FOREWIND

DOGGER BANK
TEESSIDE A & B

November to December 2013

Community Consultation Summary

Dogger Bank Teesside A & B consultation

As part of the development of Dogger Bank Teesside A & B, Forewind has thoroughly consulted stakeholders both formally and informally. A first phase of statutory consultation was held in May 2102.

Forewind is now holding a second and final phase of statutory consultation, giving stakeholders an opportunity to review, comment on and influence the Dogger Bank Teesside A & B proposals, before it submits its application for a development consent order to the Planning Inspectorate in early 2014.

The consultation to date has contributed to Forewind's design proposals and the information presented in the consultation documents prepared for this phase – Preliminary Environmental Information.

We now invite feedback on the Preliminary Environmental Information, which includes a draft Environmental Statement (ES) and a draft Non-Technical Summary, as well as the draft plans and maps detailing the nature and location of Dogger Bank Teesside A & B. This booklet provides a summary of this information but for complete and comprehensive details on any issue covered please refer to the full documents.

While Forewind welcomes feedback on all aspects of the proposed development, there remain some key decisions to make prior to the final application. These are highlighted in boxes throughout this booklet and we particularly invite comments on them. This statutory consultation period starts on Monday, 4 November. **Forewind must receive all responses by Friday, 20 December to ensure their consideration.**

Details about how to respond to the consultation, as well as dates of the public exhibitions and how to access the consultation documents, are covered in this booklet.

All stakeholders are encouraged to participate in this last stage of pre-application consultation, as it will provide the best opportunity to submit comments about the proposals. Forewind believes that consultation is a key element of the development process and that transparent consultation is key to successful offshore wind development. A Statement of Community Consultation summarising the approach to community consultation for Dogger Bank Teesside A & B can be found at www.forewind.co.uk and in the local libraries detailed on the website.

Continuing stakeholder engagement

Stakeholder engagement has been a key element of the pre-application process for Dogger Bank Teesside A & B, and has already resulted in changes and improvements to the proposals.

As Forewind is a developer, it will not be responsible for the construction and operation of each wind farm. This will be the role of a lead operator, most likely to be one of Forewind's four parent companies. The lead operator for each wind farm has not yet been finalised, however it will be within their remit to engage and consult with stakeholders, including the local community, during those stages.

Forewind will include principles for continuing stakeholder engagement in the Outline Code of Construction Practice. This document will be submitted with the application for a development consent order and will be finalised after consent with agreement from Redcar and Cleveland Borough Council.

Contents

Why offshore wind energy?

Above top: Sheringham Shoal Offshore Wind Farm under construction
Above: Saltburn beach

There are many reasons why offshore wind is an integral part of the UK's energy generation mix. While no single energy source or generation technology is ever likely to provide a total solution to our energy needs, offshore wind takes advantage of the UK's shallow waters and the strong winds, which extend far into the North Sea. Through the use of increasingly efficient and improving technologies, we will be able to progress towards reducing our reliance on fossil fuels.

Energy security

The UK has a huge natural wind resource – more than a third of the total European potential and equivalent to three times the UK's annual electricity consumption.

By harnessing the energy in the wind to generate electricity, the UK can become less reliant on imports for our energy. This will reduce our exposure to the type of price and availability fluctuations that can result from political or economic instability in some of the countries supplying the UK with oil, gas and coal. We have already seen these issues affect our energy supplies and they are more likely to occur as oil and gas reserves deplete over time.

Economic benefits

The UK has an excellent opportunity to benefit economically from the expanding wind industry. Proposed investments, for example a new green port and turbine manufacturing operation in Hull, and the development of new plant, such as the opening of a foundation fabrication facility in Teesside, are proof that businesses are keen to invest and create jobs in a wide variety of sectors.

Offshore wind will provide tens of thousands of new jobs to local communities, both directly and indirectly, and encompass the development of new infrastructure to better serve the needs of the UK population.

Emissions reduction

The UK aims to generate 15 per cent of its energy from renewable sources by 2020, helping to meet the EU target of reducing carbon emissions by 20 per cent over the same period.

The amount of energy coming from renewable sources is steadily increasing. For example in the second quarter of 2013 it accounted for 15.5 per cent of the UK's total electricity consumption. However, to meet its targets, the UK must continue to increase its consumption from renewables. Offshore wind energy generation is well placed to play a significant role as it has lower lead-in times than nuclear energy and is in a more advanced state, both from a technical and economic perspective, than other forms of low carbon energy technology.

The UK is legally required to reduce its greenhouse gas emissions by at least 80 per cent by 2050, relative to 1990 levels. Dogger Bank Teesside A & B has the potential to make a very significant contribution to the reduction of harmful greenhouse gas emissions in the UK as a whole through the generation of nationally significant quantities of electricity from a clean, renewable and sustainable source.

"Meeting the renewable energy targets is not just about preventing climate change and securing future energy supplies. **Achieving the targets could provide £100 billion worth of investment opportunities and up to half a million jobs in the renewable energy sector by 2020."**

Department of Energy and Climate Change

Largest Round 3 zone

Forewind's owner companies are:

RWE npower renewables is the UK subsidiary of RWE Innogy and one of the UK's leading renewable energy developers and operators. Committed to developing and operating renewable energy projects to produce sustainable electricity across Europe, RWE Innogy pools the expertise and generating plant of the RWE Group.
www.rwe.com

SSE is one of the UK's leading energy companies and its largest non-nuclear electricity generator, operating a diverse generation portfolio across the UK and Ireland. It is involved in renewable energy projects covering wind, wave, tide and hydro electricity.
www.sse.com

Statkraft is Europe's largest generator of renewable energy and is the leading power company in Norway. The company owns, produces and develops hydropower, wind power, gas power and district heating. Statkraft is also a major player in European power trading.
www.statkraft.com

Statoil is an international energy company headquartered in Norway, with operations in 36 countries. Building on 40 years of experience from oil and gas production, the company is committed to accommodating the world's energy needs responsibly, applying technology and creating innovative business solutions.
www.statoil.com

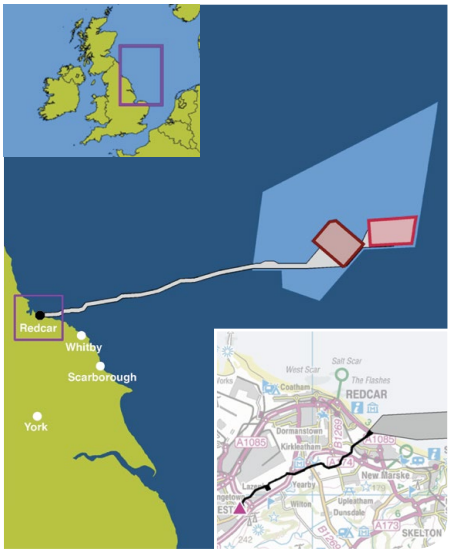
Dogger Bank Zone

The largest of The Crown Estate's Round 3 offshore wind farm zones, the Dogger Bank Zone is in the North Sea, between 125 and 290 kilometres (77 to 180 miles) off the east coast of Yorkshire. It extends over approximately 8,660 square kilometres (km^2) or roughly 3,340 square miles, which is about the same size as North Yorkshire.

