

Norfolk Vanguard Offshore Wind Farm

Consultation Report

Appendix 20.10 Formal Consultation

Public Exhibition Boards

Applicant: Norfolk Vanguard Limited
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Photo: Kentish Flats Offshore Wind Farm



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WELCOME

Thank you for coming today to find out more about the **Norfolk Vanguard Offshore Wind Farm Project** proposal and to share your views.

Under the Planning Act 2008, Nationally Significant Infrastructure Projects (NSIP) – major developments in England and Wales such as large transport or energy generation projects – need to seek a Development Consent Order (DCO) in order to be built and operate.

We are seeking a DCO which would permit the development of the Norfolk Vanguard Offshore Wind Farm.

With an installed capacity of up to 1800 megawatts, the project could power 1.3 Million homes.¹

Norfolk Vanguard is an Environmental Impact Assessment (EIA) development and so we will prepare an Environmental Statement to accompany the application to the Planning Inspectorate. We have undertaken extensive surveys, reviews and informal consultation with the local community, landowners, key stakeholders and statutory consultees up to this point.

Now, prior to submission of an application to the Planning Inspectorate (PINS), we are consulting the local community and stakeholders again – in a Statutory Consultation process to help us refine our final proposals further. Your views are important.

The purpose of the exhibition and accompanying Consultation Summary Document is to help inform your input and response to the Norfolk Vanguard proposals. What's here to see:

- Information about Vattenfall
- An overview of the consultation process and the DCO process
- A description of the Norfolk Vanguard project, offshore and onshore, and an outline of Preliminary Environmental Information, in particular in relation to onshore infrastructure and possible mitigation of potential impacts
- An explanation of how to respond to the consultation and make your views known



Between October 2016 and August 2017, we have held twenty exhibitions and workshops and talked directly to more than 1,850 local people

Please provide your feedback in writing so it can be noted, reported on and considered as we refine our proposals, then finalise and submit our DCO application in 2018.

How can I have my say?

- ✓ We want to understand the issues that are important to you, in your own words – please use the questionnaire
- ✓ The display and questionnaire will also be available on our website
- ✓ Please also encourage others to participate

Want more information?

- ✓ Please talk to a team member
- ✓ Other supporting information, including the PEIR, is also available



¹ Number of homes equivalent: This is calculated using statistics from the Department for Business, Energy and Industrial Strategy showing that annual UK average domestic household consumption is 4,115kWh: renewableuk.com/page/UKWEExplained

ABOUT VATTENFALL

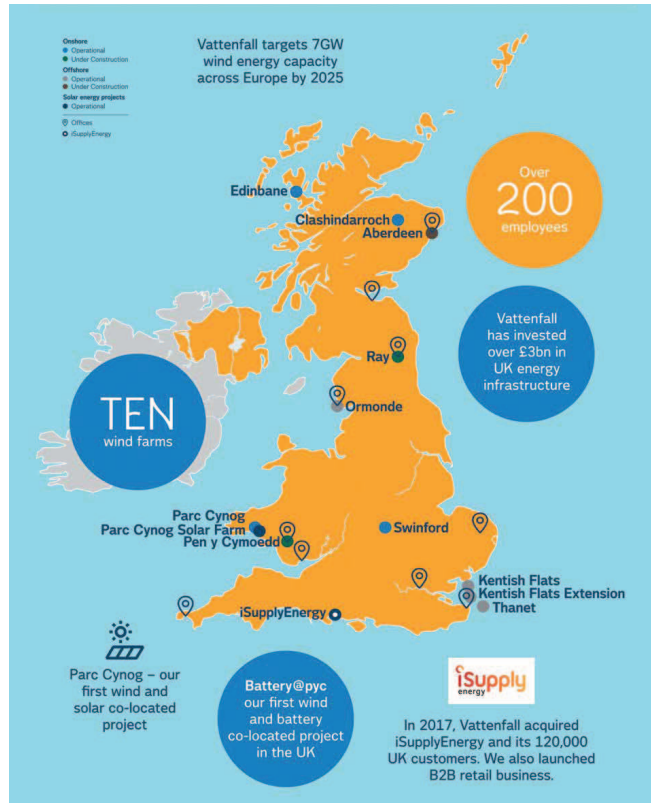
Vattenfall's key drivers in the UK are providing cost effective energy security, reducing greenhouse gas emissions, and maximising economic opportunities through investment in the UK.

Vattenfall is 100% owned by the Swedish state and is one of Europe's largest energy providers, operating in Sweden, Denmark, Finland, Germany, the Netherlands, Poland, and the United Kingdom, with more than 20,000 employees.

The world is in urgent need of finding alternative, cleaner ways of powering and heating homes, industries and cities, and our purpose is to power 'Climate Smarter Living'. To achieve this Vattenfall plans to invest €5bn in renewables, mainly offshore wind, in Northern Europe by 2020 with an overall ambition to have 4GW of operational capacity by 2020 and 7GW by 2025. Our goal is climate neutrality by 2050, and by 2030 in the Nordic countries.

Vattenfall operates electricity distribution networks in Sweden and Germany and is developing smart grid solutions to ensure security of supply. We are one of Europe's largest producers and distributors of district heating. Vattenfall offers energy services, such as charging solutions for electric vehicles, solar panels, heat pumps and smart control of energy consumption.

To achieve our goals, we are innovating, particularly in key areas such as offshore wind, district heating, decentralised generation and distribution and electrification.



DELIVERING MORE THAN JUST RENEWABLE ENERGY

Every development and operating wind farm is unique, and at each, we strive to ensure our operations are sustainable developments, delivering local, regional, as well as global benefits. Here is an example of what we mean:

Pen y Cymoedd Onshore Wind Farm – 228MW installed capacity

- ✓ £3 million Habitat Management Plan –upland restoration – from peat bogs, to heathland, grassland, and native woodland (the largest peatland restoration project in South Wales)
- ✓ Construction partnership Jones Bros & Balfour Beatty Gold Award winners of the 2016 Considerate Constructors Awards:
 - “Significant engagement with the local community throughout the project has been continually surpassed”
 - “Site inductions, supplemented by toolbox talks, reinforce an awareness of specific environmental issues among the workforce”

Major boost to Wales' economy

- ✓ Power to 188,000 homes – equivalent to 15% of households in Wales
- ✓ Carbon footprint pay-back by 2020
- ✓ Innovation – Renewable energy park with an Enhanced Frequency Response Battery helping to regulate fluctuations in our national power network.

Vattenfall's wind farms in numbers



United Kingdom 396MW
Denmark 246MW
The Netherlands 281MW
Sweden 257MW
Germany 19MW



United Kingdom 590MW
Denmark 158MW
The Netherlands 108MW
Sweden 121MW
Germany 636MW

WHY DOES THE UK NEED OFFSHORE WIND FARMS?

Offshore wind, as a source of renewable energy, offers the UK a wide range of benefits including:

- ✓ energy security
- ✓ decarbonisation of our energy supply
- ✓ economic growth

Providing a secure supply of energy to UK domestic, industrial and commercial consumers

Many of the UK's older fossil fuelled and nuclear plants have either reached the end of their operational life span, are no longer economical to run, and/or do not meet legal air quality limits. The UK Energy Security Strategy estimated that around a fifth of the energy capacity available in 2011 will close by 2020 (DECC, 2012). This means that over the next decade, the UK may face a significant shortfall in supply or will have to rely on global markets for imported energy. The second option leaves the UK vulnerable to spikes in world energy market prices, political pressure and potentially, to physical supply disruptions.

At the same time, as heating, transport and industry in the UK become increasingly "electrified", the demand for electricity is set to rise.

To avoid an energy gap the UK needs to act quickly to replace older power stations with cleaner, more effective solutions that have a track record of being built on time and on budget, such as offshore wind.

Decarbonising electricity supply

In the Overarching National Policy Statement for Energy (Department of Energy and Climate Change (DECC), 2011), predictions are made that a continuation of global emission trends, including emissions of greenhouse gases such as carbon dioxide, could lead average global temperatures to rise by up to 6°C by the end of this century. The effects of such global temperature rises include:

- Increased frequency of extreme weather events such as floods and drought;
- Reduced food supplies;
- Impacts on human health;
- Increased poverty; and
- Ecosystem impacts, including species extinction

To avoid these effects, UK government has set legally binding emissions reductions targets.



Rt Hon Greg Clark MP, Secretary of State for Business, Energy and Industrial Strategy

“The low carbon economy could grow 11 per cent per year between 2015 and 2030, four times faster than the projected growth of the economy as a whole.”

Source: <https://www.gov.uk/government/news/government-reaffirms-commitment-to-lead-the-world-in-cost-effective-clean-growth>

As one of the biggest offshore wind projects in the world, Norfolk Vanguard will:



of the UK offshore wind cumulative deployment target for 2030

(as recommended by the Committee on Climate Change in the 5th Carbon Budget)



Prevent more than 2,000,000 tCO₂ from entering the atmosphere



of the East of England's electricity demand (domestic, commercial and industrial), or 2% of the UK's annual equivalent electricity demand

(Department for Business, Energy and Industrial Strategy, 2016)

Maximising the economic potential of offshore wind

The UK has the greatest potential for offshore wind out of all assessed EU member states in the Atlantic, North Sea and Baltic Sea areas (Wind Europe, 2017). A key commitment within the UK's Industrial Strategy (developed by the Department for Business, Energy & Industrial Strategy) is to "lead the world in delivering clean energy technology" and to support innovation in this area.



supported and a 0.6% increase in Gross Domestic Product (GDP) delivered by 2030

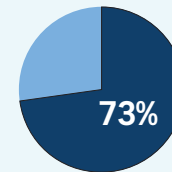
(Centre for Economics and Business Research, 2012)



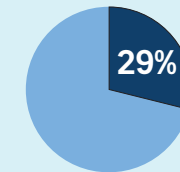
The UK supply chain for offshore wind is strong, and can get stronger.

