAP)

	Norfolk		East of England		Great Britain	
	Numbers	%	Numbers	%	Numbers	%
Employed	415,900	75.7	2,927,200	77.7	30,084,600	75.1
Employees	346,100	64.0	2,492,600	66.2	25,734,900	64.3
Self Employed	67,900	11.5	426,400	11.3	4,231,300	10.6
Unemployed	20,500	4.7	118,400	3.8	1,345,400	4.2

100. The distribution of professions across Norfolk in 2018 is shown in Table 31.23 and is graphically represented in Appendix 31.1 Plate 1.5. This shows that the largest employment sector is in professional occupations, and that there is a slightly higher percentage of skilled trades and elementary occupations in the Norfolk county area. As a higher proportion of the population of the East of England are employed in professional and technical occupation than in Norfolk, professional and technical personnel may commute in from outside of Norfolk to meet demand.

Table 31.23 County Employment by Occupation (Source: NOMIS Norfolk LAP)

	Norfolk		East of England	Great Britain
	Numbers	%	%	%
Managers, Directors, Senior Officials	46,300	11.1	11.7	10.8
Professional Occupations	77,000	18.5	19.5	20.5
Associate Professional & Technical	49,700	12.0	14.7	14.7
Administrative & Secretarial	40,000	9.6	11.1	10.1
Skilled Trades Occupations	52,800	12.7	10.5	10.1
Caring, Leisure & other Service Occupations	38,100	9.2	9.0	9.1
Sales & Customer Service	31,900	7.7	7.1	7.6
Process Plant & Machine Operatives	32,700	7.9	6.4	6.4
Elementary Occupations	46,500	11.2	9.7	10.5

31.6.2.1 Norfolk business review

101. The *Norfolk Limited* report has been used to indicate the performance of the business sector in Norfolk. Conducted by Grant Thornton UK LLP, *Norfolk Limited* (Wilson et al. 2018) is an “annual report that analyses the most recently available financial statements of the top 100 independently owned or controlled companies in Norfolk, based upon reported turnover. It provides a measure against which the county can assess its overall economic performance and businesses can benchmark themselves against their peers”
102. This found that “results for Norfolk Limited 2018 continue to show a varied picture across the county’s economy.” (Wilson et al. 2018) Due in a large part to the downturn in the Oil, Gas & Energy sector, which represents 9% of *Norfolk Limited*’s companies. Whereas “Just three sectors reported an overall increase in operating profit – Motor Retail and Motor Services (16.1%), Manufacturing and Construction (7.9%) and Services (5.3%).”
103. In 2018 *Norfolk Limited* (Wilson et al. 2018) reported a significant increase of 7.6% in turnover since 2017. However, that increase has not necessarily translated into increase profits, as operating profit fell by 12.2%. However, when the Oil, Gas & Energy sector is removed then operating profits increase by 0.8%.
104. With regards employment, in 2018 *Norfolk Limited* stated that “*Norfolk Limited* once again expanded its total workforce, this year by 1.9% to 42,369, continuing the trend shown in each of the past four years since 2014. All sectors apart from Oil, Gas and Energy have, in aggregate at least, increased their headcount.” (Wilson et al. 2018)
105. With regards regional comparisons, in the East of England “The aggregation of results shows turnover of £29.4bn, of which Norfolk contributes 19.4%. Cambridgeshire is the largest county generating 35.0% of total turnover. Operating

profits are spread more evenly across the counties, with Essex having the largest proportion at 33.3%, a little ahead of Cambridgeshire with 30.1% of the total.”

(Wilson et al. 2018). Again, the county with the closest profile to Norfolk is Suffolk, but with comparatively less reliance on the Oil, Gas & Energy sector.

106. *Norfolk Limited’s* analysis (Wilson et al. 2018) shows a clear opportunity to further diversify and replace the Oil and Gas sector supply chain. Fortunately, many of the businesses and skills required are transferrable to the offshore renewable energy sector.

31.6.2.2 Norfolk district indices of deprivation

107. Appendix 31.1 Plate 1.10 shows relative levels of deprivation in comparison to other non-metropolitan districts in the UK. The rank goes from 1 for the most deprived region (Manchester) up to 326 for the least deprived (Wokingham). This shows that comparative to the regions around it, Great Yarmouth is particularly deprived across almost all indicators. Within Norfolk, Great Yarmouth has the highest proportion of LSOAs included in the most deprived 10% of LSOAs nationally. On this basis, Great Yarmouth is the 20th most deprived lower tier local authority in England.
108. ‘Education, Skills, and Training’ is rated comparatively poorly across Breckland, King’s Lynn and West Norfolk, Great Yarmouth, Norwich, and North Norfolk. These deprivation levels for education, skills, and training are consistent with the overall levels of deprivation across the New Anglia LEP region.

31.6.2.3 Daily movement of people for work

109. The Office for Labour Market Statistics (Nomisweb.co.uk, 2011) provides information for the movement of people between Districts based on the 2011 census data. This shows that a large proportion of people in Norfolk travel to Norwich for work; 26,967 per day. On the other hand, areas such as Breckland (-10,839), Broadland (-14,369), Great Yarmouth (-1,285), and North Norfolk (-3,550) lose people on a daily basis.
110. Many areas have the highest movement towards Norwich, except Great Yarmouth where people move to Waveney, presumably to work at Lowestoft. This parallels the growth in GVA and suggests that many people are living in areas such as Broadland and working in professional positions in Norwich.

31.6.3 Local Socio-Economic Baseline

111. The offshore export cable route makes landfall at Happisburgh South in the district of North Norfolk and passes through the Middle Super Output Areas (MSOAs) and Lower Super Output Areas (LSOAs) listed in Table 31.24. It should be noted that both

of these are geographic identifications¹⁰ used by the ONS and that LSOAs are a sub-division of MSOAs.

Table 31.24 MSOAs and LSOAs affected onshore

Infrastructure	MSOA	LSOA
Onshore project substation and National Grid substation extension	Breckland 004, 005, 002, 007, 008	Breckland 004A, 004C, 008B, 008D
Onshore cable route	N Norfolk 012, 006, 007, 010. Broadland 001, 002, 003, 004. Breckland, 004, 006, 001, 003	N Norfolk 006D, 007A, 007D, 010A to 010I, 012A, 012D, 013D. Broadland 001A to 001E 002B 002D 002E 002F Breckland 001A, 001C, 001F, 003A to D, 004B to A
Landfall	North Norfolk 012, 013, 007, 010	North Norfolk 007D, 012A, 013A

31.6.3.1 Employment distribution

112. In the 2011 census the total population along the onshore project area (Table 31.24) was 57,146 people which is weighted towards people above 45 years old (Appendix 31.1 Plate 1.11). Of these 31,958 are of working age, 55.9% (16-64). Based on 2011 Census data, 25,402 were employed (79.4%). This leaves approximately 21% (6,556 people) of the local population not in some form of employment which approximately correlates with the wider Norfolk percentage (19.7%) of people who are economically inactive.
113. The more recent, but less detailed annual population survey found the population in New Anglia was 1,655,400, 59.1% of which are working age in 2017 (Table 31.16). Based on the annual population survey 76.7% of these are employed, with approximately 23% not in some form of employment (Table 31.17); proportions similar to that seen in the 2011 Census data.
114. The data would suggest that 1,376 people along the onshore cable route may be actively searching for employment. This correlates to 4% of the working age population.
115. Approximately 9% of people along the onshore cable route were employed in construction during the most recent, 2011 Census; the most direct employment generated from the project is expected to be in construction. Manufacturing employed another 9% which may also be positively impacted by the wider Norfolk

¹⁰ Middle Layer Super Output Areas (MSOA) and Lower Super Output Areas are part of a geographic hierarchy designed to improve the reporting of small area statistics in England and Wales. MSOAs are given as a three-digit number following the District name, e.g. Breckland 002. LSOAs are given by the MSOA name followed by a letter, e.g. Breckland 002A.

Boreas. The majority of those employed in manufacturing work in ‘Technology’, ‘Food & Drink’, or ‘Other’ sectors.

31.6.4 Community Infrastructure

116. A search for community infrastructure (as defined in section 31.4.2) within 1km of landfall, onshore cable route, and onshore project substation was conducted. This provides an assessment of all assets that have the potential to be affected by noise and visual impacts from the project (as defined in paragraph 63).

117. Within this search area there are 173 community infrastructure assets assessed using the following categories, as shown in Table 31.25:

- Educational – schools and training facilities serving the local population;
- Health – GP surgeries, dentists, and other facilities serving a local population;
- Community – public houses, town halls, public sports facilities (e.g. swimming pools and publicly accessible sports grounds), etc.;
- Financial and logistics – local bank branches, post offices, etc.; and
- General business – clustering of shops, garages, and other services people use on a day to day basis.

Table 31.25 Review of community infrastructure within search boundary

Location	Education	Health	Community	Finance and logistics	General business	Total
East of Necton	1		2		1	4
Little Fransham			1		2	3
Scarning		1	1		4	6
Northern periphery of Dereham	1	4	1		8	14
Southern part of Swanton Morley		2	2		2	6
Woodgate						
Mill Street			6		4	10
North west part of Sparham			2		2	4
Northern part of Reepham		1	5	1	11	18
Southgate					1	1
Northern part of Cawston	1		1	1	7	10
Salle Park			2		2	4
Northern part of Aylsham	2	2	9	1	41	55
Northern part of North Walsham			2		1	3
Swafeld			1		1	2

Location	Education	Health	Community	Finance and logistics	General business	Total
Happisburgh and Whimpwell Green			12	1	15	28
Eccles on Sea		1	1		3	5
Total	5	11	48	4	105	173

118. Impacts on these community infrastructure assets are considered below in section 31.7.5.1.4.

31.6.5 Anticipated Trends in Baseline Conditions

119. The baseline review of socio-economics in section 31.6 and the industry review in Appendix 31.3 provides a clear indication that the New Anglia LEP have strong ambitions to grow the offshore wind sector in the area. Provided that this development is undertaken sensitively with regards the character of Norfolk, evidence shows that County and District councils support this position. Therefore, it is likely that this trend will be maintained. As the offshore wind sector continues to grow, it will continue to drive efficiency within the industry, lowering the costs for installation and operation.
120. The UK Government and European Union continue to encourage the development of offshore wind Sector. Most notably, 3 GW of new Round 3 extension sites were announced in 2018. In addition, up to 10 GW of new UK offshore wind farm sites likely to be agreed for lease in 2019-2020 for development and construction by 2030. Furthermore, the Offshore Wind Sector Deal (BEIS, 2019) sets out continued support for the industrialisation of offshore wind in UK waters.
121. North Norfolk has been part of the growth of the UK offshore wind industry from its earliest days. The increased focus and investment in offshore wind supply chain businesses along the east coast of England for example around the Humber demonstrates the opportunity and potential for economic growth offered by offshore wind.
122. It is clear that the opportunities for growth and increased socio-economic benefit in Norfolk while significant now, are expected to sustain growth.
123. Analysis of *Norfolk Limited* (Wilson et al. 2018) shows that the business sector is gradually growing but that the dependence of one sector on offshore oil and gas has reduced the overall growth rate. Due to offshore sectors having transferable skills it is reasonable to assume that the development of the offshore wind sector would offset this decline and provide suitable employment for people that were employed in the Oil, Gas & Energy Sector.

124. The offshore wind sector continues to grow and is supported by the New Anglia Local Enterprise Partnership. The New Anglia LEP published the Norfolk and Suffolk Offshore Wind Cluster brochure in 2019. This document details the east of England as the epicentre for renewable energy and outlines the vision for how the offshore wind cluster in the area can be developed further. Local partnerships have been driven to develop a collective vision for the future by the opportunities presented in the Offshore Wind Sector Deal (BEIS, 2019) which are detailed in the brochure.
125. Productivity in New Anglia is currently lower than the UK average. As with the rest of the UK, there is a challenge in matching growth in productivity with growth in other economic areas such as Gross Domestic Product (GDP) and employment. It may be that the productivity statistics lag others but in general it is anticipated that the development of productive sectors, such as renewable energy development and the manufacturing supply chain behind this, would increase the local productivity levels.
126. Increased local productivity will only be achievable with appropriately skilled people. Due to the focus on training, transferable skills, and apprenticeships (in order to support the growth of the offshore wind sector) it is possible that younger people will move to the New Anglia LEP. This would increase the proportion of the local population that are of working age. However, it is assumed that the majority of people would move to urban areas rather than the rural districts around the onshore project area.
127. In conclusion, the trend in growing the offshore wind sector will continue as described by the New Anglia LEP (2019), contributing to the growth of the New Anglia LEP region. Although this may lead to an increase in younger people migrating to the area it is not expected that these people would settle in the communities next to the onshore project area therefore the baseline conditions in these areas would be reasonably consistent.

31.7 Potential Impacts

128. The EIA is being undertaken for the following two alternative scenarios therefore an assessment of potential impacts has been undertaken for each scenario:
 - **Scenario 1:** Norfolk Vanguard proceeds to construction, and installs ducts and other shared enabling works for Norfolk Boreas.
 - **Scenario 2:** Norfolk Vanguard does not proceed to construction and Norfolk Boreas proceeds alone. Norfolk Boreas undertakes all works required as an independent project.
129. Where the assessment of the impact is different for Scenario 1 and Scenario 2 a separate assessment is presented under each impact heading. Where this is

relevant, Scenario 2 is presented first as it would generally result in the more significant impacts.

130. This section describes the potential impacts for the worst-case assumptions for the project. Factors that may cause impacts will be considered with regards to:
- The scale of the factor causing the impact;
 - The temporal nature of the factors, whether it is temporary, long term, immediate, or developing; and
 - The geographic nature of the factor, whether it is localised or spread across an area.
131. The factors that may create impacts will be developed using information provided in Chapter 5 Project Description and then compared against the baseline described in section 31.6.
132. The impact methodology is discussed in full at section 31.4 and summarised below:
- Economic impacts will be assessed with regards to job creation by the project (direct) and the associated jobs created due to people enabling the project but not directly delivering it (indirect). This is compared against the size of the labour market in the New Anglia LEP region where people have been identified (by NOMIS) as working in construction. Due to the significant contribution of the tourism sector to the economy of Norfolk, rather than also including this impact within this chapter, impacts to the tourism sector have been considered in detail in Chapter 30 Tourism and Recreation.
 - Social impacts are assessed with regards to the direct impacts on community infrastructure. These impacts are derived from the assessments in Chapter 20 Water Resources and Flood Risk, Chapter 24 Traffic and Transport, Chapter 25 Noise and Vibration, and Chapter 26 Air Quality. Impacts on the local populations that make up these communities are assessed in Chapter 27 Human Health and used to inform the assessment here.

31.7.1 Embedded Mitigation

133. Norfolk Boreas Limited has committed to a number of techniques and engineering designs and modifications inherent as part of the project, during the pre-application phase, in order to avoid a number of impacts or reduce impacts as far as possible. Embedding mitigation into the project design is a type of primary mitigation and is an inherent aspect of the EIA process.
134. A range of different information sources have been considered as part of embedding mitigation into the design of the project (for further details see Chapter 5 Project Description, Chapter 4 Site Selection and Assessment of Alternatives and Chapter 7

Technical Consultation) including engineering requirements, feedback from the community and landowners, ongoing discussions with stakeholders and regulators, commercial considerations and environmental best practice.