While Dogger Bank is the largest of the Round 3 zones, it is also one of the shallowest, with water depths ranging from 18 to 63 metres (59 to 206 feet). If fully realised, Dogger Bank will be the largest offshore wind development in the world and could supply almost 10 per cent of the UK's electricity.

Dogger Bank is being developed by Forewind, a consortium comprising four leading international energy companies – RWE, SSE, Statkraft and Statoil. Forewind is committed to securing all the necessary consents required for the development and construction of up to nine gigawatts (GW) offshore wind capacity.

Forewind, as a developer, will not be responsible for construction and operations. Instead, each of the Dogger Bank wind farms will have a lead operator, most likely to be one of Forewind's four parent companies. As the Dogger Bank Zone is so large, it is being developed in stages. The development consent order application for the first stage – Dogger Bank Creyke Beck – is now under examination by the Planning Inspectorate. The second stage was originally planned to be four separate wind farms and was called Dogger Bank Teesside. However, in late 2012 when the project boundaries for the first two wind farms were identified, this stage was divided into two separate applications – Dogger Bank Teesside A & B and Dogger Bank Teesside C & D.



- Landfall between Redcar and Markse-by-the-Sea
- Existing National Grid substation at Lackenby
- Onshore export cable route
- Offshore export cable route
- Dogger Bank Teesside A
- Dogger Bank Teesside B
- Dogger Bank Round 3 Zone

Dogger Bank Teesside A & B is now in its final phase of pre-application consultation. The offshore and onshore environmental impact assessment for Dogger Bank Teesside C & D is underway and Forewind aims to consult on the resulting draft Environmental Statement in late 2014.

Dogger Bank Teesside A & B

Dogger Bank Teesside A & B will comprise two wind farms (Dogger Bank Teesside A and Dogger Bank Teesside B) each with a generating capacity of up to 1.2 GW and connecting into the existing Lackenby substation near Eston, in the Borough of Redcar and Cleveland.

In total it will have an installed generating capacity of up to 2.4GW and will generate around 8 terawatt hours (TWh) of green electricity per annum, which is enough to power around 1.8 million British homes or supply all industrial and commercial users in the North East every year.

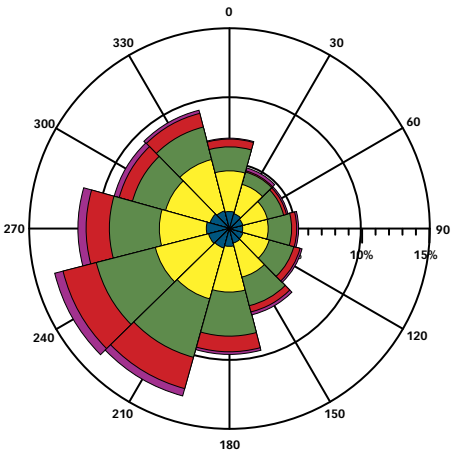
Dogger Bank Teesside A & B is classified as a Nationally Significant Infrastructure Project (under Section 14 of the Planning Act 2008) and requires a development consent order before it can be built. Following this final stage of pre-application consultation, Forewind will submit a single application for a development consent order to the Planning Inspectorate. The Planning Inspectorate will examine the proposals and make a recommendation to the Secretary of State for Energy and Climate Change, who will determine the application.

It may take up to 15 months for the application to be determined and the indicative programme for Dogger Bank Teesside A & B is:

Date	Activity
Q2 2012	First stage of statutory consultation (complete)
2012–2013	Environmental surveys and reporting (complete)
Q4 2013	Second and final stage of statutory consultation
Q1 2014	Submit application for development consent order
Q3 2015	Application determined
2015–2017	Pre-construction phase

Offshore overview

Installation of meteorolgical mast



Indicative annual wind rose for Dogger Bank Teesside A & B showing wind speeds and directions

Site information

Forewind has gathered a significant amount of information about the Dogger Bank Zone through: detailed geophysical (seabed and sub-seabed) surveys; geotechnical testing (boreholes and cone penetration tests); meteorological and oceanographic data collection and wind data collection using lidar and meteorological masts.

The data gathered has been analysed with help from a number of expert consultants and groups including the British Geological Survey, the Norwegian Geotechnical Institute, RPS Energy and Royal Haskoning DHV.

The information collected to date provides enough detail for the environmental assessment, however additional high-resolution survey data will be collected post-consent for the detailed design work required before construction can begin. Information on the seabed (bathymetry), waves, tidal currents, tidal range, geology and seabed sediments are all contained within the draft ES. *(ES ref. Chapter 9 – Marine Physical Processes)*

Wind climate

In comparison to the typical wind conditions across the UK as a whole, the Dogger Bank Zone has very high average annual wind speeds making it an attractive location for a wind energy development.

Offshore infrastructure

The boundaries for both Dogger Bank Teesside A and Dogger Bank Teesside B were identified in 2012. They define the limits of where the offshore wind farm infrastructure, such as wind turbines and platforms, can go, as well as the space between wind farms.

During construction there may be a need for additional temporary work areas, within which vessels may carry out intrusive activities, for example cable construction vessels requiring space for anchor spreads alongside the cable corridors.

In total the offshore infrastructure for Dogger Bank Teesside A & B will include:

- Up to 400 wind turbines and supporting tower structures
- Wind turbine foundations and associated support and access structures
- Two offshore converter platforms, and associated foundations
- Up to eight offshore collector platforms, and associated foundations
- Up to four offshore accommodation or helicopter platform(s) for operations and maintenance activities, and associated foundations
- Subsea inter-array cables:
  - between the wind turbines
  - between wind turbines and offshore collector platforms
  - between wind turbines and offshore converter platforms, and
  - linking to meteorological stations and accommodation platforms.
- Subsea inter-platform cables between:
  - offshore collector platforms, and
  - offshore collector platforms and high voltage direct current (HVDC) offshore converter platform.
- Offshore export cable systems, carrying power from the offshore HVDC converter platform to the landfall(s)
- Crossing structures at the points where project cables cross existing subsea cables and pipelines or other Dogger Bank project cables
- Up to 10 offshore meteorological monitoring stations. This is in addition to the two meteorological stations which were subject to an earlier and separate consent application and installed in 2013
- Protection against scour and subsea foundation damage (where necessary)
- Seabed preparation measures for foundation installation (where necessary)
- Cable protection measures (where necessary)
- Up to 20 vessel mooring buoys.

Parameters	Maximum per project	Maximum total for Dogger Bank Teesside A & B
Wind turbines	200	400
Offshore collector substation platforms	4	8
Offshore converter substation platforms	1	2
Offshore accommodation or helicopter platforms	2	4
Offshore meteorological stations	5	10
Indicative length of inter-array cabling (km)	950	1900
Indicative length of inter-platform cabling (km)	320	640
Number of HVDC export cable pairs	1	2

Summary of key offshore project components

Turbines and foundations

Above top: Installation of a monopole foundation
Above: Transition pieces

Project flexibility

As large scale offshore wind farm developments are relatively new, and technology is advancing rapidly, it is expected there will be changes in the design and availability of wind farm components, continual improvements in installation techniques, uncertainty regarding costs, and the need for flexibility to reduce health, safety and environmental risks. For these reasons it is not feasible to finalise the design for Dogger Bank Teesside A & B at this time.

