

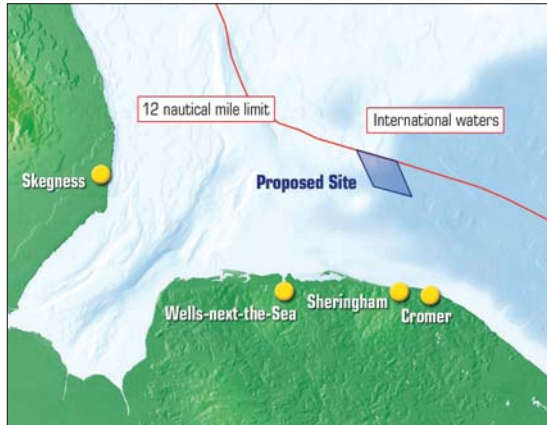


ENVIRONMENTAL STATEMENT NON TECHNICAL SUMMARY

# SHERINGHAM SHOAL OFFSHORE WIND FARM

MAY 2006

# INTRODUCTION



Overview of proposed project location

## Scira Offshore Energy Ltd.

Scira Offshore Energy Ltd (Scira) is proposing to construct and operate an offshore wind farm, known as Sheringham Shoal, sited offshore from the coastal town of Sheringham on the north Norfolk Coast. Scira is a project specific company formed by Hydro from Norway, Econcern from the Netherlands and SLP Energy from the UK.

## Project Details

The proposed wind farm would be located approximately 17 to 23km offshore from the north Norfolk coastal town of Sheringham and approximately 5km north of the offshore sand bank known as Sheringham Shoal (see Figure 1). The wind farm would comprise between 45 and 108 turbines located in water depths of approximately 15m to 22m at lowest astronomical tide (LAT).

The wind farm turbines would be connected via an inter array network of cables which would link at one or two offshore transformer substations located within the wind farm. From these stations power would be exported via two marine cables which would make landfall in the vicinity of Weybourne Hope on the north Norfolk coast. Two routes for the site to shore export cables are being considered; a preferred direct route which passes directly across Sheringham Shoal and an alternative western route which passes to the west of the shoal.

Onshore, the cables would be connected to a new switch station situated in the grounds of the Muckleburgh Collection, approximately 800m inland (Figure 2). From the switch room a new electrical connection would be required in order to pass electricity into the national grid. This new grid connection would be the subject of a separate consent.

Each turbine would comprise of a three bladed rotor mounted on the hub of a nacelle located on a tower section. The tower would be mounted on a pre-installed foundation on the seabed. The maximum height of the turbines would be up to 172m above mean high water springs (MHWS) to the blade tip in the vertically up position, and the minimum clearance to the blade tip in the vertically down position would be 22m above MHWS.