In 2015 48% of the total expenditure associated with UK offshore wind farms (OWF) was spent in the UK, and new projects are required to achieve over 50% UK content in 2015.

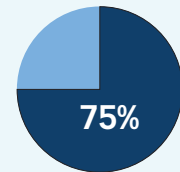
UK content in different parts of OWF lifetimes (RenewableUK, 2017).



Development



Manufacturing & construction



Operation

The offshore wind industry presents an opportunity to utilise and further develop the UK's maritime engineering skills as other industries decline (such as shipbuilding and North Sea oil) in order to secure supply chain and other employment opportunities in the UK, including during the manufacturing and construction of OWF.

Isn't offshore wind expensive?

Costs have been falling rapidly. The industry reached a landmark target of bringing the Levelised Cost of Energy (LCOE) below £100 /MWh in 2015/16 – 4 years ahead of target. On the 11th September 2017 the results of the latest Contract for Difference (CFD) auctions showed a dramatic fall in the average cost of offshore wind of almost 50% (from £105 to £57.50/MWh) in 2 years. Now, offshore wind is one of the most attractive and cost effective methods of generating large quantities of low carbon energy.

A NATIONALLY SIGNIFICANT INFRASTRUCTURE PROJECT (NSIP)

Due to the size of the proposed offshore wind farm, the Project is classed as a Nationally Significant Infrastructure Project (NSIP), and we are required to seek a Development Consent Order (DCO) from the Secretary of State for Business, Energy and Industry Strategy (BEIS). Consequently, an Environmental Impact Assessment (EIA) is required as part of a Development Consent Order (DCO) application.

This process requires us to make an application for development consent to the Planning Inspectorate, which will review and consider our proposals before making a recommendation to the Secretary of State who will make the final decision. The process is summarised below:

Pre-application Consultation

The Planning Inspectorate will need to be satisfied that we have carried out effective pre-application consultation with statutory consultees and local communities in accordance with the Planning Act 2008 (The Act). We are required to prepare a statement setting out how we propose to consult people living in the vicinity about the application for the Project. Consultation must then be carried out in accordance with that document, which is known as the Statement of Community Consultation (SoCC). The SoCC was published on 16th October 2017 and can be viewed on the project website www.vattenfall.co.uk/norfolkguard.

Feedback will be reported in our Consultation Report, which will be submitted as part of the DCO application.

Acceptance of our Application and Examination

Provided that the Planning Inspectorate (PINS) is content such pre-application consultation has been carried out adequately, and other specific criteria have been met, the DCO application will be accepted. There will then be an Examination of the DCO application with PINS acting as 'Examining Authority'. The Examining Authority review the application that has been made, ask written questions and can hold hearings during the Examination process.

Following acceptance, you can register as an Interested Party. This means that PINS will keep you informed of the process and when there are opportunities to put your case forward.

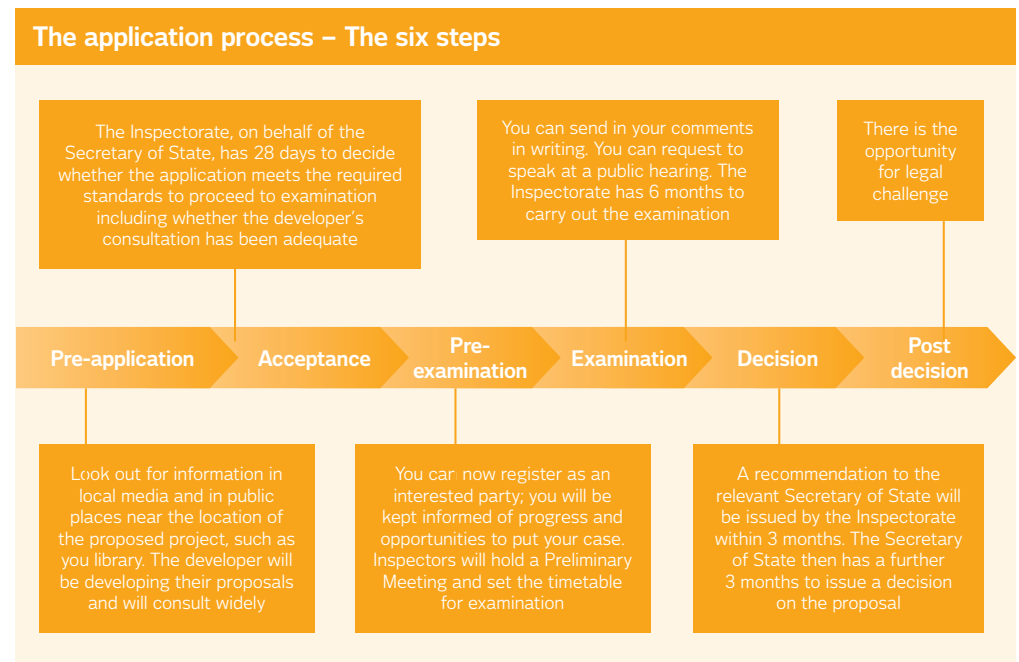
Recommendation to the Secretary of State

The Planning Inspectorate will then make a recommendation, in the form of a Report, to the Secretary of State for BEIS who will make the decision on whether or not to grant a DCO for the Project.

Throughout this process, both prior to submission to the Planning Inspectorate and during the Examination period, interested parties (including members of the local community) will be entitled to participate both in the formulation of the DCO application and its consideration by the Examining Authority.

We are committed to ongoing engagement with the local communities within which we seek to operate, so we are keen to receive continued feedback and queries throughout the process.

Further information about the NSIP process and the requirements for a DCO application can be found on the Planning Inspectorate website: infrastructure.planninginspectorate.gov.uk/application-process/

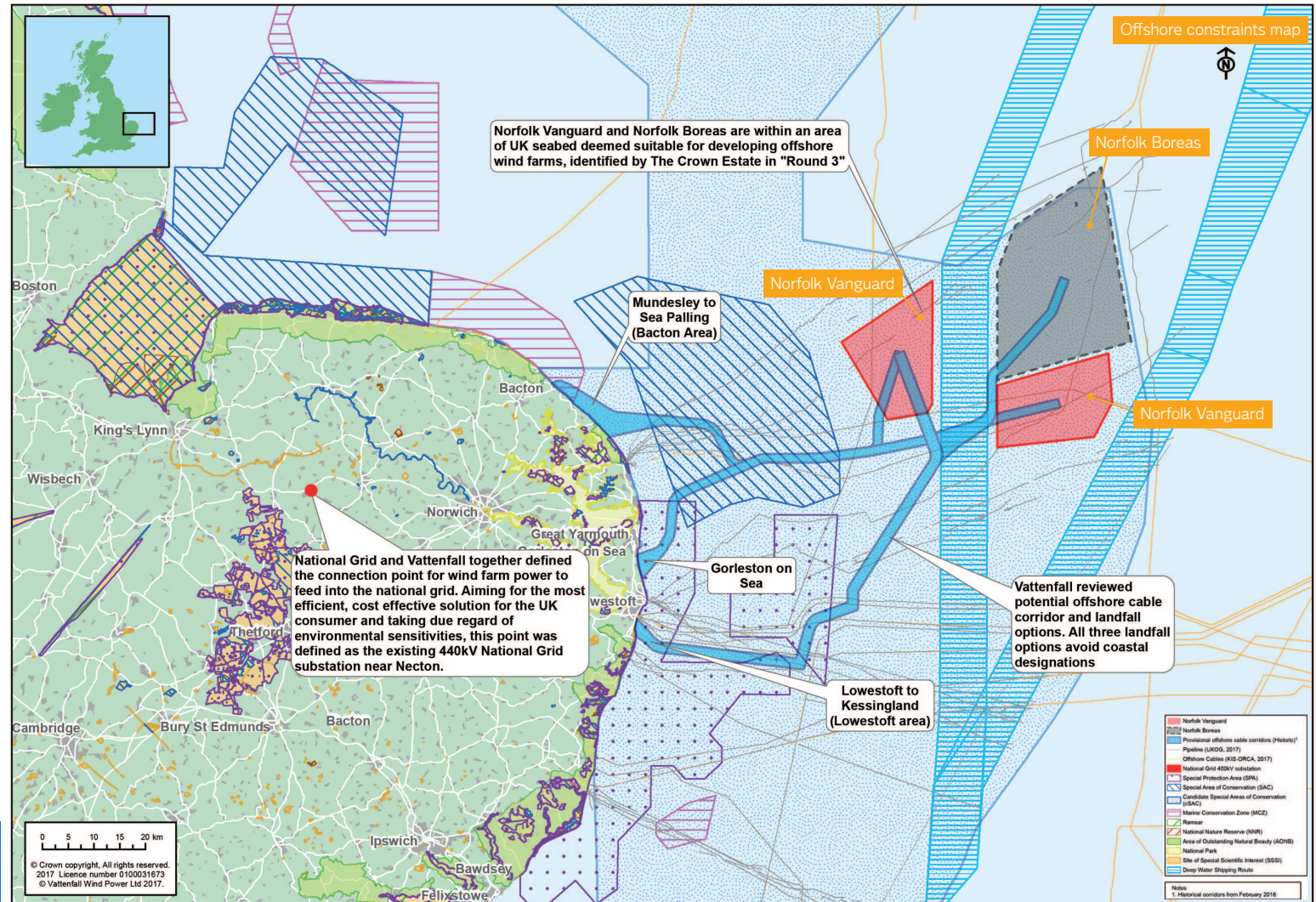
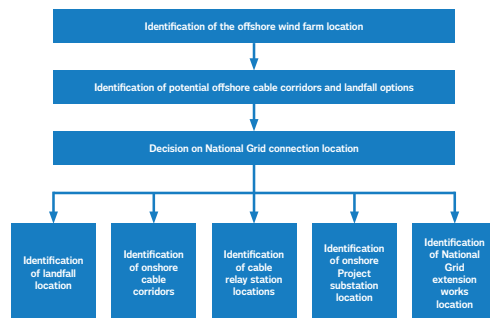


EARLY PROJECT DEFINITION, SITE SELECTION & REFINEMENT

When designing a new offshore wind farm, fundamental and early decisions are made at a nationally strategic level and form the basis of what then continues as a more iterative refinement process.