135. The following sections outline the key embedded mitigation measures relevant for this assessment. These measures are presented in Table 31.26.

Table 31.26 Embedded mitigation

Parameter	Mitigation measures embedded into the project design	Notes
Project Wide		
Commitment to HVDC technology	<p>Commitment to high voltage direct current (HVDC) technology minimises environmental impacts through the following design considerations;</p> <ul style="list-style-type: none"> • HVDC requires fewer cables than the high voltage alternating current (HVAC) solution. During the duct installation phase under Scenario 2 this reduces the cable route working width for Norfolk Boreas to 35m from the previously identified worst case of 50m. As a result, the overall footprint of the onshore cable route required for the duct installation phase is reduced from approx. 300ha to 210ha; • The width of permanent cable easement is also reduced from 25m to 13m; • Removes the requirement for a cable relay station as permanent above ground infrastructure; • Reduces the maximum duration of the cable pulling phase from three years down to two years; • Reduces the total number of jointing pits for Norfolk Boreas from 450 to 150; and • Reduces the number of drills needed at trenchless crossings (including landfall). 	Norfolk Boreas Limited has reviewed consultation received and in light of the feedback, has made a number of decisions in relation to the project design. One of these decisions is to deploy HVDC technology as the export system.
Site Selection	<p>The project has undergone an extensive site selection process which has involved incorporating environmental considerations in collaboration with the engineering design requirements.</p> <p>Considerations include (but are not limited to) adhering to the Horlock Rules (for explanation see Chapter 4 Site Selection and Alternatives) for the onshore project substations and National Grid substation extension and associated infrastructure, a preference for the shortest route length (where practical) and developing construction methodologies to minimise potential impacts.</p> <p>Key design principles from the outset were followed (wherever practical) and further refined during the EIA process, including;</p> <ul style="list-style-type: none"> • Avoiding proximity to residential dwellings; • Avoiding proximity to historic buildings; • Avoiding designated sites; 	Constraints mapping and sensitive site selection to avoid a number of impacts, or to reduce impacts as far as possible, is a type of primary mitigation and is an inherent aspect of the EIA process. Norfolk Boreas Limited has reviewed consultation received to inform the site selection process (including local communities, landowners and regulators) and in response to feedback,

Parameter	Mitigation measures embedded into the project design	Notes
	<ul style="list-style-type: none"> • Minimising impacts to local residents in relation to access to services and road usage, including footpath closures; • Utilising open agricultural land, therefore reducing road carriageway works; • Minimising requirement for complex crossing arrangements, e.g. road, river and rail crossings; • Avoiding areas of important habitat, trees, ponds and agricultural ditches; • Installing cables in flat terrain maintaining a straight route where possible for ease of pulling cables through ducts; • Avoiding other services (e.g. gas pipelines) but aiming to cross at close to right angles where crossings are required; • Minimising the number of hedgerow crossings, utilising existing gaps in field boundaries; • Avoiding rendering parcels of agricultural land inaccessible; and • Utilising and upgrading existing accesses where possible to avoid impacting undisturbed ground. 	<p>has made a number of decisions in relation to the siting of project infrastructure. The site selection process is set out in Chapter 4 Site Selection and Assessment of Alternatives.</p>
<p>Long HDD at landfall</p>	<p>Use of long HDD at landfall to avoid restrictions or closures to Happisburgh beach and retain access to the beach for the public during construction. Norfolk Boreas Limited have also committed to not using the beach car park at Happisburgh South.</p>	<p>Norfolk Boreas Limited has reviewed consultation received and in response to feedback, has made a number of decisions in relation to the project design. One of those decisions is to use long HDD at landfall.</p>
<p>Scenario 1</p>		
<p>Strategic approach to delivering Norfolk Boreas and Norfolk Vanguard</p>	<p>Under Scenario 1, onshore ducts will be installed for both projects at the same time as part of the Norfolk Vanguard construction works. This would allow the main civil works for the cable route to be completed in one construction period and in advance of cable delivery, preventing the requirement to reopen the land in order to minimise disruption. Onshore cables would then be pulled through the pre-installed ducts in a phased approach at later stages.</p> <p>In accordance with the Horlock Rules, the co-location of Norfolk Boreas and Norfolk Vanguard onshore project substations, will keep these developments contained</p>	<p>Strategic approach to delivering Norfolk Boreas and Norfolk Vanguard</p>

Parameter	Mitigation measures embedded into the project design	Notes
	within a localised area and, in so doing, will contain the extent of potential impacts.	
Scenario 2		
Duct Installation Strategy	Under Scenario 2, the onshore cable duct installation strategy is to install ducts in sections to minimise impacts. Construction teams would work on a short section (approximately 150m length) and once the cable ducts have been installed, the section would be back filled and the top soil reinstated before moving onto the next section. This would minimise the amount of land being worked on at any one time and would also minimise the duration of works on any given section of the route.	This has been a very early project commitment. Chapter 5 Project Description provides a detailed description of the process.
Trenchless Crossings	Commitment to trenchless crossing techniques to minimise impacts to the following specific features; <ul style="list-style-type: none"> • Wendling Carr County Wildlife Site; • Little Wood County Wildlife Site; • Land South of Dillington Carr County Wildlife Site; • Kerdiston proposed County Wildlife Site; • Marriott's Way County Wildlife Site / Public Right of Way; • Paston Way and Knapton Cutting County Wildlife Site; • Norfolk Coast Path; • Witton Hall Plantation along Old Hall Road; • King's Beck; • River Wensum; • River Bure; • Wendling Beck; • Wendling Carr; • North Walsham and Dilham Canal; • Network Rail line at North Walsham that runs from Norwich to Cromer; • Mid-Norfolk Railway line at Dereham that runs from Wymondham to North Elmham; and • Trunk Roads including A47, A140, A149. 	A commitment to a number of trenchless crossings at certain sensitive locations was identified at the outset. However, Norfolk Boreas Limited has committed to certain additional trenchless crossings as a direct response to stakeholder requests.

31.7.2 Additional enhancements by Norfolk Boreas Limited

136. Whilst these are not part of the final DCO application Norfolk Boreas Limited has already taken a number of activities to promote socio-economic benefit. The impact assessment will calculate magnitude of employment and compare this to the size of the available labour market. To understand whether it is likely that the increase employment demand would benefit the New Anglia LEP the aspects outlined below

and the wider developments summarised in section 31.6.1.3 will be considered. The aim of this is to see if there is evidence to suggest that the labour market will develop between the point of assessment and project implementation to supply labour and realise benefits.

31.7.2.1 Promoting a local supply chain for existing businesses

137. Assessment by BVG Associates (Appendix 31.2) shows that the skills and infrastructure required for the construction phase of an offshore wind farm are predominantly situated outside of the New Anglia LEP region. However, employment from secondary expenditure following direct employment, supply chain employment, and support services are more likely to be employed in the local and regional area, depending upon specialisation and skill levels. Evidence shows that the average proportion of UK content is substantially higher during operation than construction and this provides the greatest long-term benefit for the region (RenewableUK, 2017).
138. To promote the use of local supply chain and support services, where applicable, Norfolk Boreas Limited is committed to developing a Supply Chain Strategy. The aim of this Supply Chain Strategy is to produce opportunities for local companies to engage with the project and to encourage larger international companies to sub-contract locally.
139. As part of both the Norfolk Boreas and Norfolk Vanguards, VWPL launched a Supply Chain Information Pack¹¹ at Norwich City Football Club in March 2018. This was followed with the launch of a request for information that was submitted in June 2018 to the EEEGR Special Interest Group (SIG)¹². This included forms to be completed by potential suppliers; this returned content helps to inform Norfolk Boreas Limited on their Supply Chain Plan (SCP) and strategy going forward.
140. In September and December 2018 Skills and Supply Chain workshops were held with representatives from local government, education providers and business organisations to reflect on actions that can enable and encourage Norfolk and the East of England to maximise the socio-economic and environmental opportunities that the growing offshore wind industry brings.

¹¹ Further information can be found on Vattenfall Wind Power Limited's website - <https://corporate.vattenfall.co.uk/projects/wind-energy-projects/vattenfall-in-norfolk/norfolkvanguard/supply-chain/>

¹² The Offshore Wind Special Interest Group (SIG) aims to connect offshore wind developers with their supply chain to help meet local content targets and to fill gaps and weaknesses in knowledge and understanding. Further information can be found on the EEEGR website here - <https://www.eeegr.com/sigs/wind/>

141. At present these strategies are at a formative stage thus the direct benefit they will bring has not been quantified. This process is ongoing and would form part of the project's development.

31.7.2.2 Developing opportunities for young people

142. The project is part of a much larger development of the Offshore Wind Industry within the East of England Energy Zone. This is leading to the East of England area becoming a key resource for offshore wind power resources, and technologies. With recent estimates of FTE jobs in the sector in the East of England growing from 10,000 to 21,000 by 2032 (Cambridge Econometrics, 2017). Clearly, supporting the development of young people to engage with the growing sector will create significant increases in employment. As highlighted by the CBI (March 2017), there is a strong correlation between businesses offering work experience placements or work inspiration (through site visits, mentoring, mock interviews and enterprise competitions) and the growth in GVA per hour of a LEP.
143. To promote the development of long term local employment for both Norfolk Boreas and Norfolk Vanguard, VWPL is developing a Skills Strategy to engage schools, colleges, and universities. The aim of this is to produce a pipeline of training and employment opportunities linked to the Offshore Wind Industry.
144. Although it is too early in the development process to assess the impact of Norfolk Boreas Limited's Skills Strategy and procurement methodology, the project has already started to employ local contractors wherever possible. The following local contractors and suppliers have already been used as part of the project (pre-consent):
- Norfolk Wildlife Services has conducted onshore ecological surveys;
 - SI Drilling has undertaken investigatory ground works for engineering feasibility;
 - Remarkable Pendragon is a communications company that set up a local Norwich office; and
 - Cefas based in Lowestoft undertaking the metocean campaign.
145. To date, Norfolk Boreas Limited have developed or been involved with the following programmes:
- University Technical College Norwich, VWPL and wind farm developers partnership to pilot a six session wind development programme highlighting employability, leadership and team skills;
 - Work experience pilot enabling diverse opportunities for a student from Dereham 6th Form College. This demonstrated the importance of developing a coherent work experience offer;

- Innovative, transferable Key Stage 4&5, 3D Virtual Reality offshore wind development programme pilot, created in partnership with 3DW and with the potential to be used across VWPL and the UK (October 2017);
 - Trial MSc student thesis focused on consultation process; and
 - Other skills development as part of various early benefits and opportunities explorations; Broadband and / or Fibre (and cable splicing); Windmills in the Broads; River Hun skills opportunity; STEP into TECH (young Tech initiative); Institute of Physics lecture links; Beacon East - Business and skills development links focused on career opportunities and the professional development of local teachers.
146. Norfolk Boreas Limited have committed to producing a Skills and Employment Strategy (DCO Requirement 33) under Scenario 2 and an outline Skills and Employment Strategy (document reference 8.22) has been produced and submitted as part of the DCO application.

31.7.3 Monitoring

147. Community infrastructure impacts potentially arise due to effects outlined in other chapters such as Chapter 25 Noise and Vibration or Chapter 26 Air Quality. Therefore, managing impacts to community infrastructure will be reliant upon managing these impacts.
148. The development of the detailed design and a Code of Construction Practice (DCO Requirement 20) (an outline of which (document reference 8.7) has been submitted as part of the DCO application) will refine the impacts of the worst-case scenario assessed in this EIA.
149. It is recognised that monitoring of these impact determinants is an important element in the management and verification of the actual project impacts. The requirement for and appropriate design and scope of monitoring will be agreed with the appropriate stakeholders and included within the CoCP and the Construction Method Statement (CMS) (DCO Requirement 20(2)(g)) prior to construction works commencing.

31.7.4 Worst Case

150. Chapter 5 Project Description details the design parameters of the project using the Rochdale Envelope approach for this ES. This section identifies those parameters during construction, operation and decommissioning relevant to potential impacts on socio-economics.
151. During offshore construction, there will be a requirement for a dockside marshalling facility, where components for the offshore infrastructure will be stored prior to

loading onto construction barges or vessels. These facilities will be chosen with regard to the location of fabricators and original equipment manufacturers (to minimise transportation requirements) and availability of suitable dockside space. A decision on these primary facilities for the project has not yet been made and this would be decided post-consent.

152. The primary base for the operations and maintenance (O&M) facility for Norfolk Boreas and Norfolk Vanguard would likely be a suitable port facility on the coast of East Anglia. At present Norfolk Boreas Limited and Norfolk Vanguard Limited are in negotiations with Peel Ports about a strategic wind farm investment for an offshore operations base on the Norfolk coast; however, at time of writing the precise port is yet to be confirmed.
153. Effects due to the O&M facility have not been considered in this assessment as these will be subject to a separate consent application.

31.7.4.1 Scenario 1

154. Under Scenario 1, onshore cabling infrastructure for Norfolk Boreas and Norfolk Vanguard will be co-located. During construction of Norfolk Vanguard the onshore cable ducts for Norfolk Boreas will be installed. This will avoid the need to reopen cable trenches thereby minimising overall impacts and disruption. Norfolk Boreas will still be required to undertake the HDD at landfall and the cable pulling works along the onshore cable route.
155. The worst case assumptions (Table 31.27) uses worker transport modelling detailed in Chapter 24 Traffic and Transport as a basis for labour demand. This assumes that the onshore project substation primary works stage will be during 2024 and 2025 with peak employment of 100 people per week during the first three quarters (Q1 to Q3) of 2025. Cable pulling is assumed to be undertaken during 2026 and 2027 with an expected peak employment of 170 during the second quarter (Q2) of 2026.

Table 31.27 Worst case assumptions Scenario 1

Worst case assumptions			
Parameter	Worst case criteria	Worst case definition	Notes
Norfolk Boreas site			
Construction	Location i.e. closest point to shore	72km (closest point) from the coast	
Offshore cable corridor			
	Duration	Approximately 24 months spanning over a 4 year period	
Landfall			
Construction	Maximum temporary works duration	20 weeks	Assumes two compounds at 3,000m ²

Worst case assumptions			
Parameter	Worst case criteria	Worst case definition	Notes
	Temporary works footprint	6,000m ²	(50m x 60m) to support parallel drilling rigs
	Working hours	7am-7pm, 7 days a week.	Assumes 2 drilling rigs working in parallel
	Expected noise level	See Chapter 25 Noise and Vibration section 25.8.4.	
	Length of drill	1000m	Indicative length
	Minimum safe passing distance around cable installation vessels	500m construction vessel safety	Shallow draft vessel will be located beyond intertidal area.
Onshore project substation			
Construction	Peak onshore construction employment	Peak employment of 170 during Q2 of 2026 70% of workers from outside Norfolk and Suffolk area	It is expected that during standard construction works, the onshore workforce will be an average of 100 people. This figure includes the workforce for the National Grid extension and overhead line modification below
	Maximum land take for all construction works at the onshore project substation	95,000m ²	Operational area for Substation 250m x 300m= 75,000m ² plus additional temporary construction compound 20,000m ² .
	Maximum land take for temporary works area at Spicers Corner	10,000m ²	Spicers Corner compound 100 x 100m.
	Cable pull maximum footprint	85,500m ²	Cable pull footprint includes the running track and jointing pits
	Running Track width and length	6m and 12,000m	Up to 20% of the running track utilised by Norfolk Vanguard will need to be reinstalled to facilitate cable pulling
	Maximum number of permanent jointing pits and required dimensions	Assumes 150 at 90m ² and 2m deep each	Dimensions 6m (w) x 15m (l). Spaced approximately one per circuit per 800m cable.