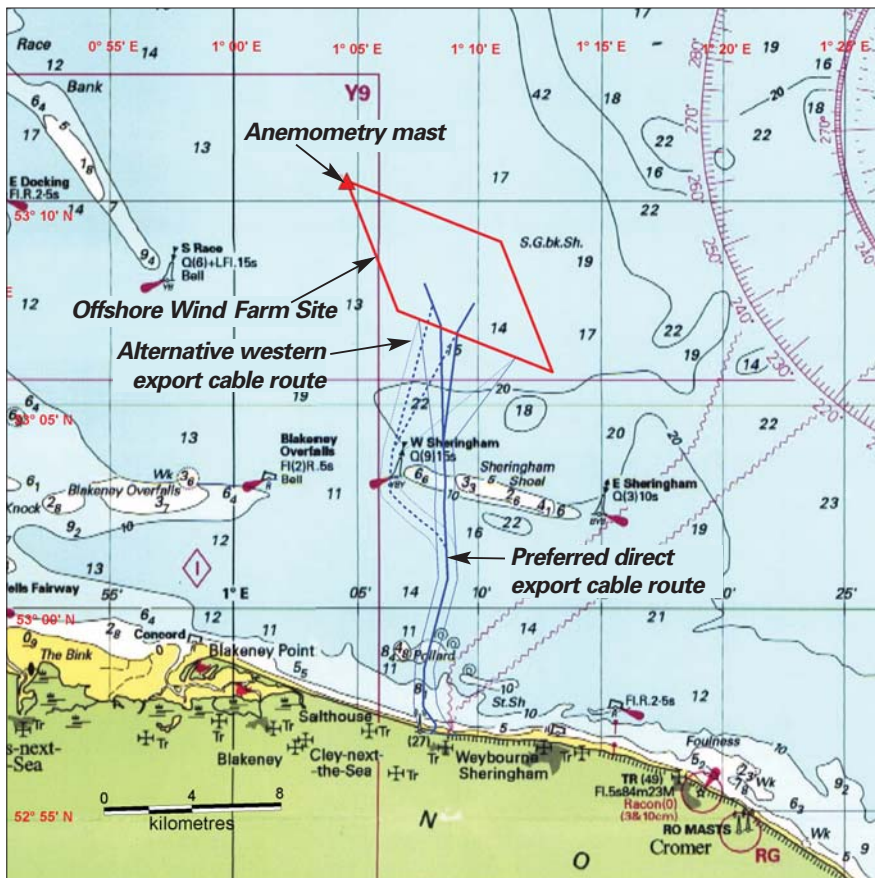


Figure 1 - Overview of the proposed project

A number of different foundation types are being considered for the project, including the monopile, tripod or quadruped structure (a frame with 3 or 4 piles), concrete gravity base and suction caisson. The final decision on the foundation will depend on the size of the wind turbine and detailed investigations of the seabed conditions. Rock protection around the base of the foundations may also be required to avoid erosion or scour of the adjacent seabed.

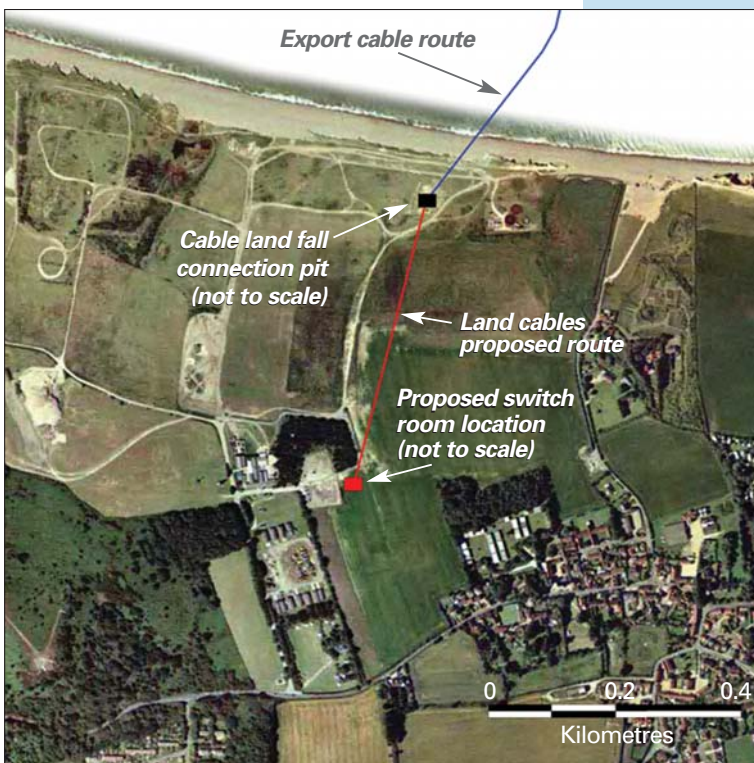
A number of installation methods for the project have been considered including piled or drilled monopiles and the use of a number of burial methods for the cables including the ploughed method or the trenched/jetted method. All cables would be buried between 1 – 3m below the seabed depending on the ground conditions. At the landfall site the cables would be ducted under the shingle bank and then buried in a 1m deep trench to a new switch room as shown in Figure 2.

The wind farm would have an operational life of 40 years during which regular servicing of the turbines would take place along with any required maintenance. The wind farm would then be decommissioned in accordance with an agreed Decommissioning Plan. It is likely that all structures above seabed level would be removed. Cables would be disconnected and left buried, with notification that they are disused, as is current common practice.



### The need for renewable energy

The central aim of the UK Government's energy policy is to establish a supply of energy that is diverse, sustainable and secure and is offered at competitive prices. Key to this goal is a 60% reduction of CO<sub>2</sub> emissions by 2050. The development of renewable energy plays a key role in the Government's strategy for carbon reduction. In 2000, the Government proposed an initial ten year strategy, which included a target to generate 10% of the UK's electricity from renewable sources by 2010. Revised targets have proposed that 15% of the UK electricity supply should come from renewable sources by 2015, with an aspiration of 20% by 2020. The Government's targets for renewable energy will help the UK to meet its international obligations, but also obtain greater security of energy supply. The construction of wind farms, (both on- and offshore) is expected to be the largest contributor to the renewable energy sector and wind energy will provide the greatest contribution to the 2010 target of all of the renewable energy technologies.



The proposed Sheringham Shoal wind farm is expected to contribute up to 2.4% of the target for renewable energy in 2010 and supply up to 178,000 (BWEA 2005) homes with renewable electricity per year.