During site selection and project refinement, the following commitments guide our decision making:

- To rule out use of overhead lines to connect into the National Grid, in order to minimise visual impacts;
- To utilize the shortest route for cables in order to minimise impacts, cost and transmission losses;
- Avoidance of key sensitive features where possible
- To accommodate the range of technology options sought within the design envelope (e.g. different sized turbines, different turbine foundations, different transmission technology, including retaining options for both HVAC technology and HVDC technology to be deployed).



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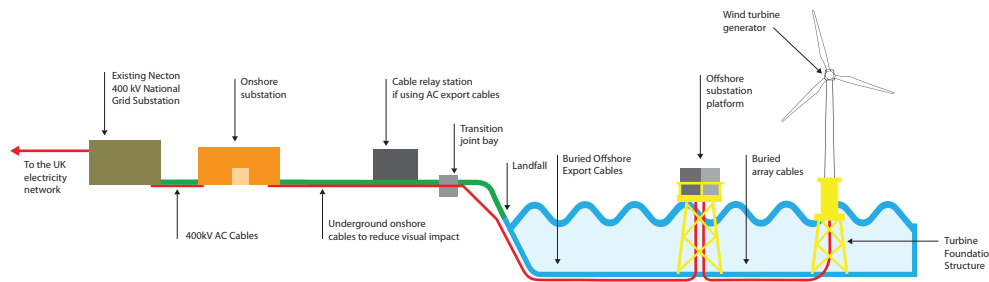
THE NORFOLK VANGUARD PROJECT PROPOSAL

The proposed DCO would authorise **offshore components** including:

1. Between 90-257 wind turbine generators ("WTGs")	Each WTG would have a capacity of between 7-20MW, a maximum turbine hub height of 198.5m, a maximum rotor diameter of 303m and a maximum tip height of 350m
2. Offshore Substation Platforms ("OSPs")	Up to three OSPs, which may employ either high voltage alternating current ("HVAC") or high voltage direct current ("HVDC") technology
3. Offshore Accommodation Platforms ("OAPs") or Offshore Accommodation Vessels ("OAV")	These will provide areas for accommodating construction and operational workers at the wind farm
4. Foundations for the WTGs and OSPs	There are a number of potential foundation types that could be used and the Project may require more than one type
5. Up to 514km array 66kV cables	To link WTGs to the OSPs within the array
6. Up to 640km offshore export cables from the OSPs to the shore	To transmit electricity from the array to the shore
7. Scour protection, as required for foundations and cables	To protect the offshore infrastructure from seabed erosion
8. Up to two meteorological masts, a number of guard buoys and monitoring equipment.	As required to monitor and demarcate the offshore site

The key **onshore components** would comprise the following:

1. Landfall site	To bring ashore the offshore cables and connect to the onshore cables requiring up to six transition pits
2. If HVAC	Up to 18 no. onshore underground cables within separate ducts in six separate trenches (i.e. three cables per trench) and up to six fibre optic cables (i.e. 1 per trench)
3. If HVDC	Up to four onshore cables each in separate ducts in two trenches (i.e. two cables per trench) and up to two fibre optic cables (i.e. 1 per trench)
4. Onshore cable corridor	Within which onshore export cables, including for the Norfolk Boreas Offshore Wind Farm Project, would be laid within cable ducts
5. Link boxes and jointing pits	At intervals along the cable route
6. Trenchless crossings	For example horizontal directional drilling, cable bridges or other trenchless methods at some roads, railways and sensitive habitats
7. Cable relay station (CRS)	Only required under the HVAC electrical solution
8. Onshore Project substation	In proximity to the grid connection location at the existing Necton 400kV National Grid Substation
9. Modification of the existing overhead line network	In the vicinity of the Necton 400kV National Grid substation
10. Extension to Necton 400kV National Grid Substation	To accommodate the new project
11. Up to 12 no. 400kV underground interface cables	Between the new onshore substation and the existing 400kV National Grid Substation near Necton
12. Temporary construction areas and access roads	Throughout construction period
13. Planting to provide screening for permanent infrastructure	As part of the mitigation works



Norfolk Boreas

Norfolk Boreas is Norfolk Vanguard's sister project. We are applying to install some shared infrastructure (such as cable ducts) for Norfolk Boreas within the Norfolk Vanguard DCO application in order to minimise environmental impacts.

Norfolk Boreas will be submitting its DCO application in Q2 2019. Find out more at www.vattenfall.co.uk/norfolkboreas.



THE PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

The PEIR considers all the onshore and offshore elements of the project. It comprises three volumes

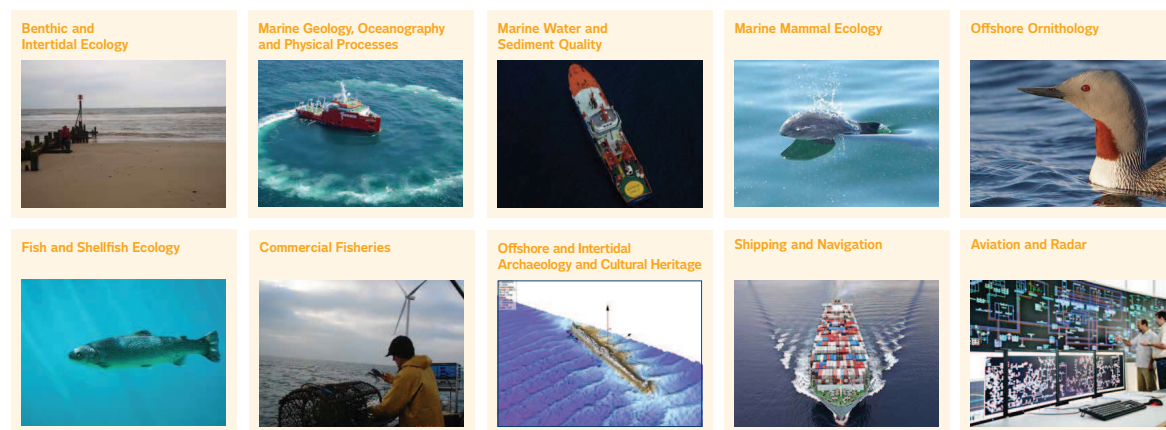
Volume 1: Preliminary Environmental Information Report chapters

Volume 2: Figures; and

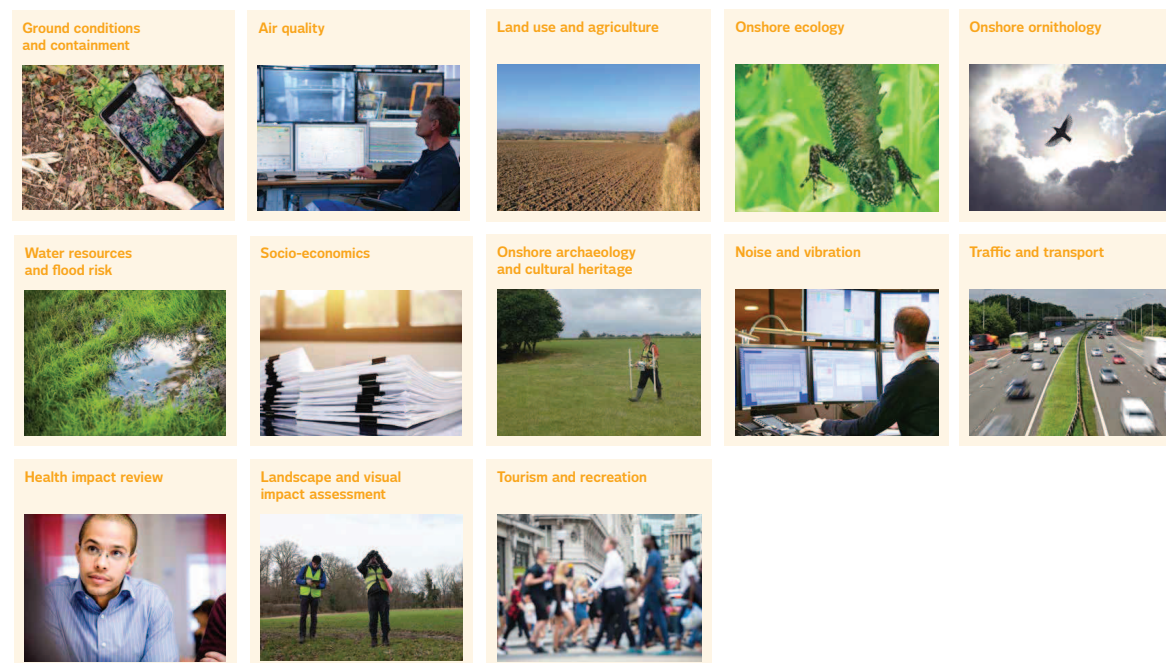
Volume 3: Appendices.