The project description for Dogger Bank Teesside A & B therefore contains flexibility to allow the best available technology and methodologies to be adopted when the wind farms are further developed. The detailed design will be carried out post-consent alongside the procurement and placement of contracts for the construction of Dogger Bank Teesside A & B.

This flexibility will enable the lead operator to reduce health, safety and environmental risks as far as possible, use the most up-to-date technology and maximise the viability of Dogger Bank Teesside A & B. These factors will also increase the likelihood of meeting government targets for cost reduction.

Project boundaries

Do you have any comments on the extent and location of the project boundaries?

Wind turbines

The wind turbines proposed for Dogger Bank Teesside A & B will be three-bladed, horizontal axis machines. As technology is evolving rapidly it is anticipated that wind turbines between approximately 6 megawatts (MW) and 10 MW will be available within the timescales of the projects. The maximum dimensions would include a blade tip height of 315 metres (above highest astronomical tide) and rotor diameter of 215 metres. Fixed caps have been placed on the total area swept by the rotor and the generating capacity of the projects.

The final layout of the wind turbines, and other wind farm components, will depend on factors such as: stakeholder feedback, seabed obstructions, ground conditions, water depth, economics, and the chosen wind turbine. A number of wind farm layout rules have been developed in consultation with stakeholders that will apply to the final proposed array layout, and which address key issues and environmental sensitivities.
(ES ref. Chapter 5 – Project Description and Chapter 16 – Navigation and Shipping)

Wind turbines

Do you have any comments on the total installed capacity and number of wind turbines, or other aspects of the wind turbine array?

Foundations

Foundation structures secure the wind turbines, platforms and other offshore structures to the seabed while withstanding loads from the wind and the marine environment. They also provide means of safe access to the structures for maintenance crews. The range of foundation types continues to grow as technology advances, however those currently available can be grouped into three categories: monopole, multi-leg and gravity base. The innovative suction bucket foundation technology employed by Forewind for its two meteorological masts is an example of a monopole.
(ES ref. Chapter 5 – Project Description)

The foundations for Dogger Bank Teesside A & B will be chosen after consent, via a detailed design process taking into account: the selected wind turbine type; offshore platform size; ground conditions; water depth, wind, wave, current and tidal regime; economic factors, and results of the environmental assessment.

Foundations

Of the three types of foundations available, do you have a preference?

Offshore cables

Above top: Cable laying by Team Oman
Above: Tying off cables inside a turbine

Offshore cables

Offshore cables transmit the electricity generated by the offshore wind turbines to shore via the offshore collector and converter platforms. Fibre-optic cables serving the wind farm control systems may be integrated within offshore cables. These will also power the ancillary systems, for example lighting and lifts, of the turbines and offshore substation.

Inter-array cables will connect the wind turbines to each other and to collector platforms, and they may also connect offshore accommodation platforms and meteorological masts to the main wind farm electrical system. Inter-platform cables connect the collector platforms to the converter platforms, while offshore export cables connect the offshore converter platforms to the onshore transition bays, where they are jointed to the onshore HVDC export cables.

Offshore cables are typically installed from a cable-laying vessel or barge using either a multi-point anchoring or dynamic positioning system. The Dogger Bank Teesside A & B offshore cables will be buried where feasible or protected appropriately along their full length. The proposed construction methodologies are fully outlined within the draft ES.
(ES ref. Chapter 5 – Project Description)

Offshore export cable corridor

The offshore export cables for both Dogger Bank Teesside A and Dogger Bank Teesside B will be installed within the corridor shown in the map below. The export cables will run from the offshore converter platforms to the cable landfall.

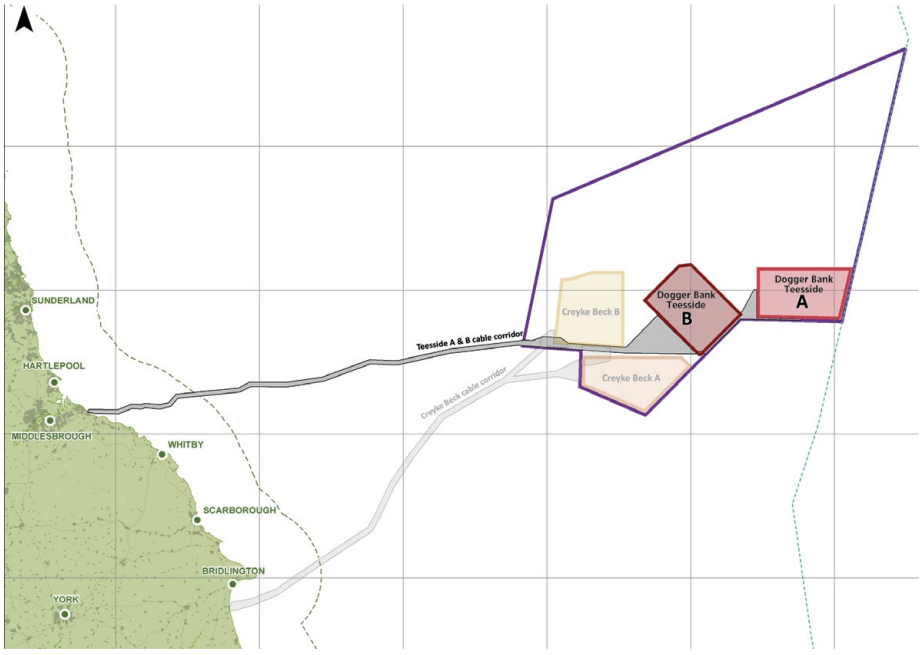
The export cable corridor within the zone broadens as it approaches the project boundaries to allow for flexibility of the final cable location, which will depend on the final wind farm layouts. For these reasons, the cable location that would result in the largest effect has been assessed.

The export cable corridor is generally 1.5 km wide but widens to approximately 2 km towards the zone exit point and narrows closer to the cable landfall.

Export cable

Do you have any comments on the proposed route of the export cable corridor, the installation methods or proposed cable protection?