*Calculations based on British Wind Energy Association (BWEA) 2005, applied load factor: 30%.*

*Left: Figure 2  
Location of proposed export cable landfall and onshore cable route at The Muckleburgh Collection, Weybourne, Norfolk.*



*Right: Offshore Wind Turbines*

## REGULATORY REQUIREMENTS AND THE EIA PROCESS

### Regulatory Consents

A number of regulatory consents are required for the construction and operation of the Sheringham Shoal project. The Department of Trade and Industry (DTI) leads the consent process in association with the Department for Environment, Food and Rural Affairs (Defra).



*Installation of an offshore wind farm*

Scira is applying for the following key consents:

- Consent under **section 36 of the Electricity Act 1989** to construct and operate the offshore wind power generating station, including all ancillary infrastructure.
- Licence under **section 5 of the Food and Environment Protection Act 1985** to deposit materials such as the turbine foundations and the buried cables, on the seabed.
- Consent under **section 34 of the Coast Protection Act 1949** in order to make provision for the safety of navigation in relation to the export cables.
- Deemed planning permission under **section 90 of the Town and Country Planning Act 1990**, sought as part of the section 36 application, for the onshore elements of the works.

In gaining consent under the Electricity Act or the Food and Environment Protection Act, conditions may be imposed to control and mitigate the impact of the development.

In addition, the extinguishment of public rights of navigation will be requested under the Energy Act 2004 for the areas of seabed directly covered by the offshore structures comprising the turbines, transformer stations and meteorological mast. Safety Zones of up to 500m around all structures will also be requested, which would limit the activities of certain vessels within this area. The exact requirements for Safety Zones will depend on the phase of the project and the activity involved. This is to ensure the safety of life at sea.

### Programme

The most suitable period for offshore construction activities, cable laying and landfall works is during the spring and summer months when the weather is most favourable. It has not yet been determined whether construction would take place over one season or spread over a longer period. This would be influenced by factors including the number of turbines. It is anticipated, however, that the majority of the onshore cable works would be undertaken over the winter period when the Muckleburgh Collection museum is closed, in order to minimise interference to the museum operations as well as recreational users and tourists in the area.

*View of Sheringham*



## The Need for Environmental Impact Assessment

The Sheringham Shoal project is subject to an Environmental Impact Assessment (EIA), as required under the Electricity Works (Environmental Impact Assessment) Regulations 2000.

### The EIA Process

EIA is a tool for systematically examining and assessing the impacts and effects of a development on the environment. The resultant Environmental Statement reports on the EIA and contains:

- Description of the development proposal, including any alternatives considered;
- Description of the existing environment at the site and its environs;
- Prediction of potential impacts on the existing human, physical and natural environment at the site and assessment of subsequent effects;
- Description of mitigation measures to avoid or reduce such effects;
- Description of monitoring requirements; and
- Non-Technical Summary.

## Scoping and Consultation

A scoping exercise was carried out to identify the main issues that needed addressing as part of the EIA and subsequently agreed with the DTI, Defra and others. Consultation formed an essential part of the EIA process and included over 45 statutory and non-statutory bodies representing key interests and user groups in the North Norfolk District and the wider area, including navigation interests.



Public Exhibition in Sheringham

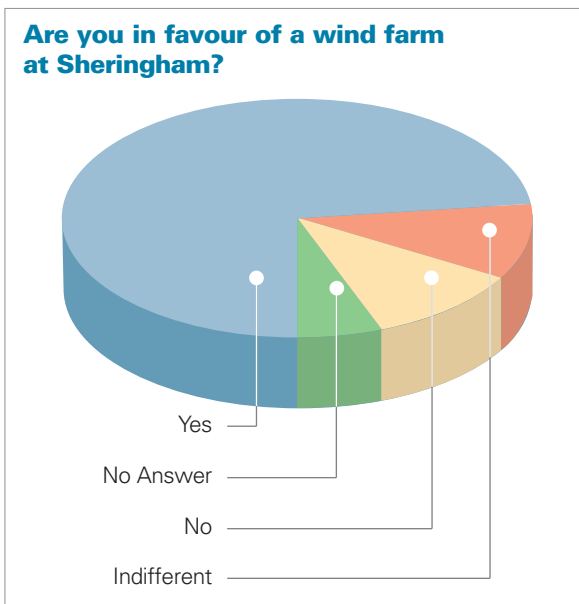
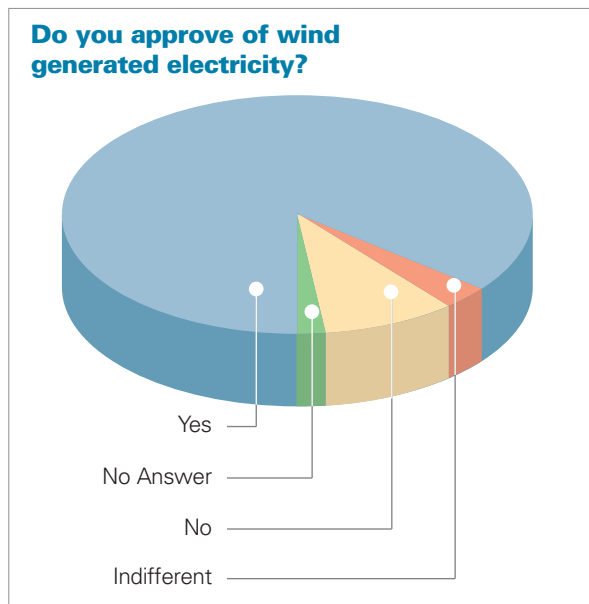
A tailor-made communication and consultation campaign dedicated to the fishing community is also ongoing.