Introductory	<ul style="list-style-type: none"> Chapter 1 Introduction Chapter 2 Need for the Project Chapter 3 Policy and Legislative Context Chapter 4 Site Selection and Assessment of Alternatives Chapter 5 Project Description Chapter 6 EIA Methodology Chapter 7 Technical Consultation
Offshore	<ul style="list-style-type: none"> Chapter 8 Marine Geology, Oceanography and Physical Processes Chapter 9 Marine Water and Sediment Quality Chapter 10 Benthic and Intertidal Ecology Chapter 11 Fish and Shellfish Ecology Chapter 12 Marine Mammals Chapter 13 Offshore Ornithology Chapter 14 Commercial Fisheries Chapter 15 Shipping and Navigation Chapter 16 Aviation and Radar Chapter 17 Offshore and Intertidal Archaeology and Cultural Heritage Chapter 18 Infrastructure and Other Users
Onshore	<ul style="list-style-type: none"> Chapter 19 Ground Conditions and Contamination Chapter 20 Water Resource and Flood Risk Chapter 21 Land Use and Agriculture Chapter 22 Onshore Ecology Chapter 23 Onshore Ornithology Chapter 24 Traffic and Transport Chapter 25 Noise and Vibration Chapter 26 Air Quality Chapter 27 Health Impact Assessment Chapter 28 Onshore Archaeology and Cultural Heritage
Scheme Wide Aspects	<ul style="list-style-type: none"> Chapter 29 Landscape and Visual Impact Assessment Chapter 30 Tourism and Recreation Chapter 31 Socio-economics

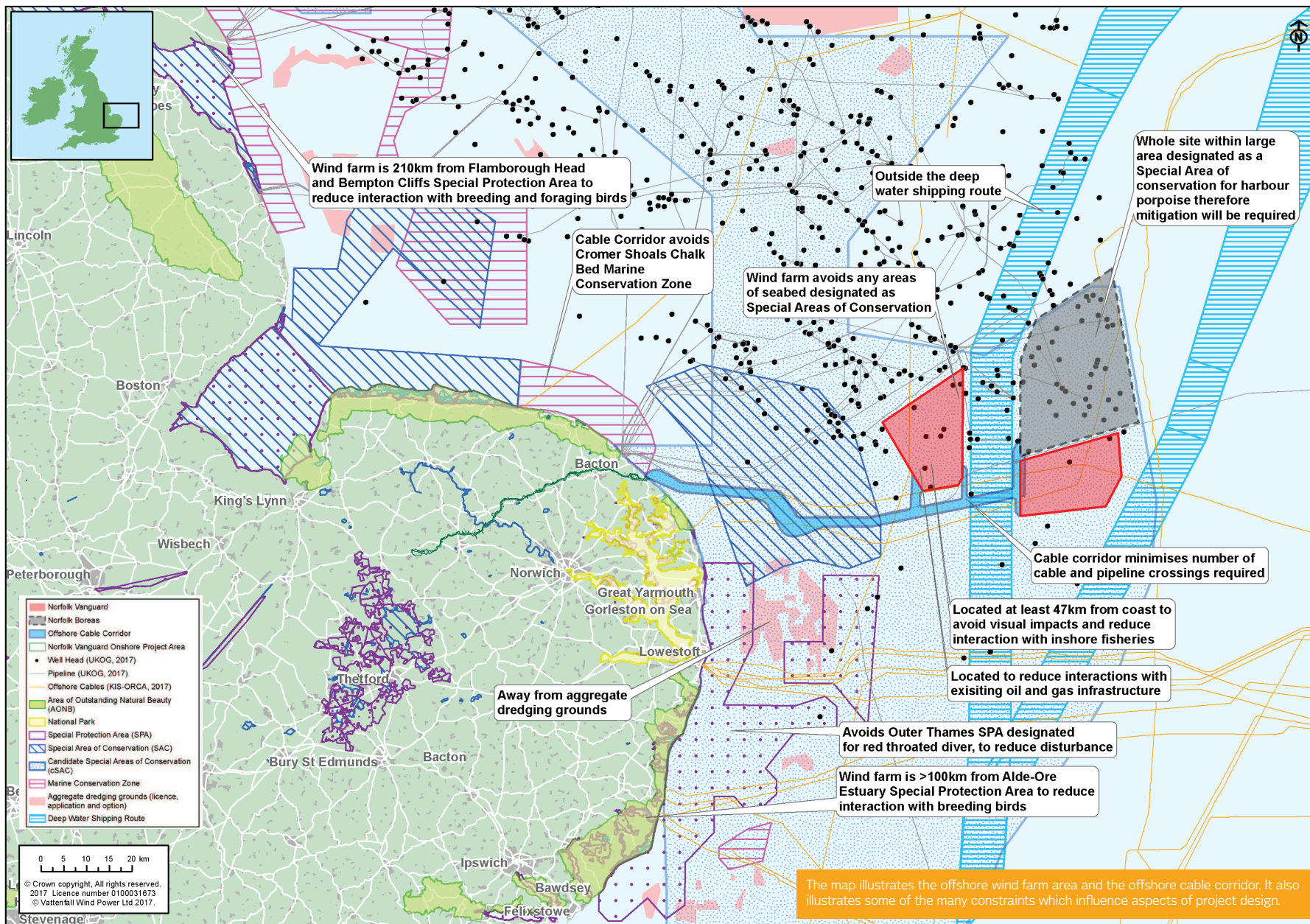
OFFSHORE ELEMENTS OF THE PROPOSAL



ONSHORE ELEMENTS OF THE PROPOSAL

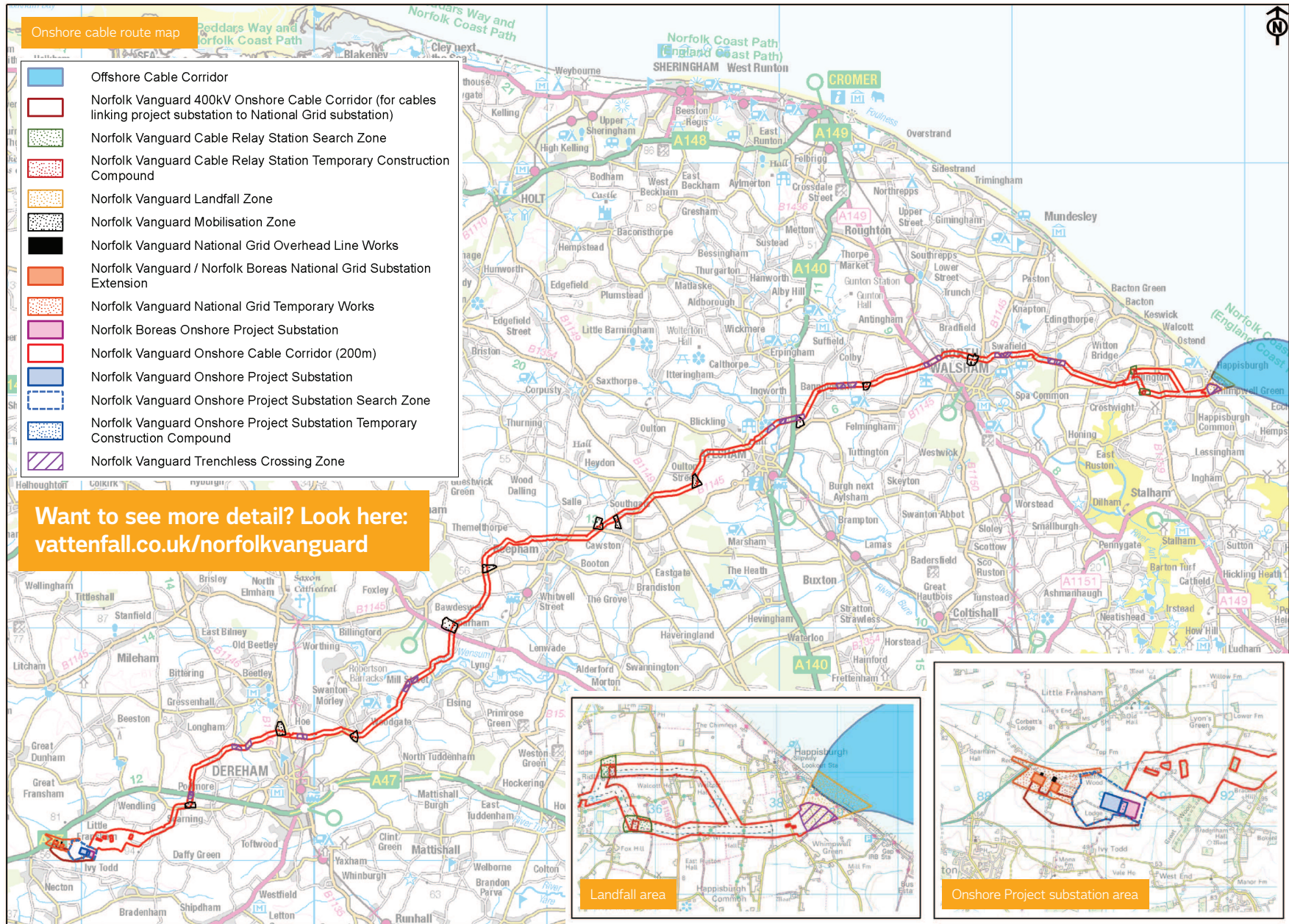


OFFSHORE ELEMENTS OF THE PROPOSAL



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ONSHORE ELEMENTS OF THE PROPOSAL