- Dogger Bank Round 3 Zone
- Dogger Bank Teesside A
- Dogger Bank Teesside B
- Dogger Bank Creyke Beck A
- Dogger Bank Creyke Beck B
- Dogger Bank Teesside A & B export cable corridor
- Dogger Bank Creyke Beck export cable corridor
- UK International boundary
- 12nm Territorial boundary



Offshore export cable corridor

Onshore description

Onshore converter station at Salle, Norfolk

Construction in parallel	2017–2020	2020–2024	2024
Dogger Bank Teesside A	Up to three years		
Dogger Bank Teesside B	Up to three years		
Construction in sequence	**2017–2020**	**2020–2024**	**2024**
Dogger Bank Teesside A	Up to three years	maximum five-year gap	
Dogger Bank Teesside B			Up to three years

Indicative construction timeframe

- Dogger Bank Teesside A&B cable landfall envelope (from mean high water mark)
- Dogger Bank Teesside A&B landfall horizontal directional drill compound and joint transition bay

Onshore cable route

- Dogger Bank Teesside A&B HVDC, open trench
- Dogger Bank Teesside A&B HVDC, HDD
- Dogger Bank Teesside A&B HVAC, open trench
- Dogger Bank Teesside A&B HVAC, HDD
- Dogger Bank Teesside A&B major horizontal directional drill entry or exit locations
- Dogger Bank Teesside A&B minor horizontal directional drill entry or exit locations
- HDD or open trench to be confirmed
- Dogger Bank Teesside A&B indicative access points for construction
- Dogger Bank Teesside A&B cable route primary construction compound
- Dogger Bank Teesside A&B cable route primary construction compound project divider
- Dogger Bank Teesside A&B intermediate construction compound
- Dogger Bank Teesside A&B intermediate construction compound options

Converter station site

- Dogger Bank Teesside A&B converter station area of work
- Dogger Bank Teesside A&B converter stations
- Converter stations landscape mitigation works
- Dogger Bank Teesside A&B converter station construction compounds
- National Grid Lackenby Substation
- HVAC Access options
- Indicative environmental assessment area

Site information

The land likely to be affected by the onshore works during the cable installation and construction of the converter stations is a mix of semi-urban, rural with large arable fields and, at the converter station end, industrial. There are a number of buried services along the route including water mains, sewers, gas and telecommunications.

Onshore infrastructure

In total the onshore infrastructure required in the Borough of Redcar and Cleveland will include:

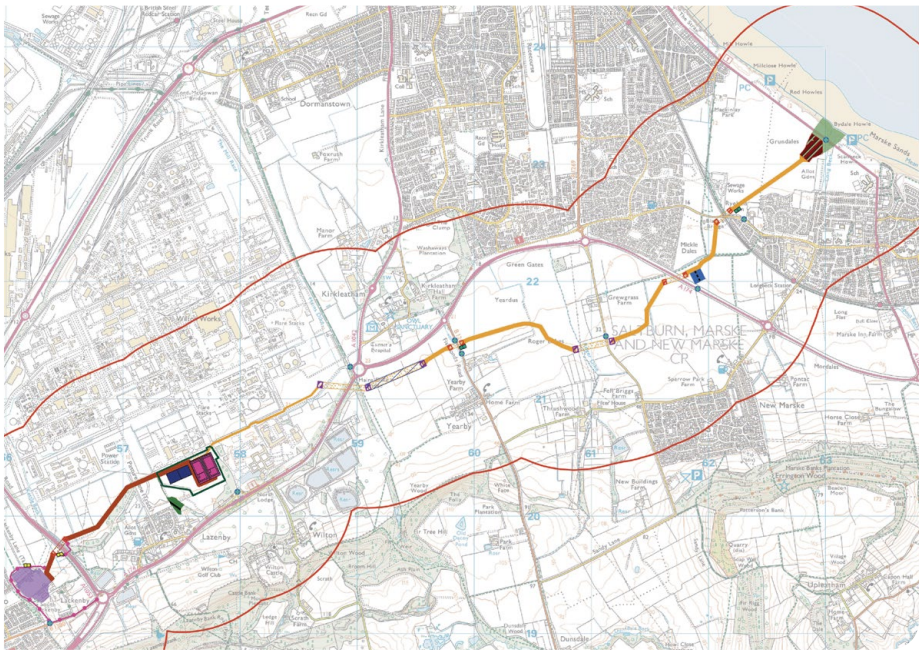
– Cable landfall and transition joint bays
– Onshore high voltage direct current (HVDC) export cable system carrying power from the landfall to the onshore HVDC converter stations
– directional drilling as part of the landfall works and under the foreshore, as well as where required under obstructions such as roads, watercourses, other cables, railways and pipelines
– Onshore converter stations with associated road, fencing, landscaping and drainage
– Onshore high voltage alternating current (HVAC) cable systems carrying power from the onshore HVDC converter stations to the existing National Grid substation at Lackenby
– Connection bays within the existing National Grid substation at Lackenby containing switchgear and electrical equipment for connection of the export cable system to the transmission network
– Temporary works and laydown areas
– Permanent and temporary access roads
– Service corridors, including telecommunications, water and connection to the local electricity network.

Some works will be required at the existing National Grid substation at Lackenby to enable the connection of Dogger Bank Teesside A & B. National Grid will be responsible for the consent, construction and other elements of these works, and Forewind will be responsible for the remainder. These 'works to connect actions' have been considered in the impact assessment for Dogger Bank Teesside A & B.

Dogger Bank Teesside A and Dogger Bank Teesside B may be constructed at the same time, one after the other or with some overlap, with certain onshore elements for the second project being installed during the construction of the first. If they are built in parallel, the entire development, from landfall to the Lackenby substation, may take up to three years to complete. If built sequentially, it is anticipated three years will be required for each project, with a maximum gap of up to five years between projects (see table left).

Onshore design and components

Are there are any additional factors we should consider when finalising the onshore aspects of the proposals?



Indicative cable route and converter station locations

Landfall description

Example of landfall works

Landfall

The landfall, where the offshore export cables comes to shore, is proposed for an area along the Teesside coastline between Redcar and Marske-by-the-Sea. The offshore cables will be connected to the onshore cables in one or more specifically designed underground joint bays or pits, known as transition bays.

To minimise the disruption on the shoreline and coastal road, the horizontal directional drilling (HDD) technique has been assessed for cable installation. Landfall HDD operations are likely to start from the transition bay location with drilling under the cliffs and beach.

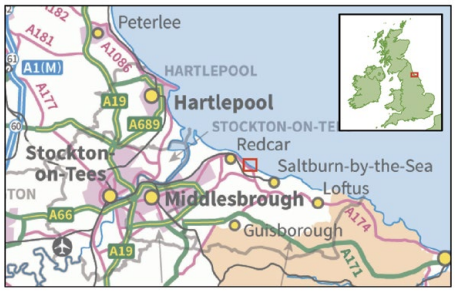
If it is not possible to drill directly from the transition bay area to the seabed in the sub-tidal area, the exit point for the HDD may be in the inter-tidal zone on the beach, between the low and mean high water marks. In this case, extra works such as the installation of cofferdams, watertight enclosures pumped dry to enable construction work, and open cut trenching to reach the sub-tidal zone, may be required.

The transition bay will be on dry land, buried below ground, and its location will take into account local coastal erosion, a feature of the area. Its dimensions are approximately 1.5 m deep, 4 m wide and 12 m long although they may vary depending on the final electrical design.

After the installation is complete, the transition bay will be backfilled and the top surface reinstated so the area can be returned to previous use.