To ensure that local people were aware of and involved in the EIA process, an all day public exhibition was held on the 28th of April 2005 in Sheringham. Some 300 visitors attended, of which nearly three quarters were in favour, in principle, of building an offshore wind farm off the coast of Sheringham. Particular issues that were raised included effect on bird life; fishing; visual impact; peripheral construction activities; and sea life.

Scira maintains a dedicated website containing up-to date information on the project plans and its progress: [www.scira.co.uk](http://www.scira.co.uk). Consultation and liaison will be ongoing throughout the life of the project.



## Public Questionnaire Results from Sheringham Exhibition



### Original data collection and surveys

Further to the findings of the scoping exercise and consultation with the statutory consultees, the following surveys were undertaken as part of the EIA in order to collect site specific information about the area:

- Oceanographic survey;
- Geophysical survey;
- Shallow geotechnical surveys;
- Natural fisheries survey;
- Marine water and sediment quality;
- Marine ecological survey;
- Marine archaeological survey;
- Shipping and navigation survey;
- Commercial fishing survey and observation trips on local vessels;
- Bird surveys (aerial, boat based and via radar);
- Terrestrial ecological survey; and
- Seascape and visual character assessment.



Conducting the bird survey along the cable route

### Impact identification and evaluation

Impact identification and evaluation was carried out via a number of methods and techniques, including reference to guidelines, research and literature review, computer modelling and consultation. In order to provide a consistent framework for considering and evaluating impacts, significance levels have been assigned to each impact. The assigned definitions are set out in Table 1.

**Table 1 Terminology for classifying environmental impacts**

Impact Significance	Definition
Major adverse	The impact gives rise to serious concern and it should be considered as unacceptable.
Moderate adverse	The impact gives rise to some concern but is likely to be tolerable depending on scale and duration.
Minor adverse	The impact is undesirable but of limited concern.
Negligible	The impact is not of concern.
No Impact	There is an absence of one or more of the following: impact source, pathway or receptor.
Minor beneficial	The impact is of minor significance but has some environmental benefit.
Moderate beneficial	The impact provides some gain to the environment.
Major beneficial	The impact provides a significant positive gain.

### Mitigation and monitoring

Mitigation measures are considered and described where potentially significant adverse impacts were identified, either as part of design or as a measure implemented during construction or operation with the objective of avoiding, reducing or minimising those

impacts. A series of monitoring programmes will also take place during construction or operation of the project to verify predicted impacts and add to the existing knowledge and understanding of environmental impacts associated with this kind of development.



## SUMMARY OF ENVIRONMENTAL IMPACTS

### Introduction

The following sections summarise the potential environmental impacts associated with the construction and operation of the Sheringham Shoal project. The following environmental topics have been assessed for the two elements of the project:

#### *Offshore wind farm and export cable route*

- Hydrodynamics and geomorphology;
- Marine and coastal water quality;
- Ornithology;
- Marine ecology;
- Natural fisheries resources;
- Marine mammals;
- Commercial fisheries;
- Landscape, seascape and visual resources and character;
- Shipping and navigation;
- Marine archaeology;
- Military and aviation;
- Other human activities; and
- Socio-economic activities.

#### *Landside cable route and infrastructure*

- Geology, land quality and water resources;
- Terrestrial ecology, including ornithology
- Landscape and visual character;
- Terrestrial archaeology and cultural heritage;
- Coastal tourism and recreation;
- Traffic and access; and
- Noise, dust and air quality.

Cumulative impacts from other wind farm developments or other existing or planned projects or activities in the area have also been addressed, as well as the impacts from decommissioning. These are discussed in detail within the Environmental Statement.

### Offshore wind farm and export cable route

#### *Geology, hydrodynamics and geomorphology*

The mobile surface sediment of the site and cable route are mainly comprised of gravelly fine to medium sand varying in depth from 0.5m (near the shore) to 10m (at Sheringham Shoal). These sediments overlie Bolders Bank formation and chalk bedrock which is periodically exposed at the surface near the shore then dips gradually to 20m below the seabed to the north of the wind farm site.