Worst case assumptions			
Parameter	Worst case criteria	Worst case definition	Notes
	Works hours and maximum duration of construction works	12 hour working day, 5 to 7 days a week for 30 months	Indicative construction window 24 months. Assumes piling might be required during construction of foundations
Operation	Maximum land take for permanent footprint area	75,000m ²	The total land requirement for the onshore project substation to the perimeter fence is 250m x 300m
	Maximum height of onshore project substation	19m building with 25m lightning protection masts, fences 3.4m high.	
	Maximum access requirement to onshore project substation	One visit per week	Site lighting require during maintenance visits only.
	Expected noise level	See Chapter 25 Noise and Vibration section 25.8.5.	
National Grid substation extension and overhead line modification			
Construction	Maximum land take for construction works at the substation extension	95,250m ²	Operational area (135m x 150m) plus temporary compound adjacent to eastern extension site (150m x 200m) and compound adjacent to the Norfolk Vanguard Extension (300m x 150m).
	Works hours and maximum duration of construction works	12 hour working day, 5 to 7 days a week, for 30 months	Indicative construction timing 24 months
Operation	Maximum land take for substation extension permanent footprint	20,250m ²	Permanent eastern extension footprint 135m x 150m
	Access	One visit per month.	Site lighting required during maintenance visits only

31.7.4.2 Scenario 2

156. Under Scenario 2 Norfolk Boreas will be responsible for constructing all of the onshore infrastructure for the project. It is expected that the onshore cable route will be constructed through 2023 and 2026. The worst case assumptions (Table 31.29) uses worker transport modelling detailed in Chapter 24 Traffic and Transport as a basis for labour demand.

157. Indicative employee requirements at different parts of the cable route are as shown in Table 31.28 below. The sequencing of these works and the level of parallel work dictate the upper and lower limits of peak employment. It is expected that peak employment may vary between 250 and 420 people during the summer months of these years depending on how the works are sequenced and how many tasks are conducted in parallel.

Table 31.28 Assumed number of employees at different locations of cable route

Location	Indicative number of employees
National Grid extension	50
Onshore project substation	50
Each route section being worked for duct installation	20
Each trenchless crossing site setup and strip down	10
Each trenchless crossing during the drilling operation	5

Table 31.29 Worst case assumptions Scenario 2

Worst case assumptions			
Parameter	Worst case criteria	Worst case definition	Notes
Norfolk Boreas site			
Construction	Location i.e. closest point to shore	72km (closest point) from the coast	
Offshore cable corridor			
	Duration	Approximately 24 months	
Landfall			
Construction	Maximum temporary works duration	20 weeks	
	Temporary works footprint	6,000m ²	Assumes two compounds at 3,000m ² (50m x 60m) to support parallel drilling rigs
	Working hours	7am-7pm, 7 days a week.	Assumes 2 drilling rigs working in parallel
	Expected noise level	See Chapter 25 Noise and Vibration section 25.8.4.	
	Length of drill	1000m	Indicative length
	Minimum safe passing distance around cable installation vessels	500m construction vessel safety	Shallow draft vessel will be located beyond intertidal area.
Onshore cable route			
Construction	Maximum onshore cable route length	60km	It is expected that during most construction works the onshore workforce will be an average of 20-
	Maximum onshore cable working width	35m	

Worst case assumptions			
Parameter	Worst case criteria	Worst case definition	Notes
	Onshore construction employment	70% of workers from outside the Norfolk and Suffolk area	30 people per week per location.
	Pre-construction works	2021-2022	
	Total window of ducting installation	2023-2024	
	Total cable pulling window	2025-2026	
	Total maximum onshore construction window	2021-2026 Approximately 6 years	
Permanent jointing pits	Maximum number and required dimensions	Assume 150 at 90m ² and 2m deep each	Dimensions 6m (w) x 15m (l). Spaced approximately one per circuit per 800m cable.
Permanent link boxes	Maximum number and required dimensions	Assumes 24 at 1.5m x 1.5m if below ground and 1.2m x 0.8m x 1.8m if above ground	1 link box per circuit per 5km (24). Type of link box and exact locations to be defined during detailed design.
	Access	Periodic access to installed link boxes may be required for inspection, estimated to be annually.	
Onshore project substation			
Construction	Onshore construction employment	70% from outside the New Anglia LEP region	It is expected that during standard construction works, the onshore workforce will be an average of 100 people.
	Maximum land take for construction works at the onshore project substation	95,000m ²	Operational area for Substation 250m x 300m= 75,000m ² plus additional temporary construction compound 20,000m ² .
	Works hours and maximum duration of construction works	12 hour working day, 5 to 7 days a week, 30 months	Indicative construction window is 24 months
	Maximum land take for temporary works area at Spicers Corner	10,000m ²	Spicers Corner compound 100 x 100m.
	Maximum land take for access road.	10,800m ²	Dimensions 1.8km x 6m. New access road from A47.

Worst case assumptions			
Parameter	Worst case criteria	Worst case definition	Notes
Operation	Maximum land take for permanent footprint area	75,000m ²	The total land requirement for the onshore project substation to the perimeter fence is 250m x 300m
	Maximum height of onshore project substation	19m building with 25m lightning protection masts, fences 3.4m high.	
	Maximum access requirement to onshore project substation	One visit per week.	Site lighting required during maintenance visits only
	Expected noise level	See Chapter 25 Noise and Vibration section 25.8.5.	
National Grid extension and overhead line modification			
Construction	Maximum land take for construction works at substation extension	97,500m ²	Operational area (200m x 150m) plus temporary compounds (150m x 150m and 300m x 150m).
	Maximum land take for temporary works area – overhead line	176,310 m ²	
	Works hours and maximum duration of construction works	12 hour working day, 5 to 7 days a week, for 30 months	Indicative construction window 24 months.
	Maximum height of temporary towers	Three towers at 45m	
Operation	Maximum land take for substation extension - permanent footprint	30,000m ²	Permanent western extension footprint approx. 200m length and 150m wide
	Maximum land take for overhead line permanent footprint	Up to 1,000m ²	Assumes two new permanent overhead line towers will be required.
	Maximum height of replacement towers	Two towers at 55m	Not normally illuminated other than infrequent inspection and maintenance activities (during working hours only). No illumination required at night.
	Access	One visit per month	

158. Chapter 5 Project Description outlines the timings to be assessed in relation to the phasing of the works. In all cases for socioeconomics; the two phase option, where cable pulling works are undertaken in two consecutive years to facilitate the commissioning of the offshore wind turbines, is assumed to be the worst case. This is

due to the increased length of time that receptors will be potentially impacted by the project.

159. The key reasons for maintaining a two phase installation for the electrical works onshore (cable pulling along the cable route and commissioning of electrical equipment at the onshore project substation) is with respect to uncertainty in the Contract for Difference auctions and potential supply chain capability. The separation between the first and second phases onshore will be dictated by these aspects and aligned with the offshore construction works.

31.7.5 Potential Impacts during Construction

31.7.5.1 Impact 1: Direct and indirect job creation

160. The onshore construction direct and indirect job creation has been assessed using Average Daily Personnel Requirements and which have also been used for the traffic assessment provided in Chapter 24 Traffic and Transport. The offshore construction job creation has been assessed using a supply chain assessment provided by BVG Associates based on their work analysing the UK Content of offshore wind farms.
161. To avoid repetition the assessment has the following order:
- First, the general sensitivity of the labour market is considered. Under both scenarios the labour market will be the same because the construction is in the same region. However, it is expected that the labour market that will supply onshore and offshore workers would be different.
 - Second, the volume of employment due to onshore construction is considered separately for Scenario 2 and then for Scenario 1.
 - Third, the volume of employment due to offshore construction is considered. With the exception of the possible project interconnector, Norfolk Boreas and Norfolk Vanguard, will not share their offshore infrastructure the level of employment will be the same under both scenarios.
 - Fourth, the pathways for potential employment are considered.
 - Fifth, impact significance is then assessed per scenario by combining the onshore with offshore construction levels and comparing them against the labour market.

31.7.5.1.1 *New Anglia labour market sensitivity*

162. Using travel to work analysis as part of the assessment in Chapter 24 Traffic and Transport, it can be seen that people are likely to be employed from across the entire New Anglia LEP. The Business Register and Employment Survey (BRES) (Office for National Statistics. NOMIS, 2017) does not provide a category for people working in the offshore wind sector or its exporting infrastructure specifically.

163. However, the BRES survey shows that in 2017 there were approximately 39,500 people employed in the sectors that relate to the project (Table 31.33). Not all of these people are employed in sectors that are directly applicable to the project but with regional growth in the offshore wind sector it is assumed that this is a reasonable size for the labour market that has transferrable skills to this sector.
164. Appendix 31.1, Figure 31.11, section 31.6.1.2 and section 31.6.2.2 describe relative levels of deprivation in New Anglia and Norfolk in comparison to other non-metropolitan districts in the UK as follows:
- Employment deprivation is ranked 18th out of 39 which suggests a low to medium sensitivity; and
 - Education deprivation is ranked 3rd out of 39 which suggests a high sensitivity.
165. As described in section 75, NOMIS data shows that skill levels have increased but are consistently below UK and East of England averages. However, unemployment figures are comparable to East of England and UK levels.
166. *Norfolk Limited* (Wilson et al. 2018) suggests that although the economy is growing the downturn in the oil, gas & energy sector is still reducing growth. As the skills required for the oil, gas & energy sector are transferable to the offshore wind sector this provides a good opportunity for beneficial enhancement to the local economy.
167. Labour market sensitivity is a measure of whether the available population could supply the labour that the project requires. Based on indices of multiple deprivation the labour market sensitivity is considered to be medium.

31.7.5.1.2 Scenario 2 - Onshore construction employment

168. Under Scenario 2 where Norfolk Boreas has to construct all of the onshore infrastructure, it is assessed that peak employment will be 420 in Q3 of 2022 and the demand for labour would be as shown in Plate 31.1. It is estimated that this would lead to a total direct FTE job creation of 509 FTE jobs across the 4 year onshore works programme with the majority of demand in the first two years, as shown in Table 31.30.
169. Assumptions have been made about the proportion of demand that the local labour market may be able to supply as follows:
- Onshore cable route – this would include standard civil construction techniques so it is assumed that this would mainly be procured from within the New Anglia region to ensure cost efficiencies;
 - Trenchless crossings, landfall HDD, and cable pulling – as these are relatively specialised tasks it is assumed that contractors would operate nationally but employ local sub-contractors for more standard civil and construction tasks;

- A47 highway access - this would include standard civil construction techniques so it is assumed that this would be procured from within the New Anglia region to ensure cost efficiencies;
- Onshore project substation and National Grid substation extension - as these are relatively specialised tasks it is assumed that contractors would operate nationally but employ local sub-contractors for more standard construction tasks.

Table 31.30 Estimates of Full Time Equivalent jobs created and supported in each year by onshore construction under Scenario 2

FTE jobs	2023 FTE	2024 FTE	2025 FTE	2026 FTE	Direct FTE yrs	Local content	Direct FTE yrs	Indirect FTE yrs	Total FTE yrs
Cable Route	165	55	0	0	220	70%	154	139	293
Trenchless Crossings	14	2	0	0	16	30%	5	4	9
Landfall HDD	19	2	0	0	21	30%	6	6	12
Cable Pulling	0	0	92	0	92	30%	28	25	53
A47 Highway Access	3	2	0	0	4	100%	4	4	8
Onshore Substation	33	42	3	3	80	30%	24	22	46
National Grid Electricity Transmission (NGET) Substation	33	42	0	0	75	30%	23	20	43
Total	266	145	95	3	509		244	219	463

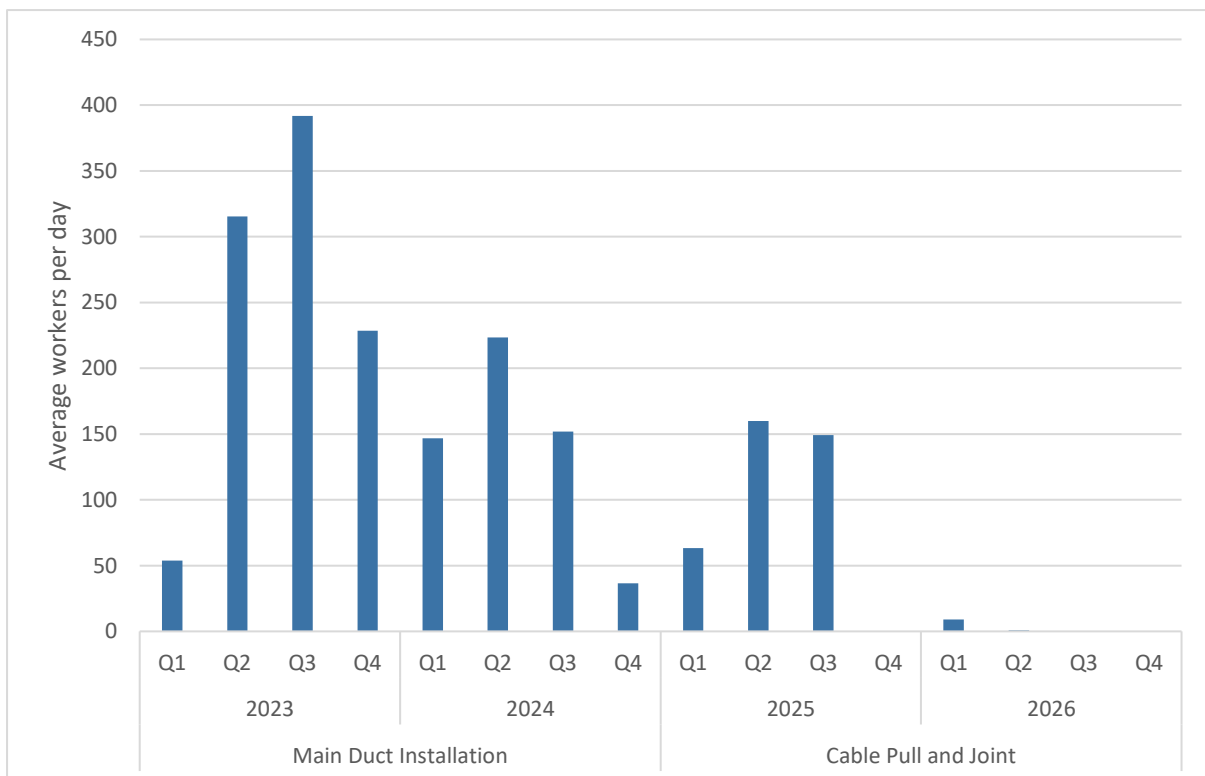


Plate 31.1 Norfolk Boreas labour curve for Scenario 2 showing average workers per day per quarter¹³

170. The assumptions above inform the level of local content for different aspects of the project. This indicates that approximately 244 FTE jobs may be locally created across the four years of the onshore construction works (i.e. FTE years). This is the sum of FTE jobs per year across the 4 years assessed in Table 31.30. Although the entire construction programme is six years, the labour requirement is confined to the four years shown in Plate 31.1. This correlates with the transport assessment undertaken in Chapter 24 Traffic and Transport and shows that the largest demand would be in 2023 and 2024.
171. To calculate indirect and induced¹⁴ job creation a Type 1 employment multiplier of 1.9 has been applied to the local portion of the direct job creation. This is based on the latest ONS dataset that uses 2013 as a reference year for input-output data (ONS, 2017). As shown in Table 31.30, this may lead to the indirect creation of 219 FTE jobs across the New Anglia LEP. Thus, across the 4 year period there would be a total of 463 FTE years which equates to an average of 154 FTE jobs per year¹⁵.