LANDFALL

Landfall at Happisburgh South has the following principal advantages, it:

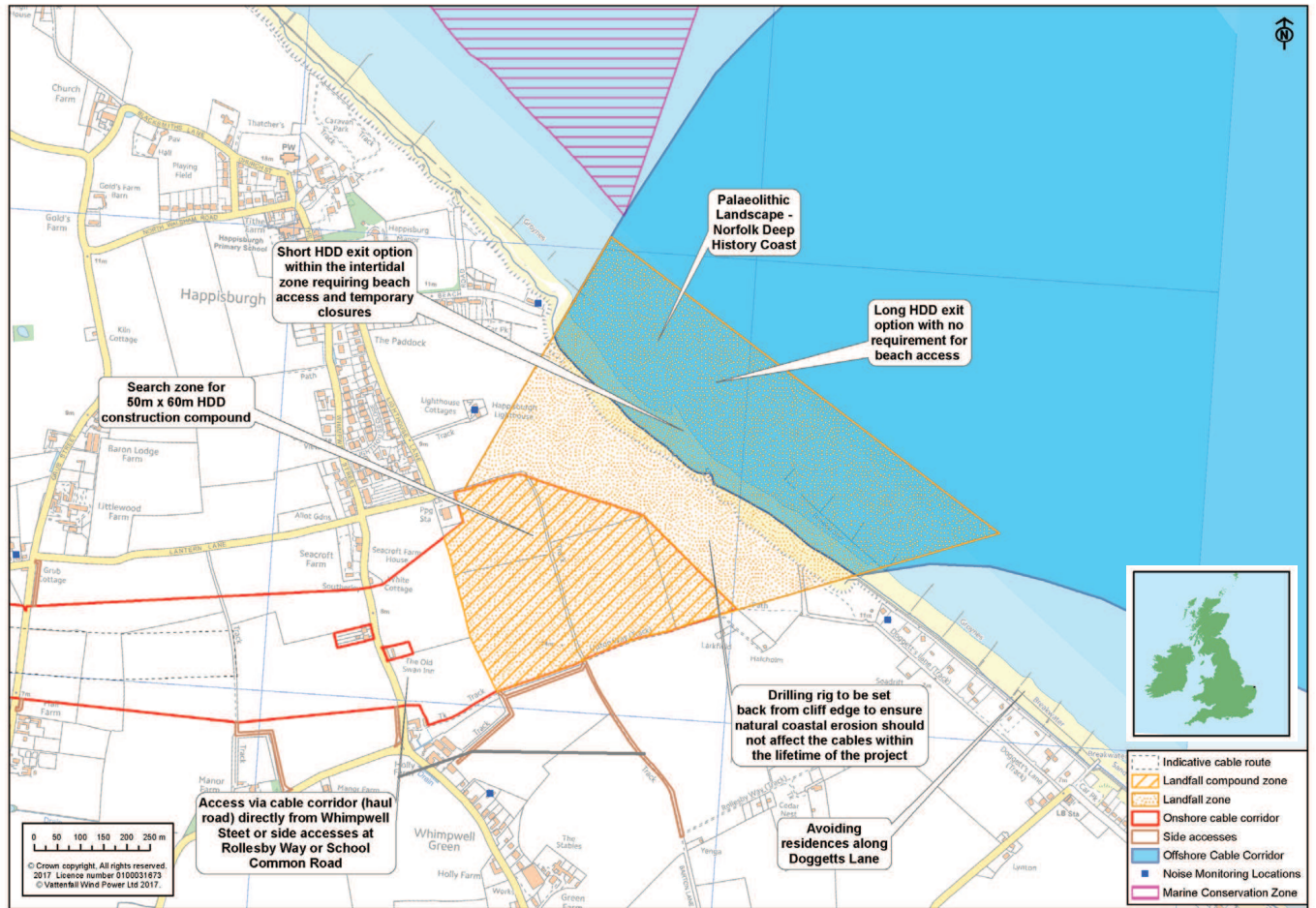
- Avoids offshore cables traversing the Marine Conservation Zone
- Accommodates the co-location of Norfolk Vanguard & Norfolk Boreas transmission cables (thereby limiting environmental impacts)
- Supports appropriate options for siting of CRS (if required), with good access and natural screening and topographic characteristics that we can work with to help minimise visual and noise impacts

The Landfall search zone has been refined to a subarea of the previously identified Happisburgh South landfall option which excludes any direct impacts on properties along Doggetts Lane. The search zone remains a relatively large area of approximately 450m x 300m, however the drilling compound will be micro-sited over the coming months to within an area of 50m x 60m.

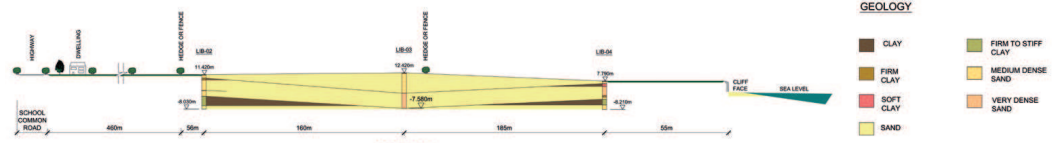
We will utilise Horizontal Directional Drilling (HDD) at landfall, drilling from ground level at the drilling compound within the onshore landfall search zone out to an offshore location. This method allows the landfall to be made without impacting on the cliff face.

Over spring/summer 2017, we have undertaken boreholes at key crossing locations along the cable route, including within the landfall search zone, to gain a better understanding of the ground conditions. We are developing further details of our HDD works based on this information.

Next, we will conduct geophysical surveys to better understand the archaeology in the area and use this information, alongside the borehole information and other considerations, to microsite the drilling compound within the current search area.



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Geological Cross section based on site investigation drilling at Happisburgh in Summer 2017. The Cromer Forest Bed was not encountered in these boreholes.

CABLE RELAY STATION

The purpose of a CRS is to maximise the efficiency of power transfer from the offshore wind farm to the National Grid at Necton. A CRS would only be required if it is necessary to deploy a HVAC transmission system.

The CRS search zone has been refined to two locations west of Walcott Green. Only one location will be included within the final planning application (DCO submission).

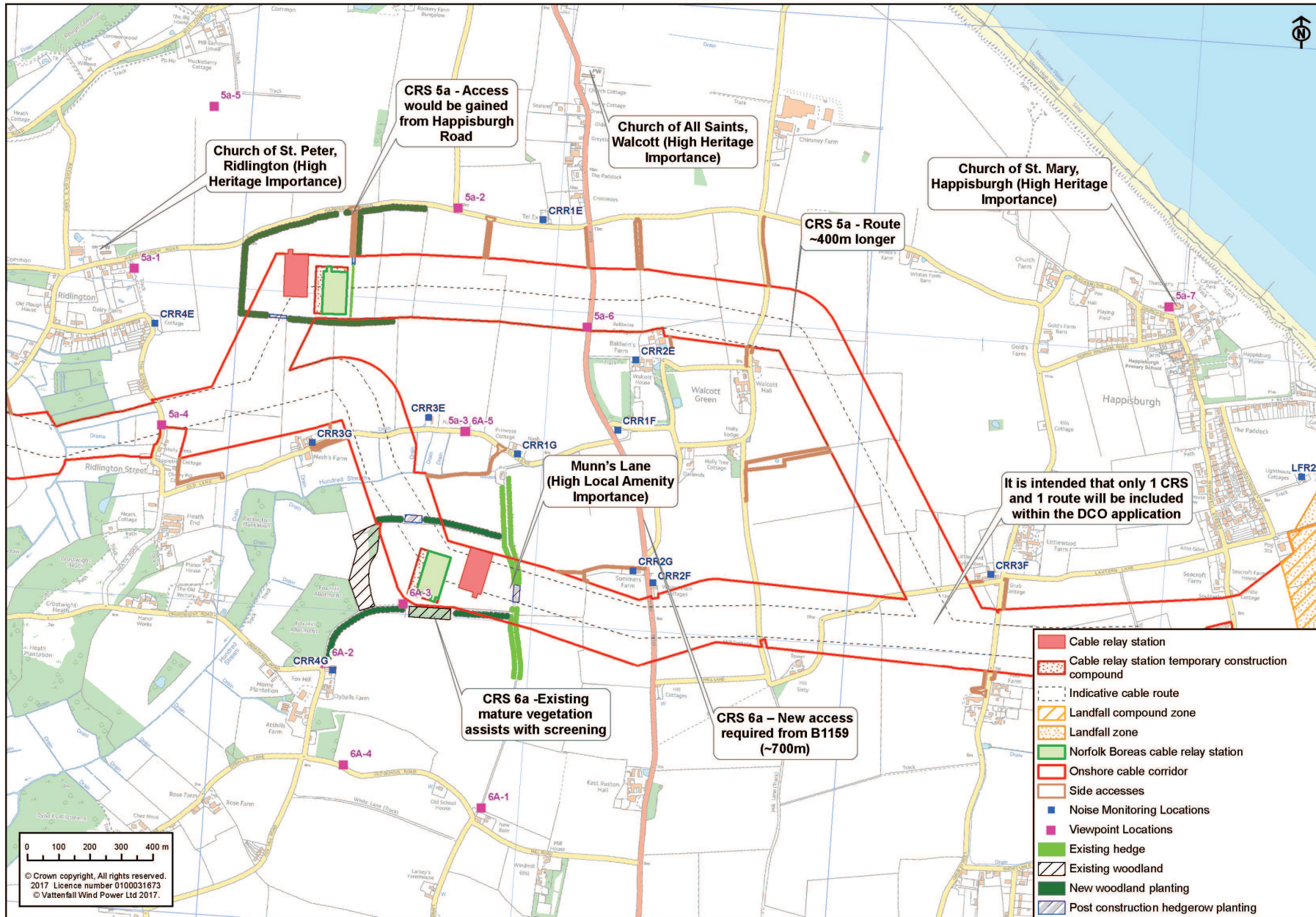
There are separate cable corridors associated with the two CRS sites which also require consideration.