An assessment of the impact of the wind farm on hydrodynamics and geomorphology looked at the changes that the wind farm and cable route would have on the local waves, currents, sediment transport regime and features of the seabed. The project would have some localised impact in the immediate vicinity of the wind farm site such as localised erosion or scour around the base of the foundations but no significant impacts further afield. The design of the foundation structures would take account of any scour and may include rock placement as protection against erosion. Overall, changes caused by the structures are likely to be less than those experienced due to natural variation and are therefore of **negligible** significance.

It has been shown by numerical modelling that increases in suspended sediment levels due to the cable laying process are small, localised and short lived. Increases are considered very low and probably insignificant for ploughing, with higher but still localised concentrations for trenching. The routes have been chosen to avoid areas of chalk at the surface as far as possible. Overall a **minor adverse to negligible** effect is predicted on suspended sediment levels.

The beach at Weybourne Hope is exposed to a high energy wave and tidal environment and is also subject to ongoing erosion. To avoid disturbance of the low cliffs at the rear of the beach and the shingle bank that protects them, the cables would be installed through a duct, pre-drilled under the cliff and shingle bank which would also take account of the ongoing erosion in the area.

### *Marine and coastal water quality*

There are five designated bathing water areas and one designated shellfish water area located within the vicinity of the Sheringham Shoal project, the nearest being located at Sheringham and Blakeney respectively. Due to the exposed location of the site, the localised extent and nature of the sediment disturbance and the distance of the construction activities from the designated sites, **no impacts** on water quality of these sites are anticipated. The low sensitivity of the water quality outside these designated sites means that impacts would be of **negligible significance**. The disturbance of short lengths of areas of surface and near surface chalk on the export cable route could lead to a visible milky plume; however the impact would be of an aesthetic nature only and would be dispersed over a number of tides.

Strict adherence to standard pollution prevention guidance, site environmental plans and best practice will reduce risks to water quality from accidental spillage during construction and operation.



*Children playing on Sheringham Beach*

In order to minimise disturbance during operation and reduction of any possible barrier effect, the wind farm will be designed so that the corridors between rows of turbines are orientated in the main flying direction of the north Norfolk Tern population which travels between its breeding sites on the coast and foraging areas of sea to the north east of the wind farm site. Overall the presence of the wind farm is considered to have a **minor adverse** impact on Terns and Razorbills and a **negligible** impact on other species.

The nature and magnitude of actual impacts on all species of concern will be assessed through a monitoring programme which will be developed in consultation with English Nature.

### *Marine ecology*

Impacts of greatest potential significance, in the context of the marine ecology of the area, are anticipated to arise during the construction phase of the development, specifically, the direct impact on habitats and species through the installation of foundations, cables and associated infrastructure. The sediment types and communities found within the footprint of the Sheringham Shoal project are typical of the wider study area and are consistent with the findings of other studies. No species of conservation significance are present within the footprint of the construction activities, and the communities, comprising polychaete worms, crustaceans and bivalve molluscs are considered to be well adapted to living in a dynamic and periodically disturbed environment. As such, the potential direct impact of habitat loss during construction is considered to be of short term duration and of **minor adverse** significance.



### *Ornithology*

A programme of boat-based, aerial and radar bird surveys over two years were used to understand the use and activity of the proposed wind farm site by birds. Species of note included Sandwich and Common Terns, Little Gulls and Razorbills, Gannets, Lesser Black-backed Gulls and Guillemots.

Although the surveys showed relatively few numbers of birds using or flying through the area, bird species were assessed in relation to their risk of collision and the level of potential disturbance and displacement from the area during construction and operation. This concluded that no single species would be likely to incur impacts that were considered to be significant.



Sediment disturbance and deposition from construction activities such as cable installation, could have an adverse indirect impact on the marine communities, through increased turbidity and smothering. Modelling has shown that the vast majority of disturbed sediment is expected to settle in the immediate vicinity of the disturbance. The amount of fine sediment is limited in the area, and outcrops of chalk would only be encountered along a short stretch of the cable route. Research and studies have shown that the benthic community is tolerant to such disturbance and shows a rapid rate of recovery. The potential impact is considered to be of short term duration and **negligible** significance.

Following construction a range of benthic species from the wider study area are expected to rapidly colonise the foundations and any scour protection. This colonisation may serve to cause some highly localised increase in biodiversity, and would provide foraging opportunities and refuge habitats for a range of species.



practices, such as soft-start piling which gradually increases the amount of noise produced, these impacts can be effectively reduced. A **minor adverse** impact is anticipated. Following construction, fish would be expected to return to the area.