Landfall location

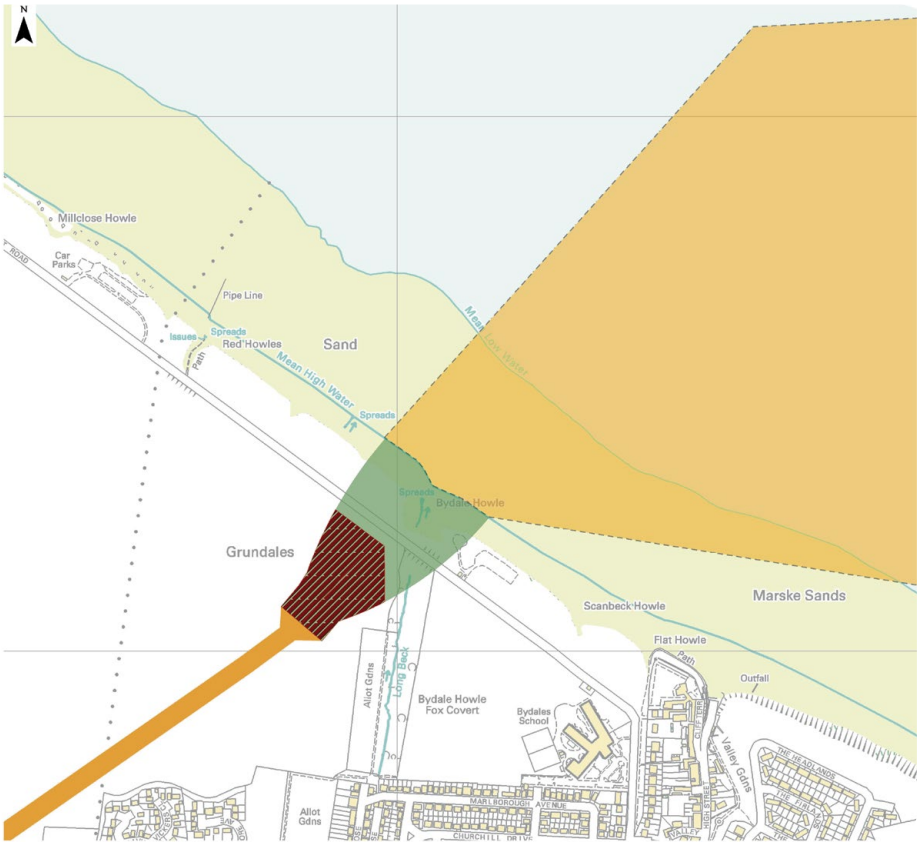
Do you have any comments on the proposed landfall location and whether there is anything else we should consider when finalising the location the cables come ashore?



- Dogger Bank Teesside A&B offshore export cable corridor
- Dogger Bank Teesside A&B cable landfall envelope (from mean high water mark)
- Dogger Bank Teesside A&B landfall horizontal directional drill compound and joint transition bay

Onshore cable route

- Dogger Bank Teesside A&B HVDC, open trench



Indicative landfall location

Onshore export cable

Onshore cable route reinstatement at Gwynt y Môr Offshore Wind Farm

Onshore cable corridor

The onshore cable systems will be buried approximately 1.2 m underground for their entire length.

Forewind ruled out the use of overhead lines early in its development process for several reasons, particularly the potential landscape and visual impacts.

Cables will be installed using conventional open cut trenching, either buried directly or in ducts. A six-kilometre HVDC cable route will connect to the converter stations and the cables used will be subject to detailed electrical and thermal design analysis. This will be carried out as part of the final design in consultation with specialist cable manufacturers.

A two-kilometre HVAC cable route will connect the converter stations to the existing National Grid substation at Lackenby. After installation, the trenches will be backfilled and the land reinstated so it can be returned to its former use. No permanent over-ground structures will remain beyond marker posts.

Where the cables need to cross obstacles such roads, railways, pipelines and waterways and it is not feasible to use open cut trenching, alternative installation techniques will be considered – most likely horizontal directional drilling (HDD), where the cable passes under the obstacle, would be used. Where HDD is used for road crossings, the need for road closures during construction will be reduced.

The cable installation techniques will be finalised after consent, as part of the detailed design process. The locations of temporary construction compounds for offices, storage areas and lay-down areas along the route will also be finalised at that time.

Onshore cable corridor

Is there anything else we should consider when finalising details for the onshore cable route not already within the draft Environmental Statement?

Electric and magnetic fields (EMF)

Forewind's proposals all comply with the established industry guidelines (1998 International Commission on Non-Ionizing Radiation Protection (ICNIRP)).

The underground cables will produce magnetic fields, however these will be below the limits set in the guidelines. Cable screening will eliminate any electric fields. The converter stations will generate electric fields from the above-ground conductors, however these fields will either be completely contained within the site, or at most will fall to zero within the first few metres of the perimeter fence.

Further information about EMF can be found in Forewind's EMF factsheet (available at www.forewind.co.uk) or on the Department for Energy and Climate Change website.[1]

Footnote

[1] www.gov.uk/consents-and-planning-applications-for-national-energy-infrastructure-projects

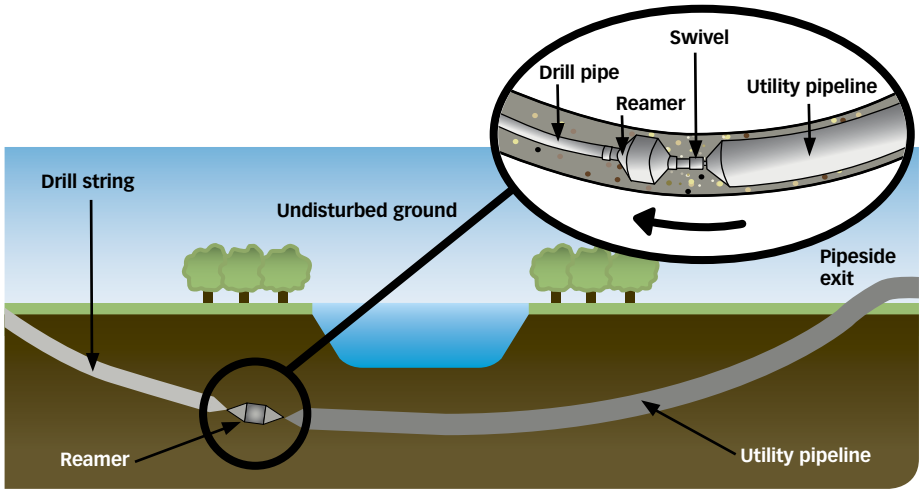


Illustration of horizontal directional drilling operation under a river

Converter stations

Indicative converter station landscape mitigation plan

1. Proposed bunding to screen views from Lazenby. Landform graded into existing bunds.
2. Proposed native woodland
3. Existing woodland

Visualisations of the converter station site viewed from Lazenby northern edge

Photograph of the site today

Computer generated visualisation of the converter stations

Visualisation 10 years after construction

Converter stations

The proposals include two converter stations, one for each of the wind farms. Converter stations are required to convert direct current (DC) electricity into alternating current (AC), so that the wind farms can be connected to the National Grid electricity transmission network.