31.7.5.1.3 Scenario 1 - Onshore construction employment

172. Under Scenario 1 where Norfolk Vanguard installs ducts and other shared enabling works for Norfolk Boreas, assessment shows that peak employment as a result of Norfolk Boreas will be 170 people in Q2 of 2026. Plate 31.2 shows that the primary works stage of the construction of the onshore project substation would have an average labour demand of 100 per week from Q2 of 2024 to Q3 of 2025. The labour demand would then peak to an average of 160 people per week for Q2 and Q3 of 2026 for cable pulling works.

¹³ Indicative rates based on outline construction programme provided by project engineers June 2017. Estimates given per week to the nearest 10 people

¹⁴ Indirect job creation is due to increases in demand by the project. To meet this, the project's suppliers must increase demand on their suppliers on so on. This leads to associated job creation.

Induce job creation is due to a proportion of the household income due to direct and indirect employment being spent in the wider economy.

¹⁵ Note FTE jobs per year is calculate by dividing 463 FTE years by 3 years as the 4th year has an insignificant amount of employment

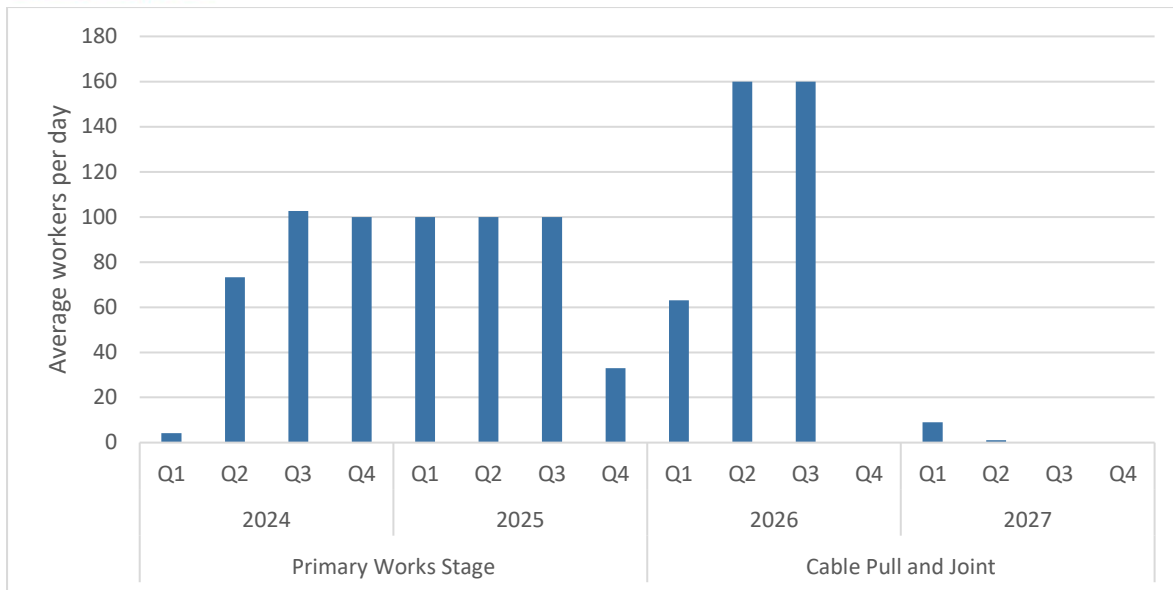


Plate 31.2 Norfolk Boreas labour curve for Scenario 1 showing average workers per day per quarter¹⁶

173. As shown in Table 31.31, it is estimated that this would lead to direct employment of 75 FTE years from 2024 to 2026 and a total of 143 FTE years including indirect and induced employment. Under Scenario 1 the following assumptions have been made about the labour demand as follows:

- Onshore cable route duct installation, trenchless crossings, and A47 highways access – Norfolk Boreas would make use of existing infrastructure and this would not lead to further employment;
- Landfall HDD, and cable pulling, onshore project substation, and National Grid substation extension - as these are relatively specialised tasks it is assumed that contractors would operate nationally but employ local sub-contractors for more standard construction tasks. As a worst case it is assumed this would lead to 70% of this work being completed by in-migrant workers and 30% being procured locally.

174. To calculate local direct employment the FTE has been multiplied by 30%. Then to calculate indirect and induced job creation a Type 1 employment multiplier of 1.9 has been applied to the direct job creation. This is based on the latest ONS dataset that uses 2013 as a reference year for input-output data (ONS, 2017).

175. Thus, across the 4 year period there would be a total of 143 FTE years which equates to an average of 48 FTE jobs per year¹⁵.

¹⁶ Indicative rates based on outline construction programme provided by project engineers December 2018. Estimates given per week to the nearest 10 people.

Table 31.31: Full Time Equivalent employment as a result of the project under Scenario 1

Activity	2024 FTE	2025 FTE	2026 FTE	2027 FTE	Direct FTE yrs	Local content	Direct FTE Yrs	Indirect FTE Yrs	Total FTE Yrs
Trenchless Crossings	4	0	0	0	4	30%	1	1	2
Cable Pulling & Jointing	0	0	92	0	92	30%	28	25	52
Onshore Substation	34	41	2	2	80	30%	24	22	45
NGET Substation	34	41	0	0	75	30%	22	20	43
Total	71	82	94	2	251	30%	75	68	143

31.7.5.1.4 Offshore construction employment

176. Under both scenarios, the largest capital expenditure of the project will be the offshore construction of the wind turbine array. A significant concern of local stakeholders is how much of this investment is likely to be captured by the New Anglia LEP and lead to job creation.
177. In November 2014, the Offshore Wind Industry Council (OWIC) approved the adoption of an industry-wide methodology to measure the UK content of offshore wind farms. This methodology was published by BVG Associates in May 2015. Industry submits anonymous, aggregated data from all contracts worth over £10m in value that come from UK wind farms to the industry trade body, RenewableUK, for analysis.
178. Based on their analysis since 2014, BVG Associates produced the supply chain assessment for the project. This is included in Appendix 31.2 and summarised with regard to potential job creation in the construction phase in Table 31.32.
179. To create a worst case scenario, the following multipliers were applied to the sum of Direct and Indirect FTE recorded in Appendix 31.2. This reflects both the likelihood that elements could be procured within New Anglia and UK markets, and the commitment that Norfolk Boreas Limited is making to 50% UK content where possible:
- Low probability elements were assumed to be procured from outside of New Anglia or UK markets;
 - It was assumed that medium probability elements have a 50% chance of being procured in the New Anglia LEP region or the UK; and
 - It was assumed that high probability elements would definitely be procured within East Anglia or the UK.

180. Under the worst case scenario, the likelihood of the New Anglia LEP region benefiting from the construction of the offshore elements of the project is low compared to the job creation potential for the entire manufacturing and assembly of offshore project elements and their installation on site. This is due to the area lacking companies that can provide offshore construction services at this scale or the presence of a manufacturing supply chain. It should be remembered that the offshore wind sector in the New Anglia LEP is in development (see section 31.6.1.3) and thus it is unlikely for a supply chain to exist yet.
181. Whilst Norfolk Boreas is a significant project, it should be noted that this part of the assessment only considers the impact due to this single project. Whereas, the market will react to the development of multiple projects which would provide confidence to business investors. The potential for the development of such a supply chain as a result of the many offshore wind projects being developed in the New Anglia LEP region is considered in section 31.8 Cumulative Impacts.
182. The analysis shows that there may be 1,200 FTE years created in the New Anglia LEP during to the two-year period of construction for the offshore elements of the wind farm. This equates to 600 FTE jobs per year.
183. Based on the strategic port assessment (BVG Associates, 2016) in Appendix 31.3 these jobs are most likely to be created in Great Yarmouth but due to potential commuter distances the benefits may be spread across the New Anglia LEP region. The creation of this number of jobs has a significant potential impact in providing training and employment opportunities for job seekers, young professionals, and those moving from other technical industries (such as ex-military personnel) in the New Anglian LEP region during the construction period of the project.
184. The supply chain for offshore wind farm components is not something that Norfolk Boreas Limited can control because it is determined by many factors. If Norfolk Boreas, along with other offshore wind farm developments of a similar scale, are developed as currently planned, then it is assumed that the local supply chain may develop to provide services. This is further discussed in section 31.8 Cumulative Impacts.

Table 31.32 Potential for supply chain job creation during offshore construction¹⁷

Element	Sub element	Probability procured in New Anglia	Probability procured in UK	FTE Years NALEP Direct	FTE Years New Anglia Indirect	FTE years New Anglia LEP
Project management	Management and procurement	Medium	High	300	150	450

¹⁷ Source: BVG Associates Supply Chain Assessment Appendix 31.2

Element	Sub element	Probability procured in New Anglia	Probability procured in UK	FTE Years NALEP Direct	FTE Years New Anglia Indirect	FTE years New Anglia LEP
Turbine ex-works	Nacelle and hub	Low	Low	0	0	0
	Blades	Low	High	0	0	0
	Tower	Low	Medium	0	0	0
Balance of plant	Foundations	Low	Medium	0	0	0
	Subsea cables	Low	Medium	0	0	0
	Transmission electrical	Low	Medium	0	0	0
	Transmission structural	Low	Low	0	0	0
Installation and commissioning	Foundation installation	Low	Low	0	0	0
	Cable installation	Low	Medium	0	0	0
	Turbine installation	Medium	Medium	500	250	750
	Substation installation	Low	Low	0	0	0
Total				800	400	1200

31.7.5.1.5 Employment pathways

185. The Business Register and Employment Survey for 2017 (available on the NOMIS website) shows that there are approximately 39,500 people employed in construction sub-sectors (Table 31.33) in the New Anglia LEP. However, the majority of these are employed in sectors that are not directly relevant to the project. When considering the employees in industries that would be related to construction of the project (Table 31.34) the available workforce reduces to approximately 15,000 people in total.

Table 31.33: Civil engineering and construction employment in the New Anglia LEP (Source: Business Registry and Employment Survey 2017)

Industry category	Employees
0610: Extraction of crude petroleum	400
0620: Extraction of natural gas	0
3511: Production of electricity	700
3512: Transmission of electricity	30
3513: Distribution of electricity	1,750
3514: Trade of electricity	20
3521: Manufacture of gas	150
3522: Distribution of gaseous fuels through mains	50
4110: Development of building projects	1,250
4120: Construction of residential and non-residential buildings	11,000
4211: Construction of roads and motorways	2,500

Industry category	Employees
4212: Construction of railways and underground railways	75
4213: Construction of bridges and tunnels	10
4221: Construction of utility projects for fluids	350
4222: Construction of utility projects for electricity and telecommunications	300
4291: Construction of water projects	50
4299: Construction of other civil engineering projects n.e.c.	2,500
4311: Demolition	75
4312: Site preparation	350
4313: Test drilling and boring	20
4321: Electrical installation	4,500
4322: Plumbing, heat and air-conditioning installation	3,500
4329: Other construction installation	900
4399: Other specialised construction activities n.e.c.	3,000
7112: Engineering activities and related technical consultancy	6,000
Total	39,480

Table 31.34: Employment directly relevant to the project in the New Anglia LEP (Source: Business Registry and Employment Survey 2017)

Industry category	Employees
4222: Construction of utility projects for electricity and telecommunications	300
4299: Construction of other civil engineering projects n.e.c.	2,500
4312: Site preparation	350
4313: Test drilling and boring	20
4329: Other construction installation	900
4399: Other specialised construction activities n.e.c.	3,000
3513: Distribution of electricity	1,750
7112: Engineering activities and related technical consultancy	6,000
0610: Extraction of crude petroleum	400
0620: Extraction of natural gas	0
Total	15,220

31.7.5.1.6 Employment impact significance

186. As described in section 31.4.3.5, impact significance is determined by considering the magnitude of the impact (i.e. the full time equivalent job opportunities) and the sensitivity of the receiving population (i.e. whether the labour market can supply the required labour).
187. The FTE employment per year created during onshore and offshore construction is shown in Table 31.35. It should be noted that due to the contract based nature of the construction industry many of these are likely to result in continued employment for people in relevant industries rather completely new jobs for unemployed people.

Table 31.35: Employment levels under Scenario 1 and Scenario 2 in FTE years and FTE (per year)

	Direct		Indirect & Induced		Total	
	FTE Years	FTE	FTE Years	FTE	FTE Years	FTE
Scenario 2 onshore	244	81	219	73	463	154
Scenario 1 onshore	75	25	73	24	143	49
Offshore	800	400	400	200	1200	600
Total scenario 2	1044	481	619	273	1663	754
Total scenario 1	875	425	473	224	1343	649

Table 31.36: Employment impact magnitudes under different scenarios

	Direct	Indirect & Induced	Total
Scenario 2 construction FTE	481	273	754
Scenario 1 construction FTE	425	224	649
Labour Market	15,000	38,000	53,000
Scenario 2 employment % increase and magnitude	3.21% - High	0.72% - Low	1.42% - Medium
Scenario 1 employment % increase and magnitude	2.83% - High	0.59% - Low	1.22% - Medium

188. As presented in Table 31.36 the percentage increase in direct employment is 3.21% for Scenario 2 and 2.83% for Scenario 1. In accordance with Table 31.11 these percentages increases represent a high magnitude of impact. For indirect employment the percentage increase is 0.72% for Scenario 1 and Scenario 2 is 0.59%, which represents a low magnitude of impact.

189. The sensitivity of the labour market is considered to be medium due to the relative deprivation of the New Anglia LEP with regards skills levels and employment deprivation. Using the impact significance matrix in Table 31.13 onshore construction would lead to the following impacts:

- Under Scenario 2 employment would have:
 - **Major beneficial impact** significance due to direct employment in the New Anglia LEP; and
 - **Minor beneficial impact** significance due to indirect and induced employment in the New Anglia LEP.
- Under Scenario 1 employment would have:
 - **Major beneficial impact** significance due to direct employment in the New Anglia LEP; and
 - **Minor beneficial impact** significance due to indirect and induced employment in the New Anglia LEP.

190. This is based on the following assumptions:

- It is likely that residential workers during onshore construction could be supplied by the labour market of 15,000 people detailed in Table 31.34; and

- Indirect and induced employment is likely to be from the wider labour market of 38,000 people detailed in Table 31.33.
191. BRES does not categorise workers with regards the offshore wind sector. However, the supply chain assessment shows that the most likely areas of employment for the project are in management, procurement and turbine installation (Table 31.32). As this is where the majority of employment is likely to come from, for offshore construction to benefit the New Anglia LEP the labour market shown in Table 31.34 may need to be stimulated. This could be accomplished through early supplier engagement and collaboratively working with the New Anglia LEP and other relevant stakeholders to develop appropriate skills. Considering the skills strategy that is in development it is plausible that there would also be opportunities for people to transfer from other technical industries to the offshore wind sector.
192. The additional enhancements outlined by Norfolk Boreas Limited (in combination with New Anglia LEP skills Strategy), as detailed in section 31.7.2, indicate that it is likely the regional labour market would be developed to supply the labour required to construct the project under both scenarios by the time the projects would be implemented. Therefore, under both scenarios it is likely that the total employment due to the construction phase of the project could have a long term major beneficial effect for New Anglia LEP if the additional enhancements are achieved.