Increased suspended sediment concentrations, caused by the cable installation process in particular, have the potential to impact upon shellfish. However, the short term construction activities and the localised nature of sediment deposition would minimise the impact, resulting in a localised **minor adverse** impact on shellfish.

Potential impacts during the operation of the wind farm include underwater noise and vibration, the fish aggregating effect of the structures and the influence of electromagnetic fields from the buried cables. Research in these areas as well as results of monitoring at other offshore wind farm sites indicates that a **negligible to minor adverse** impact is anticipated.



Local fishing boats in Sheringham

### Natural fisheries

In excess of 70 fish species were caught during the site-specific surveys during April, July, and September 2005, including immature herring and whiting, dab, pogue, sprat and lemon sole. The fish species is considered typical for the area and is similar in diversity to previous surveys. Shellfish species included pink shrimp, edible crab, velvet crab and lobster. The lack of herring in the surveys in July and September indicated that herring do not use the wind farm area or the cable route as a spawning ground.

Noise created during the construction period, in particular through pile driving, is anticipated to have the greatest potential impact on sensitive fish species leading to disturbance, displacement and fish mortality in some cases. However, by adopting good working



**Marine mammals**

The most common marine mammal species in the area are harbour porpoise and common seal, with The Wash hosting the main common seal population in England and Blakeney Point on the north Norfolk coast providing an important breeding site. Site specific data, however, indicated a low presence of these or other species in the wind farm area.

As marine mammals rely on sound for communication, navigation and orientation, the noise from construction activities, particularly piling works, have the potential to significantly affect harbour porpoise and seals. Mitigation measures will be implemented to minimise harm including measures such as Soft Start piling procedures which slowly ramp up the piling noise allowing marine mammals to move out of the area. Monitoring studies undertaken during construction and operation of other offshore wind farm sites have shown no significant impact on seals or porpoises.

On the basis of the current knowledge of the effects of wind farm operational noise, the relatively low presence of marine mammals within the proposed wind farm area, and the distance from their main centres of activity, it is concluded that the adverse effects due to operational noise are likely to be **negligible**.



*A Common or Harbour Seal*

In relation to the cable route the highest levels of activity occurs over the inshore section out to approximately the 3 mile limit by small beach-launched fishing vessels. Whilst the level of this activity declines further offshore, the Sheringham Shoal is a recognised fishing area.

Potential impacts on commercial fishing activities include complete loss or restricted access to traditional grounds; interference with fishing activities; increased steaming times; construction debris left on the seabed; adverse impacts on commercial species and safety issues for fishing vessels.

All potential impacts identified during the construction phase are assessed as **negligible** to commercial fisheries other than loss of fishing area which is assessed as being **minor adverse** for the six or seven inshore static gear vessels that regularly operate in the wind farm site area. During construction the cumulative loss of fishing area and increased steaming times may cause minor adverse impacts, while impacts on commercially exploited species are deemed to be **negligible**.

All potential impacts identified during the operational phase are assessed as **negligible** to commercial fisheries other than interference to fishing activity for those static gear vessels operating in the area, which is assessed as being **minor adverse**. The assessment assumed exclusion of all towed and drifting gear and conditional access for static gear within the wind farm site. Scira proposes to work with potentially affected fishermen to establish the feasibility of operating static gear vessels within the site. Assuming that access between turbines can be permitted for these vessels, impacts on fishing area and steaming times are assessed as **negligible**.



**Commercial Fisheries**

The wind farm location is not a primary fishing area and does not support as much fishing effort as the banks and shoals to the west of the site. No significant trawling activity was observed within the proposed wind farm area and only limited long lining on a seasonal basis has been reported. There is, however, a history of vessels mainly from Blakeney and to a lesser extent Wells undertaking some seasonal static gear fishing within the area of the wind farm site. Between six and seven of these local potting vessels regularly visit the site targeting crabs and lobsters.

### *Landscape, seascape and visual resources and character*

The seascape would be directly affected by the presence of the wind farm site as the area is currently open sea. The significance of the effect on seascape resources and character would be direct and **major** at the site itself, but would be indirect outwith the site decreasing with distance.

There would be no change to landscape resources as a result of the offshore wind farm and an indirect effect of **moderate** significance on the landscape character along the nearest coastal edge, decreasing to **minor** or **negligible** further inland.

There would be a change to visual amenity and to views from key viewpoint locations throughout the study area, largely along the coastal edge, but only when atmospheric conditions are clear. On such occasions, about 60% of the time, impacts of **major** significance would result at a few of the closest locations. Further inland, vegetation and changes in terrain obscure many views.

The location of the wind farm 17 - 23km offshore and the frequent presence of low levels of visibility in the area reduce the significance of the impacts. Over the 40 year lifespan of the wind farm the effect is likely to be tolerable.