Each site has relative pros and cons when considering different criteria.



	CRS 5a	CRS 6a
Cable Route	Additional 400m length of cable route compared to CRS 6a. However desktop analysis suggests potentially less archaeological risk and reduced (-2) number of track crossings (namely Munn's Lane and Nash's Lane).	Cable route length minimised by 400m. However, desktop analysis suggests potentially more archaeological risks and additional track crossings of Munn's Lane and Nash's Lane.
Access	Directly accessible from North Walsham Road in close proximity to B1159	Would require 0.7 km new access to be constructed from B1159, crossing Munn's Lane
Topology	Land is within 2m elevation change, minimising extensive earthworks requirements	
Noise	The closest residential properties where we have undertaken representative noise surveys are approximately 425m away. Initial studies of unmitigated designs have indicated that noise mitigation measures will be required. We will continue to explore these mitigation options in order to establish a design that will comfortably meet the rigorous standards of low noise emissions by both the UK regulatory bodies and stakeholders.	The closest residential properties where we have undertaken representative noise surveys are approximately 325m away. Initial studies of unmitigated designs have indicated that noise mitigation measures will be required. We will continue to explore these mitigation options in order to establish a design that will comfortably meet the rigorous standards of low noise emissions by both the UK regulatory bodies and stakeholders.
Visual	CRS 5a would be visible from Happisburgh Road to the north, Nash's Lane to the south, the north-east corner of Ridlington to the east and surrounding Public Rights of Way. CRS 5a would be seen in an open field with some screening from hedgerows. Proposed planting around CRS 5a would help to gradually screen it, such that after 15 years visibility would be notably reduced.	CRS 6a would be visible from Munn's Lane to the east, parts of Nash's Lane to the north, parts of Old School Road to the south and Public Right of Way East Ruston FP16 from Fox Hill to Munn's Lane. CRS 6a would be located in a field but with mature trees to the south and mature hedgerow to the east providing screening to start with. Proposed planting around CRS 6a would help to gradually screen it further, such that after 15 years visibility would be notably reduced.
Heritage Setting	Heritage settings assessment is ongoing. However, at this stage heritage setting effects and considerations are anticipated to be more complex at CRS 5a compared to CRS 6a. Given the nature of the Cable Relay Station structure, opportunities for effective mitigation, associated with this location, should still be feasible. Further assessment beyond PEI will further establish the situation and recommend appropriate approaches and options moving into the DCO application.	Heritage settings assessment is ongoing. However, at this stage heritage setting effects and considerations are anticipated to be fewer and more straight forward at CRS 6a compared to CRS 5a. This is in part due to the presence of existing natural screening. Given the nature of the Cable Relay Station structure, opportunities for effective mitigation, if required, associated with this location, should be feasible. Further assessment beyond PEI should help establish this.
Archaeology	Desk Based review and Aerial Photographic assessment suggests potentially less archaeological risk with the location of CRS 5a (and associated temporary construction compound) itself when compared to CRS 6a. However, the associated cable corridor options both appear to provide likely interactions with (i.e. the strong likelihood of encountering) archaeological remains. As a next step, this will be further corroborated by the programme of priority archaeological geophysical survey currently underway across targeted locations of the onshore project area.	Desk Based review and Aerial Photographic assessment suggests potentially greater archaeological risk with the location of CRS 6a (and associated temporary construction compound) itself when compared to CRS 5a. However, the associated cable corridor options both appear to provide likely interactions with (i.e. the strong likelihood of encountering) archaeological remains. As a next step, this will be further corroborated by the programme of priority archaeological geophysical survey currently underway across targeted locations of the onshore project area.

CABLE RELAY STATION



THE UNDERGROUND CABLE CORRIDOR

The cable corridor is currently identified as a search area of 200m width within which the maximum 100m working corridor would be sited.

Route amendments have been made since March 2017 following consultation with stakeholders and landowners.

- Vattenfall has committed to burying the electrical cables to mitigate the impacts associated with overhead lines.
- Vattenfall has also committed to a duct installation approach and to install ducts for both the Norfolk Vanguard and future Norfolk Boreas projects concurrently to minimise impacts and disruption.
- This approach allows the ducts for both projects to be buried throughout the 60km route length within a two year period. Cables can then be pulled through these ducts from pulling and jointing pits (approximately 800m separated) at a later stage, in line with the development of the wind turbines offshore.
- The worst case corridor width is 100m and allows for HVAC connection of both Norfolk Vanguard and Norfolk Boreas.
- To minimise impacts to the transport network during duct installation, construction materials and traffic would be delivered to mobilisation areas sited at the junction of the cable route and primary roads in the region and transported along a temporary running track/haul road adjacent to the trench excavations within the cable corridor.
- The duct installation approach allows the trenches to be excavated for as short a period as possible to minimise damage to the ground structures. It is anticipated that 100m of trench excavation, duct laying and subsoil reinstatement could be achieved each week, at which point, the construction crews would move onto the next 100m section.