31.7.5.2 Impact 2: Effects on community infrastructure

193. The effect on community infrastructure due to physical disturbance from construction will be assessed using the assessments in the following chapters:
- Chapter 24 Traffic and Transport
 - Chapter 25 Noise and Vibration
 - Chapter 26 Air Quality
 - Chapter 29 Landscape and Visual Impact Assessment
194. The receptor population is the same under both scenarios but the number of receptors change. As Scenario 2 will require a greater amount of construction works this will be considered first and Scenario 1 will be considered second. Then the significance of the impacts will be discussed.

31.7.5.2.1 Community infrastructure receptors

195. Community infrastructure provides supporting services to ensure community cohesion. It includes the following types of assets:

- Educational – schools and training facilities serving the local population;
- Health – GP surgeries, dentists, and other facilities serving a local population;
- Community – public houses, town halls, public sports facilities (e.g. swimming pools and publicly accessible sports grounds), etc.;
- Financial and logistics – local bank branches, post offices, etc.; and
- General business – clustering of shops, garages, and other services people use on a day to day basis.

196. The baseline assessment (section 31.6.4) shows that there are 173 community infrastructure assets within 1km of landfall, onshore cable route, and onshore project substation (Table 31.25). Using the definitions for sensitivity and value set out in section 31.4.3.1.2 and section 31.4.3.2 respectively, the assets are assessed as shown in Table 31.37.

Table 31.37 Community infrastructure receptors

Asset category	Value	Number	Sensitivity	Overall sensitivity
Educational	High	5	High	High
Health	Medium to high	11	Medium	Medium
Community	Medium to low	48	Low	Low
Financial and logistics	Low	4	High	Medium
General business	Negligible	105	Negligible	Negligible

197. Table 31.37 shows that certain community assets are more valuable to a community than others. For example, if people are obstructed from sending their children to school or receiving medical attention this would have a large impact than if they were delayed in reaching the local shop. Therefore, it is important to understand if more valuable community assets would potentially be affected by the project.

198. It is first important to understand if communities will be directly affected by the project, e.g. would the cable route pass directly through a community under Scenario 2. The assessment shown in Table 31.38 shows that the site selection process described in Chapter 4 Site Selection and Assessment of Alternatives has been successful in avoiding populated areas.

199. However, there is the potential for some parts of communities to be affected by noise or visual effects as defined in section 31.5.2.2 and there is also the potential for communities to be affected by transport delays, particularly in relation to attending the sensitive community infrastructure receptors outlined above.

200. Therefore, indirect impacts are the only remaining source pathway. These can be considered as disturbance to communities whilst accessing community infrastructure during construction and the sources are:

- Traffic (both congestion and noise);
- Temporary obstruction of access to assets due to construction; and
- Temporary noise, dust, vibration, and visual impacts.

201. These will be considered for Scenario 2 and Scenario 1 with respect to the receptor communities in Table 31.38.

Table 31.38 Potential for direct interaction with communities

Location	Direct Impact	Possible indirect impact
Necton	None	East of Necton within 1km of site boundary.
Little Fransham	None	All of Little Fransham within 1km of site boundary.
Scarning	None	All of Scarning within 1km of site boundary.
Dereham	None	Northern periphery within 1km of site boundary.
Swanton Morley	None	South of Swanton Morley is within 1km and Southern periphery within 200m of site boundary.
Woodgate	None	All of Woodgate is within 1km of site boundary.
Mill Street	None	All of Mill Street is within 1km of site boundary.
Sparham	None	North west of Sparham within 1km south of site boundary.
Reepham	None	North of Reepham within 1km south of site boundary. Northern periphery within 200m.
Southgate	None	All of Southgate within 1km south of site boundary and northern half within 200m.
Cawston	None	North of Cawston within 1km of site boundary.
Salle Park	None	Within 1km north of site boundary.
Aylsham	None	North of Aylsham within 1km south of site boundary.
North Walsham	None	North of North Walsham within 1km south and houses around Harvey Drive within 200m of site boundary.
Swafeld	None	All of Swafeld within 1km north of site boundary.
Happisburgh and Whimpwell Green	1 business within site boundary	Cross main thoroughfare between Happisburgh and Whimpwell Green. All within 1km of site. Several businesses within 200m of site boundary.
Eccles on Sea	None	All of town within 1km of site boundary.

31.7.5.2.2 Impacts source pathways under Scenario 2

202. Under Scenario 2 where Norfolk Boreas has to construct all of the onshore infrastructure, the source pathways would relate to construction at:

- Landfall due to long HDD and the presence of a temporary works area;
- Sequentially along the cable route as work sections progress in approximately 150m sections per week between mobilisation areas; and
- At the onshore project substation and National Grid Substation.

203. Impacts due to increased traffic density are discussed in Chapter 24 Traffic and Transport. As detailed in Chapter 24 Traffic and Transport, Traffic Management Plans would be prepared prior to construction activities commencing. Traffic Management Plans (DCO Requirement 21) would be agreed with the relevant local authorities and stakeholders to minimise disturbance to local communities, and to avoid serious disruption and indirect impact upon local populations.
204. Any traffic mitigation measures identified along shared road links would be secured through the final Traffic Management Plans to be developed post-consent (DCO Requirement 21). Following the mitigation discussed in Chapter 24 Traffic and Transport, the assessment shows:
- Negligible to minor adverse impacts on severance¹⁸;
 - Negligible to minor adverse impacts on pedestrian amenity¹⁹;
 - Minor adverse impacts on road safety; and
 - Minor adverse impacts on driver delay.
205. There is one exception at Link 69. This is Little London Road from the B1145 Lyngate Road junction to an access point approximately 210m east (as shown on Figure 24.2). At this junction, there is a small hamlet of houses that may be affected by an increase in Heavy Goods Vehicle (HGV) traffic. Although there are no community assets in the area the increased traffic may lead to minor delays in accessing them. Although, this would be short term and completely reversible community liaison could be necessary to mitigate this impact.
206. Chapter 25 Noise and Vibration discusses the mitigation relevant to minimising noise and vibration impacts, including adoption of general good practice construction noise management measures known as Best Practical Means (BPM) and applying the principles of Best Available Technique (BAT) when designing the facility and for any sound emitting mobile and fixed plant.
207. Following the mitigation outlined here and discussed in Chapter 25 Noise and Vibration, the assessment shows the following impacts during construction:
- No impact at landfall;
 - Negligible impacts along the onshore cable route;
 - No impact at the onshore project substation;
 - Moderate adverse impacts due to traffic noise at links 12, 25, and 69; and
 - No impacts due to vibration.

¹⁸ Severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery.

¹⁹ Pedestrian amenity is broadly defined as the relative pleasantness of a journey and is considered to be affected by traffic flow, traffic composition and pavement width and separation from traffic.

208. Dust and vehicle emission impacts are discussed in Chapter 26 Air Quality and impacts to human receptors within 350m of construction activities are assessed to be not significant following implementation of the mitigation outlined in the chapter.
209. A Code of Construction Practice (CoCP) (DCO Requirement 20) will be developed and agreed with stakeholders. This Plan would detail measures to be used during construction activities, including all environmental mitigation and details of a Construction Liaison Committee (CLC) to ensure effective and open communication with local businesses and stakeholders to minimise adverse impacts to an acceptable level.
210. Landscape and visual impacts are detailed in Chapter 29 Landscape and Visual Impact Assessment. The assessment summarised the impacts as follows:
- At landfall: “the landfall construction would not give rise to significant effects on the landscape character of the Bacton to Sea Palling Coastal Plains LCU as a whole, however there would be a short term significant effect in the very localised landscape around the landfall. There would also be a significant effect on the views of walkers on short and localised sections of Norfolk Coastal Path and PRoW RB22 and on the views of residents on Lighthouse Lane in the southern extent of Happisburgh. The landfall construction works would be relatively small in scale and this explains the localised extent of the effects. Furthermore, the construction works would last a maximum of 20 weeks, making the effects short term. Reinstatement of the majority of the agricultural land at the end of this period would make the effects largely reversible.”
 - Onshore cable route: “The majority of the effects would relate to the construction works and be short to medium term with effects mitigated through reinstatement of the land and hedgerows as far as practicable and permissible. Residual impacts would occur in the few instances where trees would be removed and not replaced owing to restrictions over cable easements. These effects would be long term but not irreversible as replanting of hedgetrees and trees could take place following decommissioning and the planting of hedgerows in the interim would offset the loss.”
 - Onshore project substation: “the effect on the agricultural land and the hedgerows and hedgetrees would not be significant. There would be localised significant effects on landscape character in those parts of the Settled Tributary Farmland LCT – River Wissey Tributary Farmland LCU and Plateau Farmland LCT – Beeston Plateau LCU and Pickenham Plateau LCU, close to the project, but not significant effects on the remaining parts and all other LCUs. In respect of the representative viewpoints, significant effects would arise from a section of

Lodge Lane to the immediate south of the site, a very localised section of Ivy Todd Road to the south-west and a section of the A47 to the north. These effects would all occur within 1.2km of the onshore project substation, making them localised.”

211. This shows that although some significant landscape and visual effects may be felt at very localised areas; the overall impact on community infrastructure would not be significant. In order to create a significant change for a community, the visual effect would need to be felt by a significant population over a prolonged period of time from an identified community asset, rather than by individuals as they pass certain viewpoints.
212. As detailed in Chapter 29 Landscape and Visual Impact Assessment, a Outline Landscape and Environmental Management Strategy (OLEMS) (document reference 8.7) has been submitted as part of the DCO application. This strategic approach to the management of ecology and landscape will ensure that adverse impacts to communities, due to any adverse visual impacts and impacts to landscape, nature and wildlife, are minimised.
213. Chapter 27 Human Health assesses that health outcomes due to visual impacts would be not be significant. Therefore, it is assessed that impacts associated with accessing or using community infrastructure would not be significant as a result of visual impacts, following implementation of the mitigation outlined in Chapter 29 Landscape and Visual Impact Assessment.
214. Under Scenario 2 it is assessed that the project is highly unlikely to affect community infrastructure receptors because the onshore project area does not directly impact any community assets and the only remaining plausible causal pathways are through indirect temporary disturbance that is due to factors assessed to be not significant (in ES terms) in supporting chapters (Table 31.38). Therefore, the impact magnitude is assessed to be negligible to low.

31.7.5.2.3 *Impacts source pathways under Scenario 1*

215. Under Scenario 1, the majority of onshore cable route infrastructure would be constructed by the Norfolk Vanguard and the works for Norfolk Boreas would be confined to:
 - Landfall HDD and the presence of a temporary works area;
 - Cable pulling works; and
 - Onshore project substation and National Grid Substation extension.
216. Impacts due to traffic would be minor to negligible with appropriate mitigation in place (see Chapter 24 Traffic and Transport). Without the need to install cable ducts the one significant impact highlighted would be avoided.

217. Similarly, with appropriate mitigation in place, there would be no impacts due to noise, vibration, dust or vehicle emissions at either landfall or the onshore project substation area. The traffic noise impacts highlighted would also be avoided due to the reduced requirement for construction activity.
218. Chapter 29 Landscape and Visual Impact Assessment finds the same impacts for Scenario 2 and Scenario 1 at landfall and the onshore project substation. These are summarised in section 31.7.5.2.2 and lead to no significant impacts. Although there are some localised significant impacts these are temporary and reversible.
219. Under Scenario 1 it is assessed that the project is highly unlikely to affect community infrastructure receptors because the onshore project area does not directly impact any community assets and the only remaining plausible causal pathways are through indirect temporary disturbance that is due to factors assessed to be not significant (in ES terms) in supporting chapters (Table 31.38). Therefore, the impact magnitude is assessed to be negligible to low.

31.7.5.2.4 *Impact significance*

220. The highest sensitivity receptors are likely to be educational facilities (such as schools) followed by health service providers such as (GPs, care homes or dentists) and financial or logistic businesses (such as banks or post offices). However, the agreed methodology does not capture the level of alternative asset provision outside of the study area which may reduce the overall sensitivity of financial or logistic businesses.
221. Under both scenarios, the multiple sources of potential impacts on these community infrastructure types has been discussed in the relevant chapters. Under both scenarios it is assessed as, at most, of minor adverse or negligible significance. No impact is concluded for many parts of the project following mitigation as summarised in section 31.7.1.
222. As described in the worst case (section 31.7.4) construction impacts will be temporary in nature. Therefore, if any impacts do accumulate around a community or a particularly sensitive community infrastructure asset the effects would not be long lasting and, as described in Chapter 27 Human Health, are unlikely to lead to significant impacts on human health. There are also only a small number of highly sensitive receptors so the likelihood of impact is further reduced.
223. For both scenarios the overall sensitivity of community infrastructure is assessed to be medium and the overall magnitude of effect is assessed to be negligible to low. Using Table 31.13, the impact on community infrastructure is assessed to have **minor adverse** significance.

31.7.6 Potential Impacts during Operation

31.7.6.1 Impact 1: Onshore direct and supply chain job creation

224. The onshore project substation will be unmanned and only periodic maintenance is planned at link boxes along the onshore cable route. Therefore, the potential direct and supply chain job creation for operation would be related to the offshore elements of the project. These would be the same under both scenarios.

31.7.6.1.1 *New Anglia labour market sensitivity*

225. As described in section 31.7.5.1.1 the New Anglia labour market currently has a sensitivity level of medium to high. However, the project is due to become operational after 2025 and a number of other offshore wind projects are also in development in the New Anglia LEP region. Considering the focus on local, regional, and industry strategies, it is assumed that the labour market for operational tasks will have a medium sensitivity at the time the project is commissioned.

226. Operational staff are likely to be resourced from a different market segment than construction staff. BRES data for 2017 has been analysed to determine a likely labour market size within the New Anglia LEP. This is described in Table 31.39 and shows that there are currently 15,030 people working in applicable sectors. However, it should be noted that there are approximately 43,000 people working in Professional, Scientific, and Technical sectors (Table 31.19) that may benefit by the development of the offshore wind sector.