Whilst a number of the other wind farms planned off the north Norfolk coast could be seen at the same time as the Sheringham Shoal project, there are no land based viewpoints from where the sites in combination would appear as a single development due to their separation distances.

### *Shipping and navigation*

A navigational risk assessment, based on a detailed review of navigational aspects and a number of surveys, was undertaken to determine the impact of the Sheringham Shoal Wind Farm on shipping and navigation. The level of shipping navigating through the wind farm site is low with merchant shipping tending to avoid the area due to the surrounding shallows. There would be a **minor adverse** impact on merchant vessels, fishing and recreational activity in the area. The use of safety zones around each structure of up to 500m would be used to ensure safety of life, whereby vessels would not be allowed to enter. A Safety Zone of 100m is proposed for fishing and recreational vessels. All requisite day and night marks and lights will be used to ensure safety of navigation.

### **Visualisations of the Sheringham Shoal Offshore Wind Farm**



Figure 1. View from the beach car park, Cley next the Sea on a clear day



Figure 2. View from Peddars Way between Weybourne and Sheringham on a clear day



Figure 3. View from Beeston Hill, Sheringham on a slightly hazy day

### **Marine archaeology**

The known and potential archaeological resources within the vicinity of the area include wrecks, ship-borne debris and potentially drowned landscapes, from the Lower Palaeolithic to Modern period.

No known areas of archaeological importance have been identified, however mitigation measures will be implemented for offshore and intertidal areas to ensure that any features of archaeological importance that are identified are either avoided or recorded.

### **Military and aviation**

Operational turbines in a wind farm can adversely affect radar through causing 'false' reflections, loss of signals from targets behind a turbine and intermittent returns. Due to the numbers and locations of proposed wind farm sites in The Wash region, the Ministry of Defence is carrying out a study in order that a collective mitigation strategy can be developed. There are no other impacts on civil airspace or radar.

### **Other human activities**

There are no existing activities or infrastructure, such as oil and gas facilities, pipelines and cables or marine aggregate extraction sites in the area which would conflict with the proposed Sheringham Shoal wind farm. There is some risk of construction activities disturbing unexploded ordnance on the seabed, including mines, bombs and anti-aircraft munitions. Surveys will be undertaken prior to construction and clearance carried out if necessary. Overall, the impacts resulting from other human activities are predicted to range from **no impact** to **negligible**.



### **Socio-economics**

The project has the potential to generate some positive economic effects which, given the construction investment and its 40 year lifetime, is considered to be a **beneficial** impact to the local and regional economy, including tourism. Positive effects would arise from direct employment and via the supply chain for the purchase of materials, equipment and services during construction, and the setting up of an operations and maintenance base.

Assessment of the effects of the construction phase on commercial fisheries has concluded that a **minor adverse** to **negligible** effect would be anticipated in terms of potential commercial loss and economic impact. The impact during operation has been estimated to be of **negligible** significance.



## Landside cable route and infrastructure

### Geology, water resources and land quality

The immediate area of the onshore works is devoid of geological interest features or any water features, although reed-beds and drainage ditches are present in the wider area. Installation of the buried cable and construction of the switch room would not directly impact on any of these features due to the distance separation and implementation of good construction practices. Furthermore, pollution prevention guidance would minimise impacts on the surrounding area.

As the site was used as a military barracks and anti-aircraft firing range during World War II, there is a risk of historic contamination being present. If any contamination is identified as part of pre-construction studies, it would be dealt with according to standard practices in consultation with North Norfolk District Council (NNDC).

### Terrestrial ecology

The predominant habitat to be disturbed during the construction of the onshore cable route comprises semi-improved grassland of low ecological significance. Mitigation measures would be implemented to minimise any disturbance to this habitat which would be re-instated following construction. The construction programme would also include a management plan to prevent harm to any breeding birds or reptiles in the area. There was no evidence of other protected species on the site, such as great crested newts, water voles, badgers or bats.

The installation of the cable landfall across the shingle beach could potentially impact upon areas of vegetated shingle, including small patches of the nationally scarce yellow-horned poppy. This area would be resurveyed prior to construction and areas of the habitat translocated.

Overall, construction impacts on terrestrial ecology are anticipated to be of short term minor **adverse** significance. **No impact** is envisaged to ecological interests during operation. In addition, no impact to the ecological interests of any nature conservation sites is envisaged during any stage of the works.



Figure 1 - Photo representation of existing site for proposed Switch Room location at The Muckleburgh Collection, Weybourne, Norfolk.