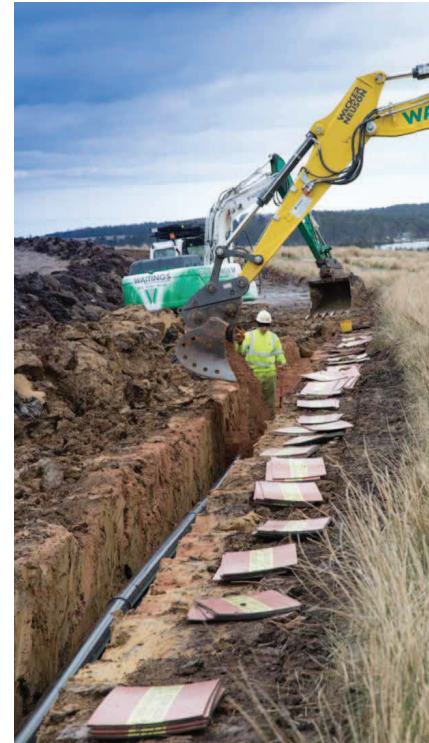
Cable laying Process



1. Topsoil Strip and Store



2. Excavate Trench, Subsoil Store separate to topsoil store and lay ducts



3. Ducts Covered and Protective Marker Tiles Laid



4. Replace Subsoil



5. Reinstat Topsoil

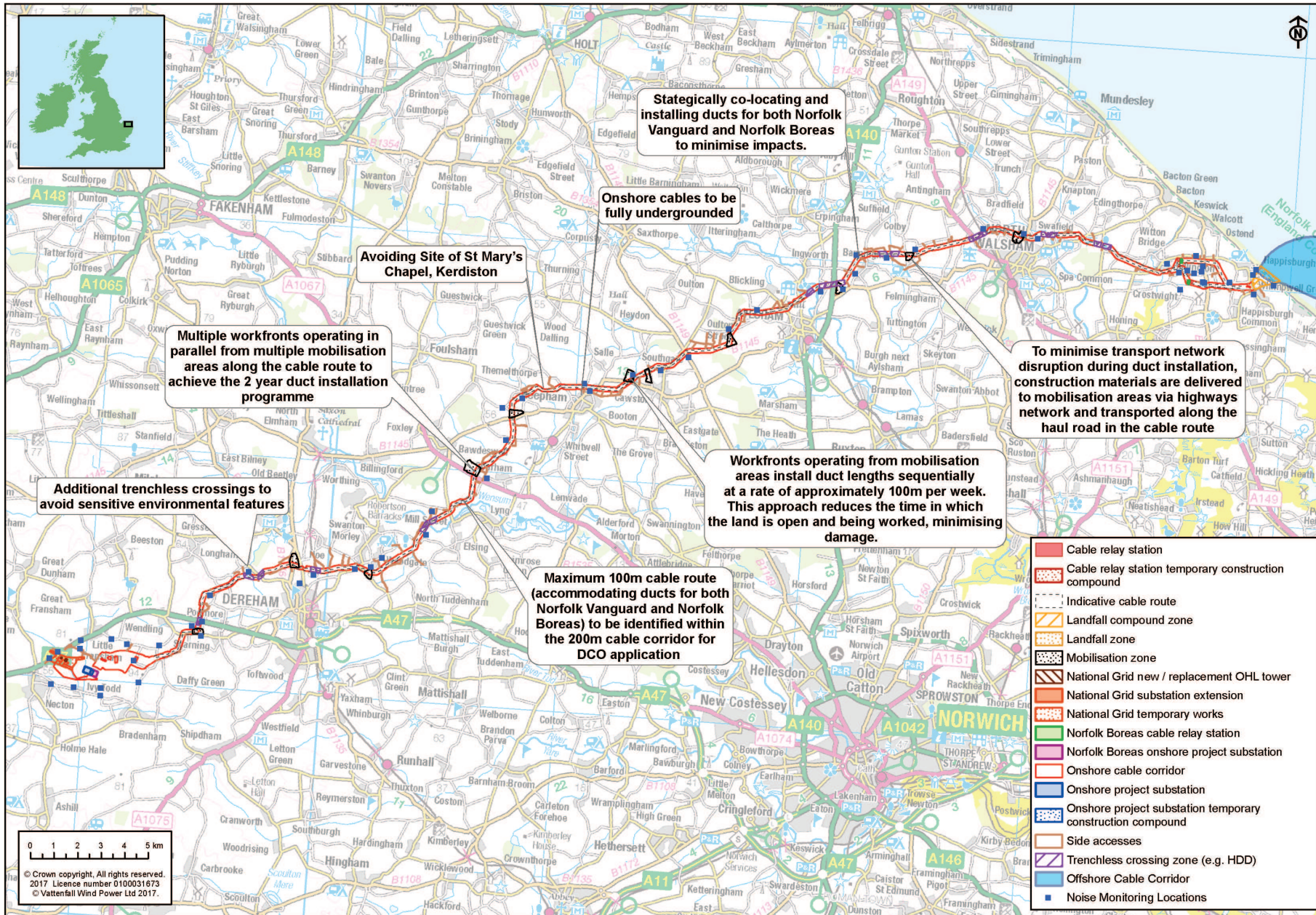


6. Excavate Joint Pit and Conduct Cable Pull (Post Duct Installation and Reinstatement)



7. Pull cables into ducts

THE UNDERGROUND CABLE CORRIDOR



THE ONSHORE PROJECT SUBSTATION

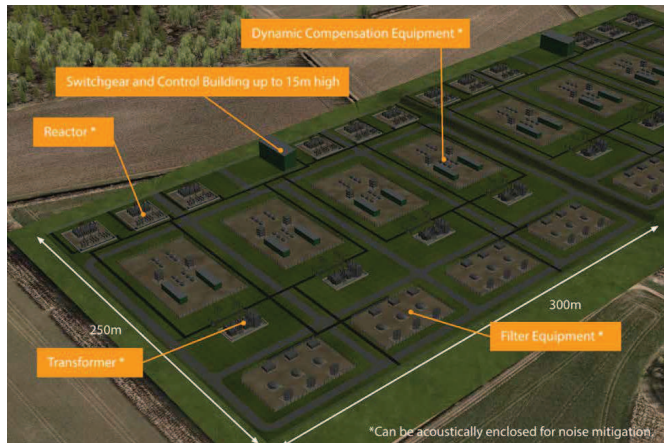
The onshore Project substation is to be located to the south of Necton Wood. This site allows for the co-location of the Norfolk Vanguard and Norfolk Boreas substations.

- The onshore substation's purpose is to convert the HVDC transmitted electrical power to HVAC for connection into the National Grid (for a HVDC connection) or transform the HVAC transmitted voltage to the appropriate National Grid voltage (for a HVAC connection)
- The electrical equipment within the onshore Project substation will make noise, however we are committed to providing a final project design meeting the rigorous standards of low noise emissions expected by the UK regulatory bodies and stakeholders. Noise reduction technology and design approach are considered within the PEIR and mitigation options include a combination of noise barriers, bunds, enclosures, site layout (e.g. location of static noise sources) and plant selection at procurement stage.
- The onshore Project substation will be compliant with the UK exposure limits set to protect members of the public against electric and magnetic fields.

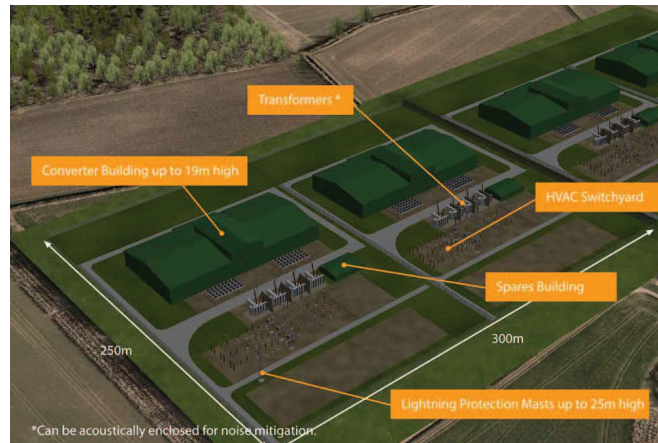
National Grid Extension Works

- The existing National Grid Necton substation must be extended to accommodate the Norfolk Vanguard connection. Preparatory extension works will also be conducted for the future Norfolk Boreas connection.
- The substation extension will be to the east and west of the existing substation for a fenced distance of 130m to the east and 200m to the west at a width of 145m. The tallest structure within the substation will be 15m and similar to the infrastructure installed at the existing substation.
- The existing National Grid 400 kV overhead lines require modification to accommodate the Norfolk Vanguard connection. Temporarily three new towers will be erected to allow the existing 400 kV circuits to be transferred and the existing connection to remain operational through the construction works. Two new permanent towers will be erected and one existing tower dismantled (a net addition of one new permanent tower). The circuits will then be transferred from the temporary towers onto the permanent towers and the temporary towers removed.
- Access for construction and operation will be obtained from the existing access to the A47.

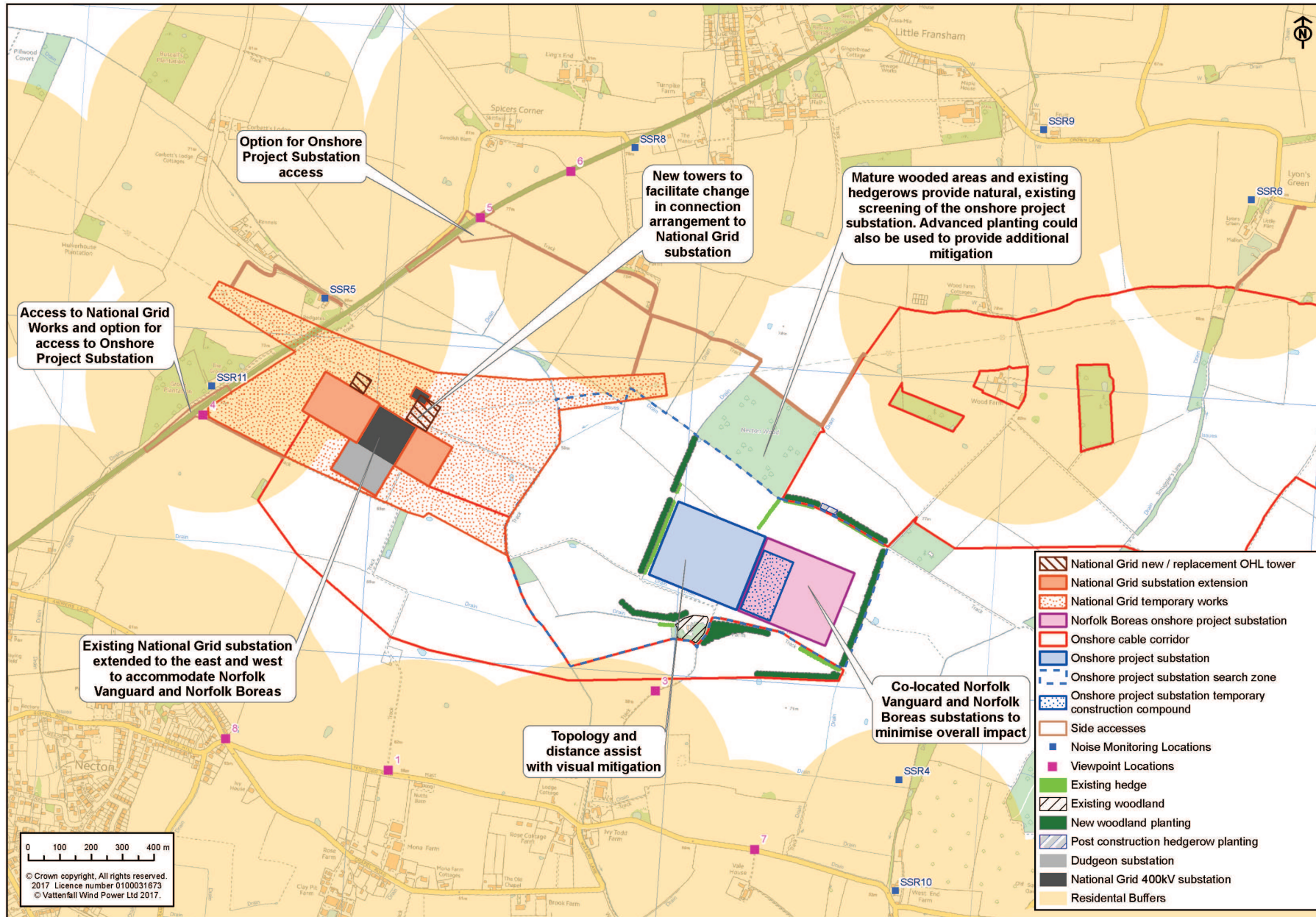
3D visualisation of project substation (HVAC option)