The two converter stations will be built on industrial land contained within the Wilton Complex located to the south-west of Redcar.

Each converter station will include a valve hall, which is a large building up to 20 m tall that houses electronic devices to convert the power from DC to AC. The valve halls, which will include lightning protection, are expected to be steel-framed buildings with cladding; the colour and external materials will be agreed with the local authority post-consent.

The site for the converter stations will also include: ancillary buildings such as control room, storeroom and operator facilities; outdoor equipment areas with current connectors and transformers; permanent lighting to minimise glare and light spillage off-site, and space for car parking and internal roads.

Location and appearance of converter stations

After considering the proposed location, design and layout of the converter stations, how do you feel about them?

The footprint has been developed based on data from the major suppliers, and allowing for roads and drainage, construction and laydown areas, and landscaping. The final footprint will be determined in the detailed design process.

The draft ES details the proposed location and possible form of landscaping to mitigate the visual impact of the two converter stations. Views are sought on both the landscaping proposed and the associated impacts that implementing that landscaping may have on local residents.

Converter station screening

What is your opinion on the landscaping proposed to reduce the visual impact of the converter stations?

Environmental Impact Assessment

Above top: Harbour porpoise
Above: Herring gull

An Environmental Impact Assessment has been undertaken for Dogger Bank Teesside A & B. The findings of this assessment are presented in the draft Environmental Statement (ES) – a comprehensive report of the development's potential effects, both adverse and beneficial, during its construction, operation and decommissioning phases. Proposed mitigation measures (actions to reduce or avoid adverse effects), are also covered.

After this consultation, the final version of the ES and an accompanying Non-Technical Summary will be produced. They will be submitted to the Planning Inspectorate with the application for a development consent order, and will be made publicly available.

Habitats Regulations Assessment

A Habitats Regulations Assessment (HRA) to determine whether Dogger Bank Teesside A & B could have an adverse effect on the integrity of a Natura 2000 site, one of those belonging to a network of protected areas, has also been undertaken and is submitted alongside the draft ES.

Assessment summary

To follow is a very broad summary of the areas that have been assessed. Potential impacts identified as being major or moderate in the ES, can be regarded as significant in terms of the Environmental Impact Assessment Regulations. The potential for mitigation has been considered for these impacts. Full details can be found in the draft ES and Non-Technical Summary.

Designated sites

Information on designated sites can be found throughout the relevant chapters in the draft ES, however it is all collated in one chapter for ease of reference. In brief the construction, operation, and decommissioning phases of Dogger Bank Teesside A & B are predicted to result in no significant impacts on any UK designated sites and species, However, if they and all other projects currently in the planning process were to commence at the same time, harbour porpoise and harbour seal could potentially experience moderate adverse impacts. This is an issue that extends beyond just Dogger Bank Teesside A & B and discussions about wider mitigation strategies are underway at industry level.
(ES ref. Chapter 8)

Marine physical processes

Information about marine physical processes such as waves, tidal currents and sediment transport has been gathered via offshore instruments, geophysical and geotechnical surveys, and seabed sediment sampling, plus modelling. The modelling has identified a number of potential effects during installation and operation, for example, there will be temporary increases in suspended sediment concentrations. The impacts of these effects have been considered in the impact assessments for other marine topics within the ES and no significant impacts have been concluded. *(ES ref. Chapter 9)*

Marine water and sediment quality

Throughout all stages of Dogger Bank Teesside A & B's development and operation only a minor deterioration of water quality is expected, and that would be due to re-suspension of sediments and contaminants. There is a low risk of accidental pollution but to ensure this remains low, and as part of an overall Environmental Management Plan, industry standard control measures will be put in place to minimise the risk of spillages or leaks that could lead to accidental pollution. *(ES ref. Chapter 10)*

Marine and coastal ornithology

Baseline surveys and data collection were carried out to understand the numbers of marine and coastal bird species using the area in and around Dogger Bank Teesside A & B, their abundance and behaviour. The same data were also used to compare the birds located within the Dogger Bank Zone with the national and international populations. Eleven seabird species have been found to use the offshore areas in significant numbers, whilst 45 migratory bird (terrestrial and waterfowl) species were recorded flying through.

The impacts on the species during construction (and decommissioning) are predominantly short-term, reversible disturbance and displacement impacts. These are not significant with respect to the national and biogeographic populations of any species identified.

During operation there are likely to be: disturbance and displacement effects due to habitat loss or alteration; a barrier effect on breeding seabird and migratory wintering or passage bird populations; and collision effects. However, even when using the lowest population figures, none of these effects are predicted to be significant.

Offshore impacts

Above top: Fisheries survey
Above: Deploying offshore camera

Marine and coastal ornithology (continued)

This is still the case if Dogger Bank Teesside A & B, Dogger Bank Teesside C & D, Dogger Bank Creyke Beck and other planned developments are constructed and operated at the same time, although the cumulative effect of multiple developments could raise the level of the impacts on some identified species, but not to a point where populations would decline or their viability would be affected. *(ES ref. Chapter 11)*

Ornithological methodology

Do you have any comments on the way that Forewind has assessed the impact of our proposal on birds?

Marine and intertidal ecology

The seabed habitats recorded in the wind farm site, cable corridor and landfall areas are among the most common habitats found around the coast of the UK, with sandy sediments supporting relatively low diversity plant and animal communities. Whilst some disturbance and habitat loss may occur during the construction phase, the impacts are not predicted to be significant. *(ES ref. Chapter 12)*

Fish and shellfish

Information on existing fish and shellfish populations was collected to describe the species and their abundance and distribution. On Dogger Bank and in the export cable corridor several species of commercial value, such as sand eel, herring, haddock, whiting, cod, plaice, lobster and edible crab were found.

These fish and shellfish species may experience habitat disturbance or loss; increased suspended sediment concentrations and deposition; underwater noise, and electric and magnetic field emissions from subsea cables. However the impact assessment has established that none of the identified effects will result in a significant impact as they are mostly localised, temporary or can be mitigated through the adoption of low impact construction techniques. *(ES ref. Chapter 13)*

Marine mammals

Aerial and boat-based studies were conducted to assess the possible impacts of wind farm construction and operation on marine mammals such as harbour porpoise, white-beaked dolphin and minke whale. While there would be some impacts, primarily during construction, the key disturbance relates to hearing injury. An industry standard protocol will be implemented to minimise this and reduce exposure to risks. Other potential impacts which were assessed included possible collisions with vessels and changes to prey resource.

The cumulative impact assessment concludes that harbour porpoise will be impacted in terms of disturbance from pile driving noise. To date there is limited data which links the effects of disturbance to effects in individuals or populations, so the assessment conclusions are not certain. However, Forewind will continue to monitor research and follow new industry guidelines or mitigation measures should they be introduced, to reduce impact levels. Significant impacts due to underwater noise are not anticipated upon other species of marine mammal. *(ES ref. Chapter 14)*

Commercial fisheries

The commercial fisheries impact assessment used fisheries datasets from national agencies in the UK and other EU countries. It confirmed that fishing vessels from the UK, Netherlands, Denmark, Germany, Belgium, Norway, France and Sweden target several commercial species of fish and shellfish, with a variety of fishing gears, in the development area.