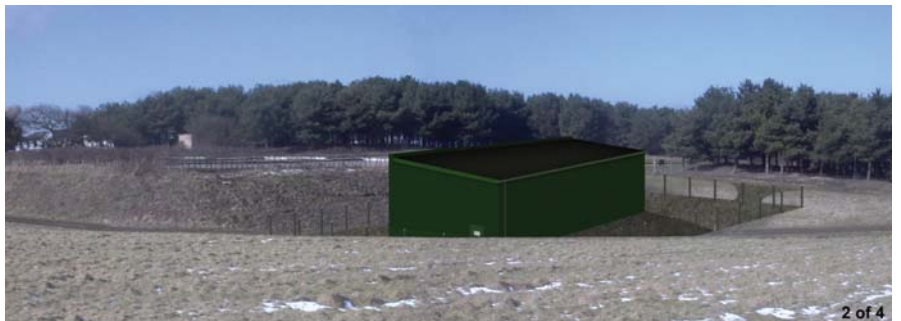


Figure 2 - Photomontage of proposed Switch Room prior to new landscaping at The Muckleburgh Collection, Weybourne, Norfolk.



Figure 3 - Photomontage of proposed Switch Room with initial landscaping and planting of Scots/Austrian Pines at The Muckleburgh Collection, Weybourne, Norfolk.



Figure 4 - Photomontage of proposed landscaping shielding new Switch Room at The Muckleburgh Collection, Weybourne, Norfolk.

### *Landscape and visual character*

There are a number of landscape designations which cover the area, such as the Norfolk Coast Area of Outstanding National Beauty (AONB), North Norfolk Heritage Coast and Area of High Landscape Value. Onshore construction activities, involving construction plant and human presence, would result in some landscape and visual impact to users of the beach and Norfolk Coast path. This would be for a short duration of approximately four months during the winter months.

The long-term landscape and visual effects would relate to the new switch room building only, as the remainder of the works would be below ground. The switch room would be partially screened by the existing coniferous plantation and the museum. Further screening to the east and south will be provided by extending the existing woodland. A **minor adverse to negligible** impact on the landscape and visual character of the area would be expected.



*Sheringham Beach on a Summers Day*

### *Tourism and recreation*

Tourism and recreation play an important role in the economy of north Norfolk, with the coastal towns and more remote coastline being popular all year round. The beach, car park and Norfolk Coast Path at Weybourne Hope are all well frequented. The Muckleburgh Military Collection and Museum is also a popular visitor attraction during the summer months.

Some disruption to the Norfolk Coast Path and beach would be experienced over short periods for the duration of the landfall works under the shingle beach. Signed temporary diversions of the path along a relatively small section would be put in place during these periods. Overall, the impacts are anticipated to be temporary and of a limited extent, and are considered to be of **minor adverse** significance.

During operation, it is anticipated that the presence of the wind farm would not deter tourists and visitors from the area and some visitors may be attracted to the coast in order to view the wind farm.



*Local fishing boats on Sheringham Beach*

### *Archaeology and cultural heritage*

There are a number of predominantly post-medieval and World War II sites and buildings within the onshore area which are of archaeological and heritage interest as well as previous finds of Roman pottery and coins. There is also a potential for currently unidentified archaeological sites and finds to exist, with evidence of Iron Age activity and Saxon settlement in the wider area. A watching brief will take place during the excavation works for the onshore cable and associated infrastructure and, if artefacts or features are found, a suitable course of action would be agreed with the County Archaeologist and English Heritage.



### **Traffic and access**

Access to the site of the onshore works would be via the A149 and the existing Muckleburgh Collection entrance. Disruption to the local traffic network is anticipated to be minimal since the construction is planned outside the busy summer months. Prior to construction, a traffic management plan would be agreed with Norfolk County Council and appropriate transport arrangements put in place. A short term **minor adverse** impact on the local road network and access is envisaged.

Once the site is operational, traffic would be restricted to light vehicles for maintenance staff only, and **no impact** on the local road network is anticipated.

### **Noise dust and air quality**

Noise sensitive receptors in proximity to the works include residential properties and users of the beach and Norfolk Coast Path. Short-term localised **minor adverse** impacts are anticipated from on-site plant and equipment during the construction activities and **no impact** is anticipated in respect of off-site traffic movements. Suitable mitigation will be put in place to minimise any potential for nuisance to be caused by these activities.

Direct emissions to air during construction occur from vehicle exhausts and dust from excavation works and stockpiles of material. Implementation of mitigation measures will ensure that the impact of dust on air quality is **negligible**.

## CONCLUSION

Overall, given the successful implementation of the stated mitigation measures as committed to by Scira, as well as further dialogue with interested parties and Government Regulators, it is predicted that the Sheringham Shoal wind farm project would not have any long term unacceptable impacts. The project would however make a significant contribution to the UK's regional and national targets for renewable energy.





Scira welcomes any questions or comments that you may have. For further information on Scira Offshore Energy Limited and the Sheringham Shoal Offshore Wind Farm, please contact:

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