Table 31.39: Potential labour market for the operation of the Norfolk Boreas offshore wind farm (Source: BRES 2017 survey)

Industry	Employees
2811: Manufacture of engines and turbines, except aircraft, vehicle and cycle engines	600
2812: Manufacture of fluid power equipment	100
2813: Manufacture of other pumps and compressors	250
2814: Manufacture of other taps and valves	250
2815: Manufacture of bearings, gears, gearing and driving elements	200
2822: Manufacture of lifting and handling equipment	500
2829: Manufacture of other general-purpose machinery n.e.c.	1,250
3011: Building of ships and floating structures	300
3311: Repair of fabricated metal products	300
3312: Repair of machinery	1,000
3313: Repair of electronic and optical equipment	400
3314: Repair of electrical equipment	250
3315: Repair and maintenance of ships and boats	450
3319: Repair of other equipment	125
3320: Installation of industrial machinery and equipment	600
8211: Combined office administrative service activities	300

Industry	Employees
7112: Engineering activities and related technical consultancy	7,000
5010: Sea and coastal passenger water transport	250
5020: Sea and coastal freight water transport	200
0610: Extraction of crude petroleum	700
0620: Extraction of natural gas	5
Total	15,030

31.7.6.1.2 Operational employment

227. Through analysis of UK Content data, BVG Associates provided a breakdown of the likelihood of procuring operational elements of the project in the New Anglia LEP region. This is detailed in Appendix 31.2 and summarised in Table 31.40. The FTE jobs quoted in Appendix 31.2 are estimated across the design life of the project. As it is expected that the people employed during operation will be full time employees that would move to the New Anglia LEP, these figures will be compared as full time jobs per year by dividing the total by 30 years of anticipated operational life.
228. To create a realistic worst case scenario, the following multipliers were applied to the sum of direct and indirect FTE indicated in Appendix 31.2. This reflects both the likelihood that elements could be procured and the commitment that Norfolk Boreas Limited is making to 50% UK content where possible:
- Low probability elements were assumed to be procured from outside of the New Anglia or UK markets;
 - It was assumed that medium probability elements have a 50% chance of being procured in New Anglia or the UK; and
 - It was assumed that high probability elements would definitely be procured within East Anglia or the UK.
229. Impact magnitude has been assessed by comparing the operational direct and indirect & induced job creation figures estimated by BVG Associates with the current employment figures for New Anglia for jobs based on the 2017 BRES survey as shown in Table 31.39.
230. This magnitude is based on the presence of suitable businesses in the New Anglia LEP region and the size of the labour market to supply staff. Considering the work that Norfolk Boreas Limited are doing to create a pipeline of employment opportunities it is likely that many of the direct roles would be filled from the local labour market. However, Norfolk Boreas Limited cannot influence where their supply chain procures staff from and the high magnitude of indirect job creation may suggest that people would migrate to the New Anglia LEP during the operational

period of the project. This could bring additional benefits as these people would be skilled and employed. It is assumed that the migration would be gradual enough for local services to respond in a sustainable manner.

231. This assessment of potential job creation supports both the strategic development of the New Anglia LEP region as a CORE and VWPL own work to actively develop local skills to create an employment pipeline.
232. Furthermore, unlike construction jobs, operational jobs are permanent and would gradually increase the level of employment. Considering this and the level of evidence of the skills development already undertaken by Norfolk Boreas Limited, the assessment concludes that the supply chain could create a beneficial impact on unemployment levels.

Table 31.40 Potential for supply chain job creation during operation in New Anglia LEP

Element	Sub element	Probability procured in East Anglia	Direct FTE Years	Indirect FTE Years	Direct FTE per year	Indirect FTE per year	Total
Operations, maintenance and service	Wind farm operations	High	2500	1000	83	33	117
	Turbine maintenance and service	High	2500	1000	83	33	117
	Balance of plant maintenance	Medium	500	200	8	3	12
Total			5500	2200	175	70	245

Table 31.41 Operational FTE job creation magnitude

	Direct	Indirect & Induced	Total
FTE Years in New Anglia during operation	5500	2200	7700
Full time jobs for 30 years	175	70	245
New Anglia potential labour market	18,000	18,000	18,000
% increase labour and magnitude	1% - Medium	0.4% - Low	1.36% - Medium

233. Using Table 31.13 the following impact significances are assessed for operational direct employment and supply chain job creation:
- Direct job creation has a beneficial impact of medium magnitude on the New Anglia labour market and the labour market is assumed to have a medium sensitivity by the time of commissions. Therefore, direct job creation is assessed to have a **moderate beneficial** impact on the labour market;
 - Indirect & Induced job creation has a beneficial impact of low magnitude on the New Anglia labour market and the labour market is assumed to have a medium sensitivity at the time of commissioning. Therefore, indirect job creation is assessed to have a **minor beneficial** impact on the labour market.

234. Although these beneficial impacts are lower than during construction the significance should be considered in context. They represent the development of permanent jobs and a cumulative potential for clustering of supply chain businesses that support the offshore wind industry.
235. Where the construction impacts would benefit the New Anglia LEP for 3 years the operation and maintenance impacts would benefit the LEP for 30 years. This level of continued employment provides confidence to both private and public investors. On the one hand, private investors would bring businesses to the areas that the New Anglia LEP are designating in support of the offshore wind industry. On the other hand, it is likely that public investors would develop training courses so that people can meet the employment demand that is created.
236. It is likely the regional labour market would be developed to supply the labour required to operate Norfolk Boreas under both scenarios by the time the projects would be implemented. This could be done through a combination of
- Additional enhancements outlined by Norfolk Boreas Limited (as detailed in section 31.7.2);
 - New Anglia LEP Skills Strategy; and
 - The evidence that New Anglia LEP is being developed to support the offshore wind sector.
237. Therefore, under both scenarios it is likely that the total employment due to operation and maintenance of the project could have a long term major beneficial effect for New Anglia LEP if the regional labour market is developed and the additional enhancements are achieved.

31.7.6.2 Impact 2: Effects on community infrastructure

238. Under both scenarios, the only area that will have significant above ground infrastructure during operation will be the onshore project substation and National Grid substation extension.
239. Above ground infrastructure does have the potential to create impacts due to noise and visual disturbances (see Chapter 25 Noise and Vibration and Chapter 29 Landscape and Visual Impact Assessment). However, the lack of community infrastructure in the vicinity of these minimises this impact pathway.
240. Negligible impacts from traffic disturbances are anticipated during operation (see Chapter 24 Traffic and Transport).
241. Other infrastructure will be buried (with the exception of link boxes which may be above ground (section 31.7.4)) and therefore the only pathway for impact will be in the event of unscheduled maintenance. Such impacts would be temporary (and for

less duration than construction) and the magnitude of effect is assessed as low. Therefore, impacts from the onshore cable route would be **negligible**.

242. During operation, potential impacts may occur to noise and visual receptors from the onshore project substation. As the level of this will be lower during operation than during construction, it can be assumed that operational impacts would be lower than during construction and therefore **negligible**.

31.7.7 Potential Impacts during Decommissioning

243. Whilst details regarding the decommissioning of the project are currently unknown, considering the worst case which would be the removal and reinstatement of the current land use at the site, it is anticipated that the impacts would be less or no worse than those during construction.
244. The decommissioning methodology would be finalised nearer to the end of the lifetime of the project so as to be in line with current guidance, policy and legislation at that point. Any such methodology would be agreed with the relevant authorities and statutory consultees at the relevant time.

31.8 Cumulative Impacts

245. The assessment of cumulative impact is a two stage process. Firstly, all the impacts from previous sections have been assessed for the potential to act cumulatively with other projects. This summary assessment is set out in Table 31.42.

Table 31.42 Potential cumulative impacts

Impact	Potential for cumulative impact	Assessment confidence	Rationale
Construction			
Onshore direct job creation	Yes	Medium	An ongoing succession of onshore construction could provide confidence to the construction market and drive investment.
Onshore supply chain job creation	Yes	Medium	A strategically developed supply chain of Tier 2 and 3 businesses could provide confidence to the fabrication market and drive investment.
Effects on community infrastructure	Yes	Medium	There is potential for construction schedules to overlap which would increase disturbance. The assessment is based on publicly available information from comparative offshore wind projects. Unfortunately, other ES chapters do not include an assessment of community infrastructure impacts and therefore comparable information from tourism assets is used.

Impact	Potential for cumulative impact	Assessment confidence	Rationale
Operation			
Onshore direct employment and supply chain job creation (see below for details)	Yes	Medium	It is estimated that 7,350 direct and indirect FTE jobs will be created as part of regional offshore wind farm development (Table 31.41 and Appendix 31.2). A strategic approach taken between developers and the New Anglia LEP could lead to significant investment in to supply chain and human resource development for O&M services to the offshore wind farm sector. Especially as part of a process to re-skill workers from the oil and gas sector.
Effects on community infrastructure	No	High	Due to the small amount of maintenance required at onshore project substations and that onshore cables are not expected to require maintenance it is implausible that they would cumulatively create physical disturbance with other projects that would affect community infrastructure.
Decommissioning			
The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning plan will be provided. As such, cumulative impacts during the decommissioning stage are considered to be no worse than those identified during the construction stage.			

246. The second stage of the CIA is an assessment of whether there is spatial or temporal overlap between the extent of potential effects of the onshore project area and the potential effects of other projects scoped into the CIA upon the same receptors. To identify whether this may occur, the potential nature and extent of effects arising from all projects scoped into the CIA have been identified and any overlaps between these and the effects identified in section 31.7 have also been identified. Where there is an overlap, an assessment of the cumulative magnitude of effect is provided.
247. Projects identified for potential cumulative impacts that were agreed as part of the Norfolk Boreas PEIR consultation (Norfolk Boreas Limited, 2018). These projects, as well as any relevant development applications submitted since this consultation have been considered and their anticipated potential for cumulative impact are detailed in Table 31.43.
248. The remainder of the section details the nature of the cumulative impacts against all those receptors scoped in for cumulative assessment.

Table 31.43 Summary of projects considered for the CIA in relation to socio-economic impacts

Project	Status	Development period	^[1] Distance from Norfolk Boreas site (km)	Project definition	Project data status	Included in CIA	Rationale
National Infrastructure Planning							
Norfolk Vanguard Offshore Wind Farm	Application submitted	Expected construction 2020 to 2025	0 – projects are co-located	Full ES available: https://infrastructure.planninginspectorate.gov.uk/projects/eastern/norfolk-vanguard/?ipcsection=docs	High	Yes	Under Scenario 1 only. Impacts will relate to job creation and community infrastructure.
Hornsea Project Three Offshore Wind Farm	Application submitted	Expected construction start date 2021. Duration 6 to 10 years dependent on phasing.	0 – cable intersects project 32km between substation locations	Full ES available: https://infrastructure.planninginspectorate.gov.uk/projects/eastern/hornsea-project-three-offshore-wind-farm/?ipcsection=docs	High	Yes	The Hornsea Project Three onshore cable route will cross the Norfolk Boreas cable route. The exact location and manner of this crossing will determine the magnitude of cumulative impacts on local tourism and recreation assets. Details of this crossing will be discussed with Ørsted, local stakeholders and the Local Authority.
Dudgeon Offshore Wind Farm	Commissioned	Constructed	0	http://dudgeonoffshorewind.co.uk/	High	No	Operational considered as part of baseline.
A47 corridor improvement programme – North Tuddenham to Easton	Pre-application (application due 2020)	Start works April 2021 Open May 2023	26.7	https://highwaysengland.co.uk/projects/a47-north-tuddenham-to-easton-improvement-scheme/	Medium	No	Roadworks may have a cumulative impact on Pedestrian Amenity but as the roads listed for the improvement programme are not within the area highlighted as potentially impacted by Norfolk Boreas, it

^[1] Shortest distance between the considered project and Norfolk Boreas – unless specified otherwise.

Project	Status	Development period	^[1] Distance from Norfolk Boreas site (km)	Project definition	Project data status	Included in CIA	Rationale
							is unlikely to have an effect on socio-economics.
A47 corridor improvement programme – A47 Blofield to North Burlingham	Pre-application (application due 2019)	Start works 2021 Open 2022	25	https://highwaysengland.co.uk/projects/a47-blofield-to-north-burlingham/	Medium	No	Roadworks may have a cumulative impact on Pedestrian Amenity but as the roads listed for the improvement programme are not within the area highlighted as potentially impacted by Norfolk Boreas. It is unlikely to have an effect on socio-economics
A47 corridor improvement programme – A47 / A11 Thickthorn Junction	Pre-application (application due 2019)	Start works 2021	18	https://highwaysengland.co.uk/projects/a47-thickthorn-junction/	Medium	No	Roadworks may have a cumulative impact on Pedestrian Amenity but as the roads listed for the improvement programme are not within the area highlighted as potentially impacted by Norfolk Boreas. It is unlikely to have an effect on socio-economics
Norwich Western Link	Pre-application	Expected construction start late 2022	2.8	https://www.norfolk.gov.uk/roads-and-transport/major-projects-and-improvement-plans/norwich/norwich-western-link	Medium	No	Roadworks may have a cumulative impact on Pedestrian Amenity but as the roads listed for the improvement programme are not within the area highlighted as potentially impacted by Norfolk Boreas, it is unlikely to have an effect on socio-economics.
Third River Crossing (Great Yarmouth)	Pre-application (application due 2019)	Expected construction start in late 2020	28	https://www.norfolk.gov.uk/roads-and-transport/major-projects-and-improvement-plans/great-	Medium	No	The Third River Crossing is a road improvement scheme to improve access to Great Yarmouth and particularly the port and enterprise zone. The aim of that scheme is to lead to increased investment in the port and enterprise zone and

Project	Status	Development period	^[1] Distance from Norfolk Boreas site (km)	Project definition	Project data status	Included in CIA	Rationale
				yarmouth/third-river-crossing			associated job creation. The reference to a separate DCO process was intended to reflect any future expansion of Great Yarmouth Port and the associated job creation. Whereas the road improvement scheme itself will not generate those jobs and so was excluded from the CIA.
King's Lynn B Power Station amendments	Approved	Expected construction 2019 to 2022	28	https://www.kingslynnbccgt.co.uk/	Medium	No	Due to the distance of King's Lynn B Power Station from the project it is unlikely that cumulative effects would occur.
North Norfolk District Council							
PF/17/1951 Erection of 43 dwellings and new access with associated landscaping, highways and external works	Approved	Anticipated Q2 2018	0.7	Application available: https://idoxpa.north-norfolk.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=_NNORF_DCAPR_92323	High	No	Works due to be completed before the project programme due to begin.
Bacton and Walcott Coastal Management Scheme	Approved	Construction start date Spring 2019	1.0	Public information leaflets available: https://www.north-norfolk.gov.uk/media/3371/bacton-to-walcott-public-information-booklet-july-2017.pdf	Medium	No	It is currently anticipated that this scheme would commence in 2018 and as offshore construction for Norfolk Boreas would start in 2025 at the earliest no overlap in construction periods is anticipated.

Project	Status	Development period	^[1] Distance from Norfolk Boreas site (km)	Project definition	Project data status	Included in CIA	Rationale
Coastal defence/protection work, Happisburgh PF/18/0751	Approved	Coastal protection over 10-year duration from August 2018	0.12	https://idoxpa.north-norfolk.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=_NNORF_DCAPR_93543	Medium	No	The coastal defence application is intended to enable a near shore rock sill to be moved landward in response to erosion. The project area is 150m north Norfolk Boreas' landfall project area. Considering this is a reactive project in response to natural process exacerbated by climate change, it is not expected to have a cumulative effect on community infrastructure during the construction phase and will not interact with the project during operational phase.
Breckland Council							
Erection of 85 Dwellings with Associated Open Space 3PL/2018/1246/F	Awaiting Decision	Application received 04/10/18.	1.26	http://planning.breckland.gov.uk/OcellaWeb/planningDetails?reference=3PL/2018/1246/F&from=planningSearch	Medium	No	There are three ways that housing developments could cumulatively effect communities: <ul style="list-style-type: none"> • Through disturbance due to noise, vibration, or dust; • Through cumulative distortion to the labour market; and • Through traffic delays.
Residential development of 40 No. units comprising a mix of housing types, accommodating open space and appropriate associated	Approved	Application approved 11/02/19. Construction must begin within 2 years.	1.42	http://planning.breckland.gov.uk/OcellaWeb/planningDetails?reference=3PL/2018/0993/F&from=planningSearch	Medium	No	These projects are far enough away from the onshore project substation area for cumulative noise impacts to not be an issue to community infrastructure receptors. Construction workers that could transfer between housing and the project would probably be providing general services.