Potential impacts on fishing activities as a result of construction, operation and decommissioning of Dogger Bank Teesside A & B include: the effects of temporary, or complete loss of, or restricted access to, traditional fishing grounds; displacement or interference of fishing activity; safety issues for fishing vessels; increased steaming times to fishing grounds; and impacts on commercially exploited species of fish and shellfish.

The main significant impact on commercial fishing is the potential loss of fishing grounds for the seine net fishermen during the construction, operation and decommissioning phase. Forewind is committed to working with the seine netters who may be affected to explore options to reduce these impacts.

During construction and operation of the wind farms, additional mitigation to address the other impacts will include: regular Notices to Mariners; the establishment of safety zones of up to 500 metres during construction or significant maintenance work; installation of adequate safety lighting, and ensuring construction vessels follow international regulations in respect of fishing routes. *(ES ref. Chapter 15)*

Offshore impacts (continued)

***Jubilee Spirit* survey vessel**

Shipping and navigation

Marine activity in the Dogger Bank area is primarily commercial, rather than recreational, and is less frequent when compared with the wider North Sea area due to shallow seas. Very few vessels transit through the site and, given its location, relatively small changes in a vessel's course will be necessary to avoid the development. This means that although the number of potential hazards increases as a result of the project, significant impacts are not expected. *(ES ref. Chapter 16)*

Other marine users

Other marine users include: renewable energy projects and carbon capture and storage, oil and gas activity, aggregate extraction, subsea cables and pipelines. It is anticipated that, through engagement with the potentially affected parties, significant residual impacts will be avoided.

This is particularly key near to the proposed landfall where there are several planned, active or out of use cables and pipelines. Mitigation measures include: minimum separation distances between underwater structures; comprehensive mapping and the development of proximity agreements. *(ES ref. Chapter 17)*

Marine and coastal archaeology

The offshore area of Dogger Bank is a well-researched and archaeologically important prehistoric submerged landscape that joined the UK coastline to north-west Europe during glacial periods when sea-levels were at their lowest. The North Sea, between Dogger Bank and the Teesside coastline, also has wreck sites and numerous aviation casualties from the Second World War. A series of exclusion zones around identified archaeological remains and features will ensure there are no significant residual impacts on marine and coastal archaeology. *(ES ref. Chapter 18)*

Military activities and civil aviation

The impact assessment considered the potential impacts of Dogger Bank Teesside A & B on all relevant Ministry of Defence (MoD) activities as well as impacts upon the interests of the Civil Aviation Authority, National Air Traffic Services, Meteorological Office weather radar, offshore helicopter operators, coastguard search and rescue operations and airports.

The development will not significantly change conditions in ways that would adversely impact MoD practice and exercise areas. To ensure the safety of military vessels and aircraft, turbines will be lit to an agreed standard and wind farm details will be incorporated into the appropriate naval and aeronautical charts.

While search and rescue helicopters may be affected by growing numbers of obstructions in areas of formerly open water, proposed mitigation measures such as lighting, marking, maximising turbine visibility on radar and on-going consultation will ensure search and rescue operations can take place safely. *(ES ref. Chapter 19)*

Offshore impacts

Do you have any comments on the offshore impacts and the proposed mitigation measures?

Seascape

Due to the distance of the wind turbines offshore, the development will not impact the coastal seascape character. There will be temporary impacts on the coastal character during the construction at the landfall and installation of the offshore export cables, however this will be short-lived. *(ES ref. Chapter 20)*

Socio-economics

Potential socio-economic benefits within the North East region relate to the potentially very significant project expenditure and both direct and indirect job creation during the construction and operation phases of the wind farms.

Forewind has proactively engaged with the UK supply chain and regional suppliers, to ensure that a high quality, sustainable supply base for the industry can be developed. The organisation has also initiated the Champions for Wind schools programme, providing teachers with bursaries, and access to industry experts, to enable them to develop curriculum-based lessons and materials. The aim is to highlight all the potential career opportunities likely to come from the offshore wind energy industry. *(ES ref. Chapter 22)*

Onshore impacts

Above top: Marske-by-the-Sea
Above: Smooth newt

Landscape and visual impact

During construction there will be a limited temporary landscape and visual impact due to activity at the landfall and along the cable route. These will be short-term and after construction, each affected area will be reinstated to its pre-construction condition.

During operation, impacts are limited to the permanent above-ground features, namely the converter stations and possible works required to extend the existing Lackenby substation. A new section of landscaped bund, with associated tree planting, has been proposed as a possible solution to help screen views of the converter stations from the surrounding areas. The agricultural farmland to the south and south west, and the edge of the settlement of Lazenby will experience the main landscape and visual impacts though the introduction of a bund and planting will reduce these visual impacts over time as seen in the visualisation photographs on page 10. *(ES ref. Chapter 21)*

Tourism and recreation

Some minor, short-term impacts have been identified on onshore tourism and recreation features during the construction phase. These are associated with disruption and a reduction in the amenity at the Kirkleatham Museum, the Kirkleatham Owl Centre, local towns and villages, the National Cycle Trail, Public Rights of Ways and other footpaths. These impacts will be managed through good communication with the community and representatives from the tourist attractions; by minimising the duration of any closures and via the agreement of a strategy with the Public Rights of Way Officer at Redcar and Cleveland Borough Council. *(ES ref. Chapter 23)*

Onshore geology, water resources and land quality

Desk studies and site walkovers detailed all geology, rivers, streams, ditches, areas of contamination, flood sensitivity and any important water resources along the proposed cable route. Potential construction impacts such as discharge of contaminants, surface water run-off, removal of groundwater to surface water and the generation of construction waste will be managed via the use of appropriate construction practices and through the adoption of a Site Waste Management Plan. *(ES ref. Chapter 24)*

Community engagement

Could we improve our communication with you, and how? Do you have any suggestions on how best to engage and inform local communities during construction?

Terrestrial ecology

The cable route and converter stations are mainly located within agricultural land of low ecological value. However the cable route does also cross the Redcar to Saltburn Coast Local Wildlife Site, which has a more valued coastal grassland habitat with a number of hedgerows. A diverse mix of bird species were found to be breeding along the cable corridor, bats were recorded foraging in the hedgerows and wintering bird species were also found to be using the coastal fields close to the landfall during the winter months. Construction impacts on hedgerows and the local ecology will be minimised by reducing the working area, reinstating habitat, through local consultation, sensitive vegetation clearance and good working practices. *(ES ref. Chapter 25)*

Land use and agriculture

Onshore construction activities will disrupt existing land use and agricultural activities along the length of the cable route and at the site of the converter stations. However, this disruption will be temporary and landowners and occupiers will be consulted throughout. *(ES ref. Chapter 26)*

Onshore cultural heritage

Known sites of cultural heritage importance have been avoided and any impacts upon buried archaeological features are not considered to be significant.