3D visualisation of project substation (HVDC option)



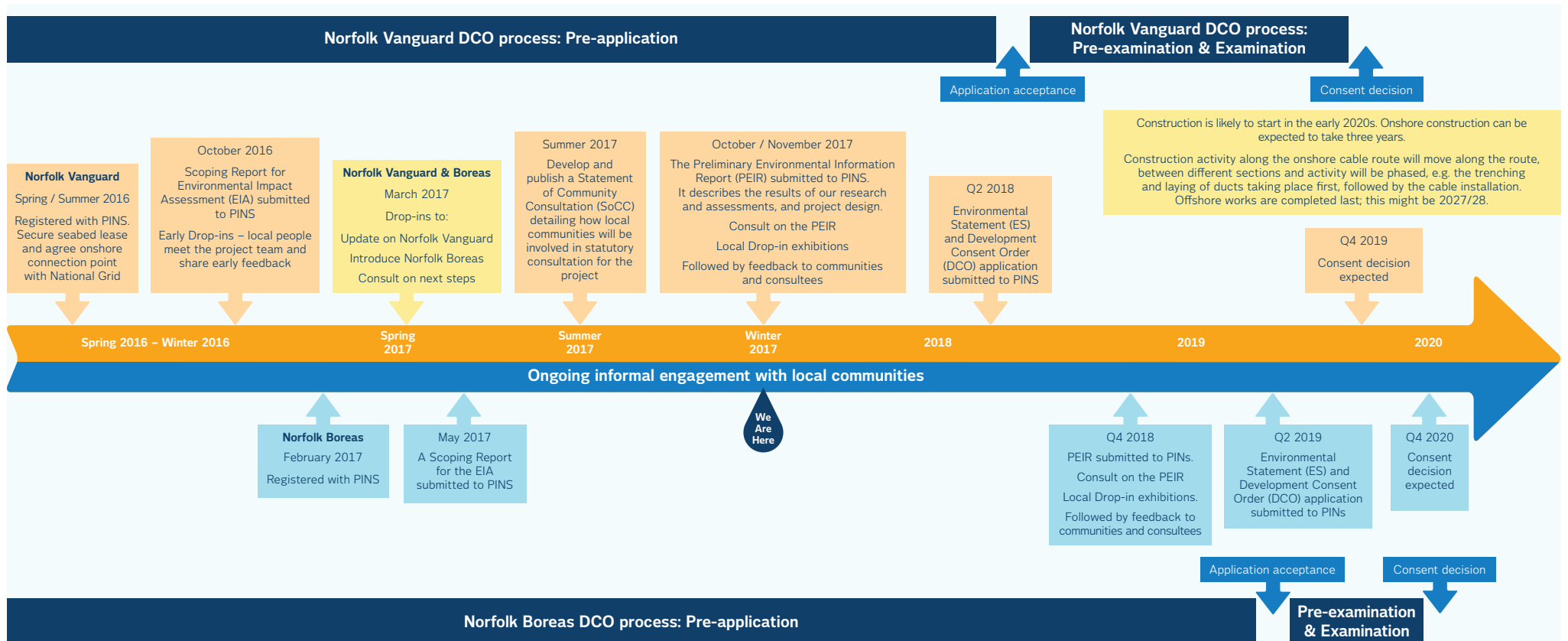
THE ONSHORE PROJECT SUBSTATION



PROJECT TIMEFRAME

The project is currently at the point of 'formal consultation' on the preliminary environmental information that is available. Following the close of this consultation period at midnight on 11th December 2017 we will be developing our final proposals taking on board feedback received from the local community and consultees to help shape the plans. We will then be preparing our application ready for submission to the Planning Inspectorate in Summer 2018.

The timeline shows where we are in the process, and when we would expect to receive a decision on our Development Consent Order application. The expected timeframes for Norfolk Boreas are also mapped out to provide context to both projects' next steps.



WHAT KIND OF LOCAL OPPORTUNITIES AND BENEFITS ARE IMPORTANT TO YOU?

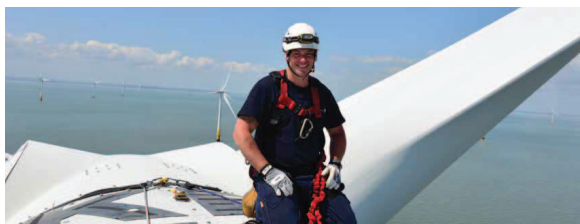
During the Spring '17 consultation we asked about the ideas people had around opportunities and benefits

The answers received were varied, but aligned with the October '16 consultation and included; training and skills development for both adults and young people, apprenticeships, local contractors and contacts for the work, broadband and fibre optic cabling, A47 improvements and local road upgrades; coastal erosion solutions and beach reshaping; archaeological/eco exhibitions, information sharing of new records or data, improvement of very local habitats impacted by the construction, investment in local renewable energy projects.

What we have been developing

Over the past year members of the community have been positive and creative about the opportunities and benefits that they would like to see. We have committed to a number of early projects and sponsorships including Norwich and Norfolk EcoAwards; Norfolk Community Foundation 'Communities that Care – Stay Well This Winter' Campaign; East of England Energy Group sponsorship of 'Skills for Energy' Award.

We would like to engage with local communities to understand your priorities. Now is the time for communities to work with us to explore ideas that create benefits and opportunities.



Supply chain opportunities



<http://ly/vfarchaeology>

When you add in the supply chain businesses that contribute to the development of a wind farm, the opportunities are even more diverse;

- ecologists
- archaeologists
- 3D VR Visualisation developers
- landowner & local liaison officers
- onshore civil engineers & contractors
- wind turbine designer/manufacturer
- service vessel crew and skippers
- cable layers
- accommodation providers...

3D offshore wind farm design training – rolling out to 8 Norfolk Schools & Colleges this Autumn

Vattenfall, in partnership with 3DW, have been developing a new 3D virtual reality offshore wind farm design programme. Students from University Technical College Norfolk trialled an onshore version in spring. The visualisation packages help students develop an appreciation of the complexities of wind farm development, whilst the programme also encourages collaboration and leadership – key skills that Vattenfall will be looking for in its future Norfolk workforce.

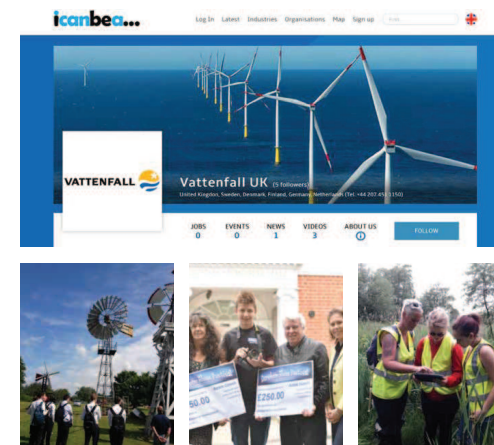
Find out more here: <https://corporate.vattenfall.co.uk/about-vattenfall/careers/>



Skills and Jobs for the Future

Education, skills and jobs have been high profile themes throughout our consultation and we have made an early commitment to support schools, colleges and their students

- Building on the work experience pilot, we now have the systems in place to enable further opportunities for more students as our projects develop
- We are actively working with schools and colleges across the project area in order to create innovative and relevant experiences for 14-19 year olds and exploring opportunities for apprenticeships, internships and thesis projects
- We promote our national and international skills programme here too: <https://www.icanbea.org.uk/>





THANK YOU FOR COMING TODAY TO FIND OUT MORE ABOUT THE PROPOSALS FOR NORFOLK VANGUARD

Now, please have your say

Your input will help make Norfolk Vanguard the best project it can be and ensure opportunities to create local benefits are recognised and realised.

We hope today has been useful and informative.

We will review all the feedback we've received from you alongside the feedback we will get from statutory, technical and local stakeholders, landowners and others.

This information will be used to refine the project designs of Norfolk Vanguard, and inform our DCO submission in the Summer of 2018.

Any response or representation in respect of the Norfolk Vanguard proposals must:

- (i) be received before 11.59pm on 11th December 2017
- (ii) be in writing
- (iii) include your name
- (iv) include an address to which correspondence relating to the response or representations may be sent.

You can get in touch in a number of ways:

-  Give us your feedback today on the questionnaire.
-  You can write to us at **Norfolk Vanguard, The Union Building, 51-59 Rose Lane, Norwich, Norfolk, NR1 1BY**
-  All of the information here today is available on our website. You can register your interest in the project via **www.vattenfall.co.uk/norfolkvanguard** to receive project news.
-  Email us **info@norfolkvanguard.co.uk**
-  If you have queries about the consultation process, please call **01603 567995** for clarification

Contact our Local Liaison Officer and Skills & Training Champion: susan.falch-lovesey@vattenfall.com

Contact our Landowner team: Email Bob McCarthy: vattenfallinnorfolk@consentssolutions.com

Contact our Fishing Liaison team: E-mail: jonathan@brownmay.com