Project	Status	Development period	^[1] Distance from Norfolk Boreas site (km)	Project definition	Project data status	Included in CIA	Rationale
infrastructure with vehicle access via Hall Road 3PL/2018/0993/F							<p>The increase in demand for these services, due to the project, is insignificant in comparison to the size of the labour market therefore this will not be considered further.</p> <p>Increased traffic density is considered in Chapter 24 Transport and Traffic. It is not possible to determine if these will culminate in community impacts but it is assumed to be highly unlikely due to the low level of human health outcomes assessed in Chapter 27 Human Health.</p>

249. In summary, the following projects will be assessed for potential direct cumulative impacts (where relevant):

- Norfolk Vanguard Offshore Wind Farm (Scenario 1 only);
- Hornsea Project Three Offshore Wind Farm; and
- Dudgeon Offshore Wind Farm.

250. Other major offshore wind projects will also be included in the cumulative assessment. These include East Anglia ONE, East Anglia THREE, East Anglia ONE North and East Anglia TWO will be included when considering construction employment. All offshore wind farms that have the potential to operate in the New Anglia LEP will be considered for operational employment.

251. To avoid confusion between different projects, the Norfolk Boreas Offshore Wind Farm, previously referred to as 'the project', is referred to as 'Norfolk Boreas' within this section.

252. The cumulative impact summary presented below presents both Scenario 1 and Scenario 2 together where the cumulative impact is the same. Where the significance of the cumulative impact is different for Scenarios 1 and 2, this is set out below.

31.8.1 Cumulative Consideration of Job Creation during Construction

31.8.1.1 Norfolk Boreas and Norfolk Vanguard

253. Under Scenario 2 there would be no cumulative impacts between Norfolk Boreas and Norfolk Vanguard because the latter would not exist. Therefore, this section only considers the cumulative impacts of Norfolk Boreas and Norfolk Vanguard under Scenario 1.

254. The combined onshore labour curve would be as shown in Plate 31.3. This shows that because Norfolk Boreas is due to begin a year after Norfolk Vanguard the only cumulative effect on employment magnitude would occur during 2024 where the onshore project substation primary works for Norfolk Boreas would be undertaken at the same time as the cable pulling for Norfolk Vanguard. However, these activities require significantly different skill sets recruited from different sectors.

255. The peak employment for Norfolk Boreas and Norfolk Vanguard would occur in 2022 (Plate 31.3 and Table 31.44). The main temporal scope of employment would increase from 3 years to 5 years. This would create overall employment of 607 FTE years across a 6 year construction project. However, only 5 years have a significant employment level, therefore the 607 FTE years would equate to 121 FTE per year.

Table 31.44 Overlap of employment for Norfolk Vanguard and Norfolk Boreas (Scenario 1)

	2022 FTE	2023 FTE	2024 FTE	2025 FTE	2026 FTE	2027 FTE	Direct FTE yr	Local content	Local FTE yr	Indirect FTE yr	Total FTE yr
Norfolk Vanguard											
Cable Route	165	55	0	0	0	0	220	70%	154	139	293
Trenchless Crossings	14	2	0	0	0	0	16	30%	5	4	9
Landfall HDD	19	2	0	0	0	0	21	30%	6	6	12
Cable Pulling	0	0	92	0	0	0	92	30%	28	25	52
A47 Highway Access	3	2	0	0	0	0	5	100%	5	5	10
Onshore Substation	33	42	3	3	0	0	81	30%	24	22	46
NGET Substation	33	42	0	0	0	0	75	30%	23	20	43
Total Vanguard	267	145	95	3	0	0	510		245	220	465
Norfolk Boreas											
Trenchless Crossings	0	0	4	0	0	0	4	30%	1	1	2
Cable Pulling & Jointing	0	0	0	0	92	0	92	30%	28	25	52
Onshore Substation	0	0	34	41	2	2	79	30%	24	21	45
NGET Substation	0	0	34	41	0	0	75	30%	23	20	43
Total Boreas	0	0	72	82	94	2	250	30%	75	68	143
Cumulative Total	267	145	167	85	94	2	760		320	288	607

Table 31.45 Total employment due to the construction of Norfolk Boreas and Norfolk Vanguard

Boreas & Vanguard	Direct		Indirect & Induced		Total	
	FTE Years	FTE	FTE Years	FTE	FTE Years	FTE
Onshore	320	64	288	58	607	121
Offshore	1600	400	800	200	2400	600
Total	1920	464	1088	258	3007	721

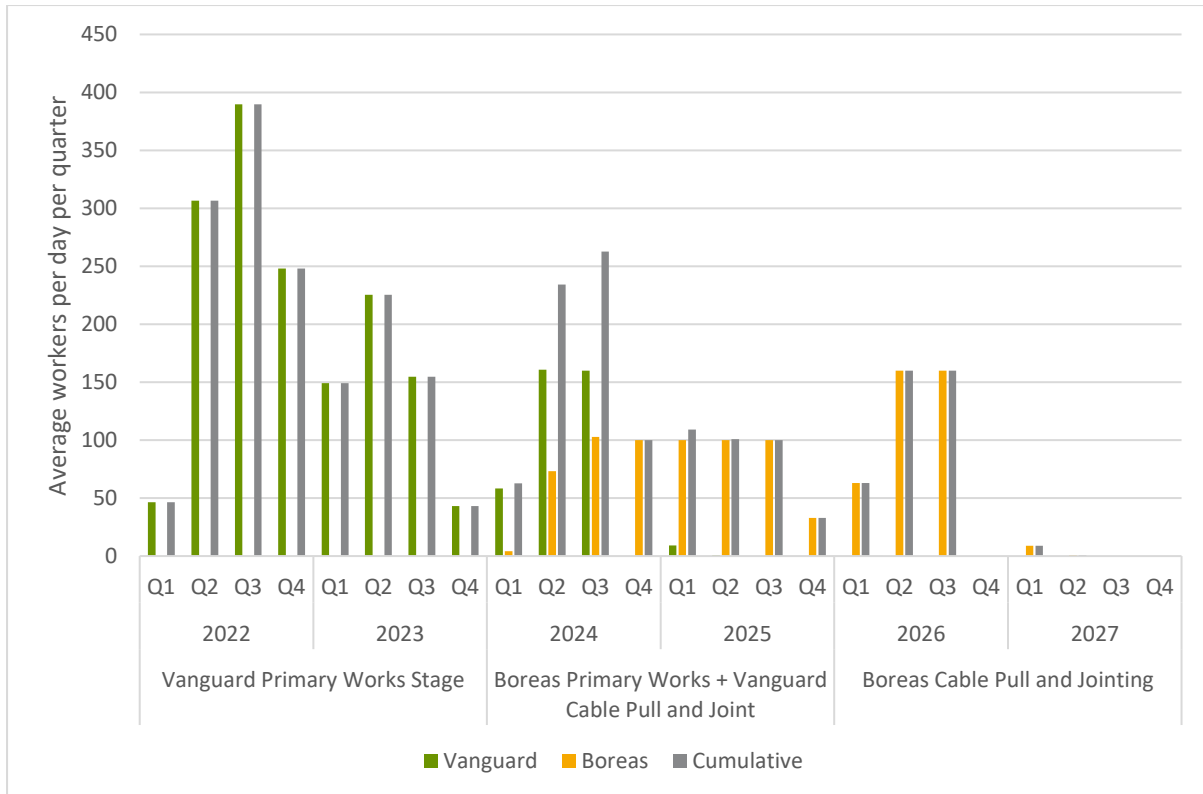


Plate 31.3 Cumulative onshore labour curve of Norfolk Boreas and Norfolk Vanguard

31.8.1.2 Norfolk Boreas, Norfolk Vanguard and other Offshore Wind Projects

256. The combined labour curve, Plate 31.3, for Norfolk Boreas and Norfolk Vanguard shows that there is limited overlap between the onshore elements of the projects. If considered as individual projects the labour curve for Norfolk Vanguard, Plate 31.3, and Norfolk Boreas, Plate 31.1, are broadly the same with the same peak employment and the same FTE. When considering onshore employment, the only difference between them is the start date of the construction where Norfolk Vanguard would start in 2022 is constructed individually and Norfolk Boreas would start in 2023 if constructed individually. Therefore, an assessment of onshore construction employment impacts under Scenario 1 and Scenario 2 would have the same results. Due to this, the cumulative impacts of both Norfolk Boreas (under either scenario) and Norfolk Vanguard will be considered cumulatively with other offshore wind projects.

257. The construction of the onshore elements of offshore wind would require similar skillsets and if a pipeline of similar projects it may incentivise the development of a sector to supply this demand within the New Anglia LEP. Therefore, Table 31.46 shows the number of employees that may be required if all of the projects are construction. This has been created using the following evidence taken from relevant environmental statements and assumptions:

- It is understood that East Anglia ONE North and East Anglia TWO will share onshore infrastructure. FTE has been estimated at 389 for the onshore construction phase. Employment due to offshore construction was estimated between 100 FTE to 300 FTE for per project, with an average of 400 FTE between both East Anglia ONE North and TWO (SPR, 2019);
- East Anglia ONE's socio-economic assessment estimated a total workforce in the East of England with a range of 385 FTE to 770 FTE and a median of 641 FTE. The median will be taken (SPR, 2012);
- The socio-economic assessment of East Anglia THREE did not quantify employment due to offshore construction. It did include an estimate of 229 FTE jobs in the East of England region due to direct employment (SPR, 2015). This is approximately 10% lower than the Norfolk Vanguard estimate but East Anglia THREE is a smaller project. Therefore, and considering efficiencies in construction, the median assessment from East Anglia ONE of 641 FTE will be used even though it has a larger capacity; and
- The Hornsea Project Three socio-economic assessment estimates a medium scenario construction employment of 880 FTE in the New Anglia LEP (Ørsted, 2018).

Table 31.46 Offshore wind farms planned in the New Anglia LEP

Wind farms	Owner and / or Operator	Total FTE	Capacity (MW)
East Anglia ONE	ScottishPower Renewables	641	714
East Anglia THREE	ScottishPower Renewables	641	1200
Norfolk Boreas and Norfolk Vanguard	Vattenfall Wind Power Limited	721	Up to 3600
Hornsea Project Three	Ørsted	880	2400
East Anglia TWO and ONE North	ScottishPower Renewables	889	Up to 1800
Total		3,772	9,714

Table 31.47 Magnitude of cumulative job creation during construction within the New Anglia LEP

	Direct FTE	Indirect & Induced FTE	Total
Total construction jobs in New Anglia	1,997	1,775	3,772
New Anglia Construction Labour Market	15,000	38,000	53,000
% increase labour and magnitude	13.31% - High	4.67% - High	7.12% - High

258. As shown in Table 31.47 cumulative direct job creation represents an effect of (very) high magnitude on the labour market. Indirect and induced job creation also has an effect of high magnitude on the labour market. This is under Scenario 1 where both Norfolk Vanguard and Norfolk Boreas are constructed. Under Scenario 2 the effects would be similar, as described above, but the construction duration would be shorter.

259. Assuming that the labour market develops to be medium sensitivity due to investment as a response to the pipeline of projects, this may lead to a cumulative impact on the labour market of **major beneficial** significance for direct employment and **major beneficial** significance for indirect employment. If all of the projects were undertaken concurrently this would lead to a labour market distortion and has the potential have a negative effect for surrounding industries.
260. Ensuring the impact has a beneficial effect depends on whether the labour market can be developed to supply such an increase in demand. First of all, it should be noted that the projects in Table 31.46 represent a pipeline of construction work. The projects are not all envisaged to be under construction during the same period and it is estimated the duration of effect would be approximately 10 years for all of the construction to be completed.
261. This cumulative impact presents a positive challenge for the New Anglia LEP and industry bodies such as the East of England Energy Group. The New Anglia Energy Sector Skills Plan (Appendix 31.3) does suggest that work is underway to increase the opportunities for people in Norfolk and Suffolk.
262. Due to the significant pipeline of work under both scenarios this would also suggest that people may permanently move to the region for these job opportunities and does provide a significant opportunity for the business sector to invest in skills development to ensure that this cumulative opportunity benefits the people across the region. Assuming that the labour market can be developed a cumulative effect on the New Anglia LEP is could have a long term major beneficial effect.

31.8.2 Cumulative Consideration of Supply Chain Job Creation during Operation

263. Table 4.1 in Appendix 31.3 shows existing offshore wind projects and Table 31.48 shows those in planning. These have been used to calculate the cumulative impact of offshore wind development in the New Anglia LEP.
264. It has been assumed that Norfolk Boreas and Norfolk Vanguard are operated as individual projects and would contribute the same number of FTE to the labour market. Therefore, the assessment considers:
- Scenario 1 where both projects are operated individually and each contribute the same number of people to the labour market; and
 - Scenario 2 where Norfolk Vanguard doesn't exist. (Note this would also be the lower limit for Scenario 1 if significant operational efficiencies are created by operating two projects by one company.)
265. Based on UK Content assessments by BVG Associates (Appendix 31.2), it estimated that the operation and maintenance elements likely to be procured in New Anglia

would have a multiplier effect of 1.42 indirect and induced FTE jobs. This is significantly lower the average suggested by the ONS because of the type of supply chain available in the New Anglia LEP. Other than this, the following assumptions have been made to calculate the cumulative employment magnitude:

- Figures for projects in operation and construction have been taken from RenewableUK as direct employment and the above multiplier added; and
- Figures for project in planning have been taken from relevant socio-economic assessments that are publicly available. Some of these use different multipliers to calculate indirect employment. For consistency, the above multiplier has been used because it is based on sector and region specific evidence rather than national averages.

Table 31.48 Wind farms serviced from the New Anglia LEP

Stage	Wind farms	Owner and / or Operator	Capacity (MW)	O&M FTE	
				Direct	Indirect
Operational	Scroby Sands	EON	60	10 ²⁰	4
	Greater Gabbard	Innogy Renewables UK	504	100 ²¹	42
	Sheringham Shoal	Statoil, Statkraft, Green Investment Bank	210	50	21
	Dudgeon	Statoil, Statkraft, Masdar	402	~ 70 ²²	29
	Galloper	Innogy Renewables UK, Green Investment Bank, Siemens, Macquarie, Sumitomo Corporation	353	60 ²³	38
Under construction	East Anglia ONE	ScottishPower Renewables	714	86 ²⁴	36
Consented	East Anglia THREE	ScottishPower Renewables	1,200	68	29
Planning	Norfolk Vanguard	Vattenfall Wind Power Limited	1,800	175	70
	Norfolk Boreas	Vattenfall Wind Power Limited	1,800	175	70

²⁰ Department for Trade and Investment (2005). Scroby Sands - Supply Chain Analysis. Available online at: <http://webarchive.nationalarchives.gov.uk/+/http://www.berr.gov.uk/files/file20840.pdf>. Accessed on 05/06/2017.

²¹ RenewableUK (2016). Offshore Wind in the East of England. Available online at: https://c.yimcdn.com/sites/www.renewableuk.com/resource/resmgr/publications/East_Regional_Wind_Factsheet.pdf. Accessed on 07/02/2019.