The operational converter stations will be visible from the scheduled monument hill fort at Eston Nab, however the buildings will be no taller than the existing nearby structures and will not be a prominent feature in the landscape. *(ES ref. Chapter 27)*

Traffic and access

The construction of Dogger Bank Teesside A & B means large numbers of vehicles, such as HGVs, will use the main roads and add to the existing ordinary traffic through the area. To minimise the effects, construction traffic will be directed to two primary compounds, six intermediate compounds and two converter station compounds, which have been positioned to avoid routing through sensitive locations such as schools and residential areas.

Construction traffic access options have been selected to avoid smaller local roads and built up areas. For access to the cable route section near the Lackenby substation, two alternative access routes have been proposed. Route 1 is to the west of the substation and Route 2 is to the east using the existing A1053 underpass.

Onshore impacts (continued)

Traffic and access (continued)

Route 2 would remove traffic from the more sensitive B1380 and direct it along the less sensitive A174. As part of this consultation Forewind invites feedback on two alternative access routes (see map this page).

Construction access near the substation

Of the two proposed alternative construction access routes to the National Grid Lackenby substation, which do you prefer?

A construction traffic management plan and construction travel plan will be developed in consultation with the Highways Authorities (Redcar and Cleveland Borough Council and the Highways Agency) to ensure that construction traffic is managed throughout the construction period. *(ES ref. Chapter 28)*

Noise

Forewind's noise assessments identified that a small number of properties in the Old Lackenby and Marske-by-the-Sea areas are located close enough to the proposed construction works to potentially experience elevated noise levels during that period. Construction noise in any one location will be relatively short-lived and the installation of fencing, to screen these properties from the construction works, will reduce the noise level at this small number of properties.

The baseline noise survey at the converter stations found noise levels typical of a heavy industrial area, variable in the day though steady and relatively high at night. An assessment of operational noise for the converter stations predicted that some form of noise reduction may be needed to ensure levels are acceptable at The Grange Estate, Lazenby Grange Farmhouse, Wilton Complex office accommodation and Wilton Golf Club. *(ES ref. Chapter 29)*

Air quality

There may be some air quality impacts where the construction is close to housing and public areas, however, a range of measures to be specified in a Dust Management Plan, will ensure that dust generated during construction does not cause a nuisance to people. Such measures are routinely and successfully applied to construction projects throughout the UK. *(ES ref. Chapter 30)*

Cumulative impact assessment

There is no industry-wide method for cumulative impact assessment although representative body Renewable UK has released guidelines, which are in line with the approach Forewind has adopted. The approach is set out in the appendix to Chapter 4 of the draft Environmental Statement, which includes other projects within the Dogger Bank Zone. This strategy has been applied throughout the offshore chapters of the Environmental Statement.

Cumulative impact assessment

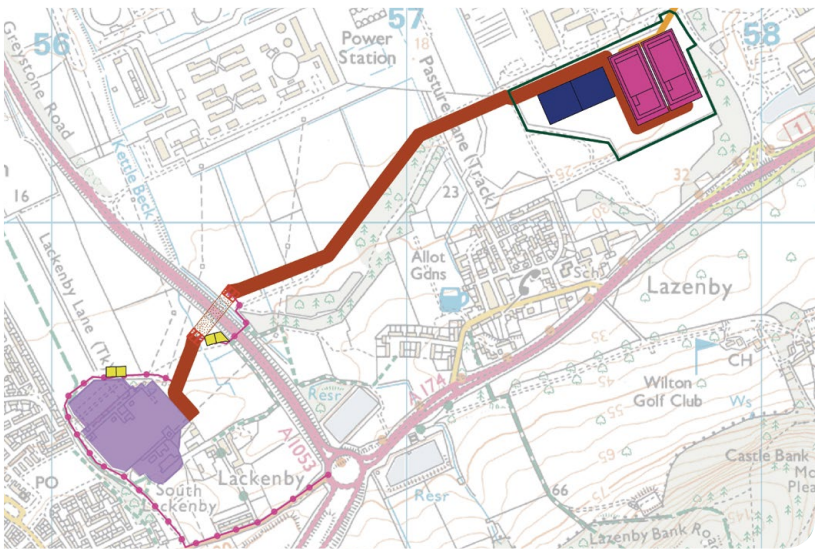
Views are sought on Forewind's selected approach to cumulative impact assessment.

Onshore cable route

- Dogger Bank Teesside A&B HVDC, open trench
- Dogger Bank Teesside A&B HVAC, open trench
- Dogger Bank Teesside A&B HVAC, HDD
- Dogger Bank Teesside A&B minor horizontal directional drill entry or exit locations
- Dogger Bank Teesside A&B intermediate construction compound options

Converter station site

- Dogger Bank Teesside A&B converter stations area of work
- Dogger Bank Teesside A&B converter stations
- Dogger Bank Teesside A&B converter stations construction compounds
- National Grid Lackenby Substation
- HVAC access options



Map of indicative construction access route

Dogger Bank Met Mast East

How to respond

The final statutory consultation period for Dogger Bank Teesside A & B will run from Monday, 4 November to Friday, 20 December.

The consultation documents will be available at the three public exhibitions, which all stakeholders are encouraged to attend.

There will be three consultation events as follows:

Venue	Date (2013)	Time
The Hub 28–29 Esplanade, Redcar, TS10 3AE	**Friday** **22 November**	**2pm to 7.30pm**
Lazenby Village Hall High Street, Lazenby, TS6 8DU	**Saturday** **23 November**	**10.30am to 4.30pm**
Zetland Park Methodist Church The Crescent, Redcar, TS10 3AU	**Monday** **25 November**	**11am to 6pm**

Responses to the consultation can be submitted –

In person	**At the public exhibitions**
Email	**info@forewind.co.uk**
Freephone	**0800 975 5636**
Website	**By the electronic questionnaire available at www.forewind.co.uk**
Post	**Freepost RSLY-HKGK-HEBR** **Forewind** **Davidson House** **Forbury Square** **Reading** **RG1 3EU**

The consultation documents will be available to download from **www.forewind.co.uk** and in hard copy at the following libraries during the consultation period: Grangetown, Guisborough, Laburnum Road, Marske, Redcar Central, Roseberry and Saltburn. DVDs will be available free of charge at Kirkleatham Museum, the local mobile library and the Wilton Centre.

They can also be requested from Forewind directly. DVDs and printed copies of the Non-Technical Summary will be available free of charge and printed copies of the Environmental Statement will be available at cost price (£600).

Please note that Forewind must receive your response by Friday, 20 December to ensure its consideration. Responses are likely to be made public as part of the Dogger Bank Teesside A & B application.

A summary of the consultation and information about how we are taking responses into account will be included in the winter edition of our newsletter: Dogger Bank News. This will be available on our website and sent electronically or in hard copy to all those that have registered with Forewind. You can register to receive the newsletter on our website or by contacting us in any of the ways listed above.

A full account of the consultation will be included in the Consultation Report, which will be submitted to the Planning Inspectorate as part of the application. Therefore, please note that responses are likely to be made public.