²² Dudgeon Offshore Wind Farm. Frequently Asked Questions [Online] Accessed 07/02/2019. Available at: <http://dudgeonoffshorewind.co.uk/operations/FAQs>

²³ Galloper Wind Farm Limited. Front Page of Project Website [Online] Accessed 06/02/2019. Available at: <http://www.galloperwindfarm.com/>

²⁴ East Anglia ONE (2012). Environmental Statement for East Anglia ONE Chapter 28 – Socio Economics [Online] Accessed on 07/02/2019. Available at: <https://infrastructure.planninginspectorate.gov.uk/projects/eastern/east-anglia-one-offshore-windfarm/>

Stage	Wind farms	Owner and / or Operator	Capacity (MW)	O&M FTE	
				Direct	Indirect
	Hornsea Project Three	Ørsted	2,400	120	50
	East Anglia TWO and ONE North	ScottishPower Renewables	Up to 1,800	200	79
Total			11,226	1,144	692

Source: Renewable UK

Table 31.49 Magnitude of cumulative supply chain job creation during operation within the New Anglia LEP

	Direct	Indirect	Total
Known jobs in operational wind farms	406	171	577
Estimated jobs in planning	563	231	794
Scenario 2 total jobs in New Anglia	944	396	1,340
Scenario 1 total jobs in New Anglia	1,119	466	1,585
New Anglia Construction jobs	18,000	18,000	18,000
Scenario 2 % increase labour and magnitude	5.24% - High	2.20% - High	7.45% - High
Scenario 1 % increase labour and magnitude	6.23% - High	2.59% - High	8.81% - High

266. Under both scenarios the direct job creation has a beneficial impact of high magnitude, assuming that labour market sensitivity is medium, the direct impact significance is **major beneficial**. Under both scenarios the indirect job creation has a beneficial impact of high magnitude and therefore indirect potential job creation during operation also has a **major beneficial** impact significance.
267. These impacts should also be considered with regards to potential creation of additional employment. The permanent jobs over the life of the project will create a hub for offshore operations in the area, which could have an additional multiplier effect and would lead to a lower level of spill over. This has been included in Appendix 31.2 and is summarised in Table 31.50.

Table 31.50: Clustering opportunities in the New Anglia LEP

Element	Clustering opportunity
Subsea cables	Cable plants typically have limited capacity for storage and there is likely to be a demand for cable storage facilities. These may be owned and operated by manufacturers, marine contractors or potentially developers.
Foundation installation	There are a range of construction support services needed for an offshore wind farm. There is the potential for investment in East Anglia for companies offering: <ul style="list-style-type: none"> • Above water asset inspection
Cable installation	<ul style="list-style-type: none"> • Catering • Environmental surveys • Fuel bunkering
Turbine installation	<ul style="list-style-type: none"> • Marine and maintenance coordination • ROV operation • Training and medicals provision
Offshore substation installation	<ul style="list-style-type: none"> • Vessel maintenance • Waste services • Guard Vessels

Element	Clustering opportunity
Wind farm operations	<p>There are a range of operational services needed for an offshore wind farm. There is the potential for investment in East Anglia for companies offering:</p> <ul style="list-style-type: none"> • Catering • Environmental surveys • Fuel bunkering • Marine and maintenance coordination • Training and medicals provision
Turbine maintenance and service	<p>There are a range of operational services needed for an offshore wind farm. There is the potential for investment in East Anglia for companies offering:</p> <ul style="list-style-type: none"> • Above water asset inspection • Blade inspection and repair • Drone operation • Training and medicals provision • Turbine cleaning

268. As with the construction employment impact this provides a positive challenge for the New Anglia LEP and relevant industry bodies to ensure that this opportunity becomes a beneficial impact for people in Norfolk and Suffolk.
269. The longevity of the employment opportunity indicates that this should be able to be fulfilled by a combination of developing the existing labour market and young people who are coming in to the labour market. It is also assumed that as there is a continuous sequence of projects over approximately ten years the people involved in the construction phases of the various planned wind farms would have relatively long term employment prospects.
270. In addition, those working in the offshore construction sector may be suitably qualified to gain permanent employment in the operational phase. Especially as the oil and gas sector is declining which may be leaving many people with appropriate skills in need of employment, as described by *Norfolk Limited* (section 31.6.2.1).
271. As described in section 31.7.2, Norfolk Boreas Limited is aiming to ensure this benefit remains in the New Anglia LEP region by developing a Skills Strategy and Supply Chain Strategy that enables people to gain employment in the Offshore Wind Industry. In addition, skilled workers are required in the offshore wind sector and are relatively well paid thus they create significant induced employment. This would help to improve the productivity gap outlined in Appendix 31.3. In the event this is achieved it is likely that the cumulative effect of the operation of a thriving offshore wind sector could have a long term major beneficial effect for New Anglia LEP.

31.8.3 Cumulative Impacts on Community Infrastructure

272. It is anticipated that the most likely cumulative effect would be with Hornsea Project Three. Norfolk Boreas are working with Ørsted to fully understand the implications of this interaction.

273. The socio-economic chapter of the Hornsea Project Three ES has been reviewed. This does not include an assessment of impacts to community infrastructure but does include an assessment of impacts to tourism assets. The source of both impacts are the same physical disturbances considered in section 31.6.4 therefore this will be used to understand cumulative impacts.
274. Paragraph 10.11.1.124 of Chapter 10 – Socio-economics of Hornsea Project Three ES states that: “In light of the limited magnitude of effects on recreational resources, visual and noise receptors, and limited disruptions to traffic and transport, the overall effect is expected to be of minor adverse significance, which is not significant in EIA terms.”
275. Base on the available public information it is expected that cumulative impacts to community infrastructure would be **minor adverse** impact significance and managed through best available construction practices.

31.8.4 Cumulative Impacts during Decommissioning

276. Decommissioning of the projects in Table 31.48 may potentially take place at a similar time. The detail and scope of the decommissioning works for Norfolk Boreas will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning plan will be provided. As such, cumulative impacts during the decommissioning stage are assumed to be no worse than those identified during the construction stage.

31.9 Inter-relationships

277. Table 31.51 lists the inter-relationships between this chapter and other chapters within the ES.

Table 31.51 Socio-economics inter-relationships

Topic and description	Related Chapter	Rationale
Topics that are determinants of social impacts		
Traffic and Transport	24	Potential impacts on traffic and transport have the potential to impact on community infrastructure as a result of the project.
Noise and Vibration	25	Potential impacts related to noise and vibration has the potential to impact on community infrastructure.
Air Quality	26	Potential impacts on air quality have the potential to impact on community infrastructure.
Topics that are part of the wider economy		
Commercial Fisheries	14	Impacts on fishery areas and activities at a regional level may have an impact on local socio-economics. Potential impacts to commercial fisheries are assessed in Chapter 14.

Topic and description	Related Chapter	Rationale
Land Use and Agriculture	21	Agriculture is a sector within the wider economy. Impacts to how land is used can affect agricultural productivity. Potential impacts are assessed in Chapter 21. However, the value of land used during construction and operation has been agreed individually with relevant land owners.
Human Health	27	Employment is a determinant of public health and is included as such in Chapter 27.
Tourism and Recreation	30	Tourism is a sub-sector of the wider economy. In-migrant workers have the potential to take bed spaces available to recreational visitors and this is assessed in chapter 30. The effect of physical disturbance to tourism and recreational assets as an indicator of impact to the tourism economy is also included in Chapter 30.

31.10 Interactions

278. The impacts identified and assessed in this chapter have the potential to interact with each other, which could give rise to synergistic impacts as a result of that interaction. The worst case impacts assessed within the chapter take these interactions into account and for the impact assessments are considered conservative and robust. For clarity the areas of interaction between impacts are presented in Table 31.52, along with an indication as to whether the interaction may give rise to synergistic impacts.
279. There is a potential for an influx of workers which may increase pressure on community infrastructure or local services. For example, more people may lead to increased pressure on local hospitals. Due to the local demographic weighting above 60 years old and the fact that incoming workers would be of working age, there may also be an effect due to the interaction between these populations. However, when compared against the size of the local population, the level of workers expected in relation to the construction and operation of the project is not expected to have a significant effect on local services or demographic changes.
280. There is a stronger potential for the development of the project in combination with the wider development of the offshore wind sector in the New Anglia LEP to lead to a gradual increase in population and in the socio-economic status of people due to (among other aspects) increased employment. This would have a positive effect on local tax revenues and increase the available funds to provide public services and infrastructure.

Table 31.52 Interactions between impacts

Potential interaction between impacts		
Construction	1 Direct and indirect job creation	2 Effects on community infrastructure
1 Direct and indirect job creation	-	Yes
2 Effects on community infrastructure	Yes	-
Potential interaction between impacts		
Operation	1 Onshore direct and supply chain job creation	2 Effects on community infrastructure
1 Onshore direct and supply chain job creation	-	Yes
2 Effects on community infrastructure	Yes	-
Decommissioning		
It is anticipated that the decommissioning impacts will be no worse than those of construction.		

31.11 Summary

281. A summary of the impact assessment for socio-economics is presented in Table 31.53 and Table 31.54. In accordance with the methodology for assessment presented in section 31.4 this table should only be used in conjunction with the additional narrative explanations provided in section 31.7.
282. Assessment shows that under Scenario 2 the project may directly create 481 full time equivalent jobs during construction. The majority of this is due to the offshore construction that can be procured from the New Anglia LEP. Under Scenario 1 the direct employment reduces slightly to 425FTE jobs. These would create a **major beneficial** impact for the region as it is assessed that the relevant stakeholders are preparing to develop skills to supply them.
283. An additional 273FTE or 224FTE jobs may be created due to indirect and induced employment under Scenario 2 and Scenario 1 respectively. This would create a beneficial impact of a smaller magnitude because it is assessed that a larger labour market would be involved in supplying the demand, resulting in a **minor beneficial** impact for the region.
284. During the operation and maintenance stage it is assessed that under both scenarios the project may directly create a total of 175FTE jobs, these would create a **moderate beneficial** impact for the region. An additional 70FTE jobs may be created due to indirect and induced employment, these would create a **minor beneficial** impact for the region. These jobs would be permanent and available for the 30 year operational lifetime of the project.
285. Cumulatively, construction employment in the offshore wind sector is assessed to create a **major beneficial** impact due to a continuous pipeline of projects over the next 10 years.

286. The assessment on community infrastructure due to physical disturbance from construction has reviewed Chapter 24 Traffic and Transport, Chapter 25 Noise and Vibration, Chapter 27 Human Health, and Chapter 29 Landscape and Visual Impact Assessment. This review has found that the proposed embedded mitigation would reduce the significance of these impacts to **negligible** or **minor adverse**. For both scenarios the overall impact on community infrastructure is assessed to have **minor adverse** significance.
287. During operation the effect on community infrastructure will be limited to the onshore project substation and unscheduled maintenance along the cable route which would have a **negligible** impact.
288. The location of communities and the infrastructure that provides services to communities has been reviewed. It was found that there would be no direct impact to community infrastructure. Indirect impacts would be insignificant and managed through the proposed mitigation measures.
289. When considered cumulatively with other projects in the region, it is assessed that due to project sequencing there may be temporary **minor adverse** impacts felt by certain local communities in comparison to **major beneficial** employment impacts across the New Anglia LEP region.

Table 31.53 Potential beneficial impacts identified for socio-economics²⁵

Potential Impact	Receptor	Value / sensitivity	Magnitude	Impact Significance	Additional Enhancement	Likely Long Term Effect	Magnitude	Significance	Additional Enhancement	Likely Long Term Effect
			Scenario 1				Scenario 2			
Construction										
1a. Direct job creation	Regional labour market	Medium	High	Major beneficial	Enable local supply-chain	Application of enhancement likely to result in a long term major beneficial effect due to total employment	High	Major beneficial	Enable local supply-chain	Application of enhancement likely to result in a long term major beneficial effect due to total employment
1b. Indirect job creation	Regional labour market	Medium	Low	Minor beneficial	Enable local supply-chain		Low	Minor beneficial	Enable local supply-chain	
Operation										
1a. Direct and Supply chain employment	Regional labour market	Medium	Medium	Moderate beneficial	Local supply chain plan and investment in local human resources	Application of enhancement likely to result in a long term major beneficial effect due to total employment over a 30-year period	Medium	Moderate beneficial	Local supply chain plan and investment in local human resources	Application of enhancement likely to result in a long term major beneficial effect due to total employment over a 30-year period
1b. Indirect and supply supply chain job creation	Regional labour market	Medium	Low	Minor beneficial	Local supply chain plan and investment in local human resources		Low	Minor beneficial	Local supply chain plan and investment in local human resources	

²⁵ Note that enhancements determine whether labour market can be developed to ensure that employment impacts would be beneficial

Potential Impact	Receptor	Value / sensitivity	Magnitude	Impact Significance	Additional Enhancement	Likely Long Term Effect	Magnitude	Significance	Additional Enhancement	Likely Long Term Effect	
			Scenario 1				Scenario 2				
Decommissioning – expected to be similar to construction or lower											
Onshore Direct Employment and Supply Chain Job Creation	Regional labour market	Low	Low	Minor beneficial	Enable local supply-chain	Negligible	Low	Minor beneficial	Enable local supply-chain	Negligible	
Cumulative											
Job creation during construction	Regional labour market	Medium	High	Major beneficial	Engagement with sector bodies	Application of enhancement likely to result in a long term major beneficial effect.	High	Major beneficial	Engagement with sector bodies	Application of enhancement likely to result in a long term major beneficial effect.	
Supply chain job creation during operation	Regional labour market	Medium	High	Major beneficial	Engagement with sector bodies	Application of enhancement likely to result in a long term major beneficial effect.	High	Major beneficial	Engagement with sector bodies	Application of enhancement likely to result in a long term major beneficial effect.	

Table 31.54 Potential adverse impacts identified for socio-economics

Potential Impact	Receptor	Value / sensitivity	Magnitude	Significance	Mitigation	Residual impact	Magnitude	Significance	Mitigation	Residual impact
			Scenario 1				Scenario 2			
Construction										
Effects on community infrastructure	Community infrastructure assets	Low	Low	Minor adverse	Noise and visual management described in other chapters	Minor adverse	Low	Minor adverse	Noise and visual management described in other chapters	Minor adverse
Operation										
Effects on community infrastructure	Community infrastructure assets	Low	Negligible	Negligible	Visual impacts outline in Chapter 29 Landscape and Visual Impact Assessment	Negligible	Negligible	Negligible	Visual impacts outline in Chapter 29 Landscape and Visual Impact Assessment	Negligible
Decommissioning – expected to be similar to construction or lower										
Effects on community infrastructure	Community infrastructure assets	Low	Low	Minor adverse	Noise and visual management described in other chapters	Minor adverse	Low	Minor adverse	Noise and visual management described in other chapters	Minor adverse

Potential Impact	Receptor	Value / sensitivity	Magnitude	Significance	Mitigation	Residual impact	Magnitude	Significance	Mitigation	Residual impact
			Scenario 1				Scenario 2			
Cumulative										
Community infrastructure	Community infrastructure assets	Low	Low	Minor adverse	Noise and visual management described in other chapters	Minor adverse	Low	Minor adverse	Noise and visual management described in other chapters	Minor adverse

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