VATTENFALL

Kentish Flats Offshore Wind Farm Extension

Non-Technical Summary

IPC Document Ref: 4.1

INTRODUCTION

Background

This Non-Technical Summary (NTS) provides an overview of the Environmental Statement produced to inform the consent application process for the offshore elements of the Kentish Flats Offshore Wind Farm Extension (Kentish Flats Extension) under section 37 of the Planning Act 2008 and the onshore elements of the project under Section 57 of the Town and Country Planning Act 1990.

In May 2010 Vattenfall Wind Power Limited (Vattenfall) was awarded rights by The Crown Estate to develop an extension to the existing Kentish Flats Offshore Wind Farm (Kentish Flats), which has been operational since 2005. The development of the Kentish Flats Extension is subject to Vattenfall gaining the necessary consents for construction and operation of the wind farm.

Vattenfall Wind Power Limited

Vattenfall is a leading European energy company. It is Europe's fifth largest generator of electricity and the continent's largest producer of heat. Vattenfall is driven by the commitment to meet society's need for energy in a responsible and sustainable manner, and aspires to take a leading role in renewable energy generation. Vattenfall has three products – electricity, heat and gas and is operating in all parts of the electricity value chain. Vattenfall's vision is to create a strong and diversified European energy portfolio with sustainable and increased profits, significant growth options and to be among the leaders in developing environmentally sustainable energy production.

Vattenfall currently operates over 500 mega watts (MW) of onshore wind capacity and almost 700MW of offshore wind across Northern Europe. Vattenfall is developing a large portfolio of wind farms in nine countries. This portfolio includes the UK's Thanet Offshore Wind Farm, currently the world's largest operating offshore wind farm. Vattenfall has operated Kentish Flats for the past five years.

Project Details

The Kentish Flats Extension is located to the west and south of the existing Kentish Flats wind farm. Kentish Flats is on the southern side of the Outer Thames Estuary, off the North Kent coast, approximately 8.6km north of Herne Bay and 9.5km north of Whitstable. It consists of 30 3MW wind turbines with a combined capacity of 90MW, equivalent to the electricity consumption of 61,000 homes annually. The electricity generated is transmitted directly into the local network.

The Kentish Flats Extension will have a maximum capacity of 51MW and will comprise of 10 to 17 wind turbines. The Kentish Flats Extension could generate up to 150,000 megawatt hours per year of clean electricity, equivalent to the total annual electricity needs of up to 35,000 UK households.

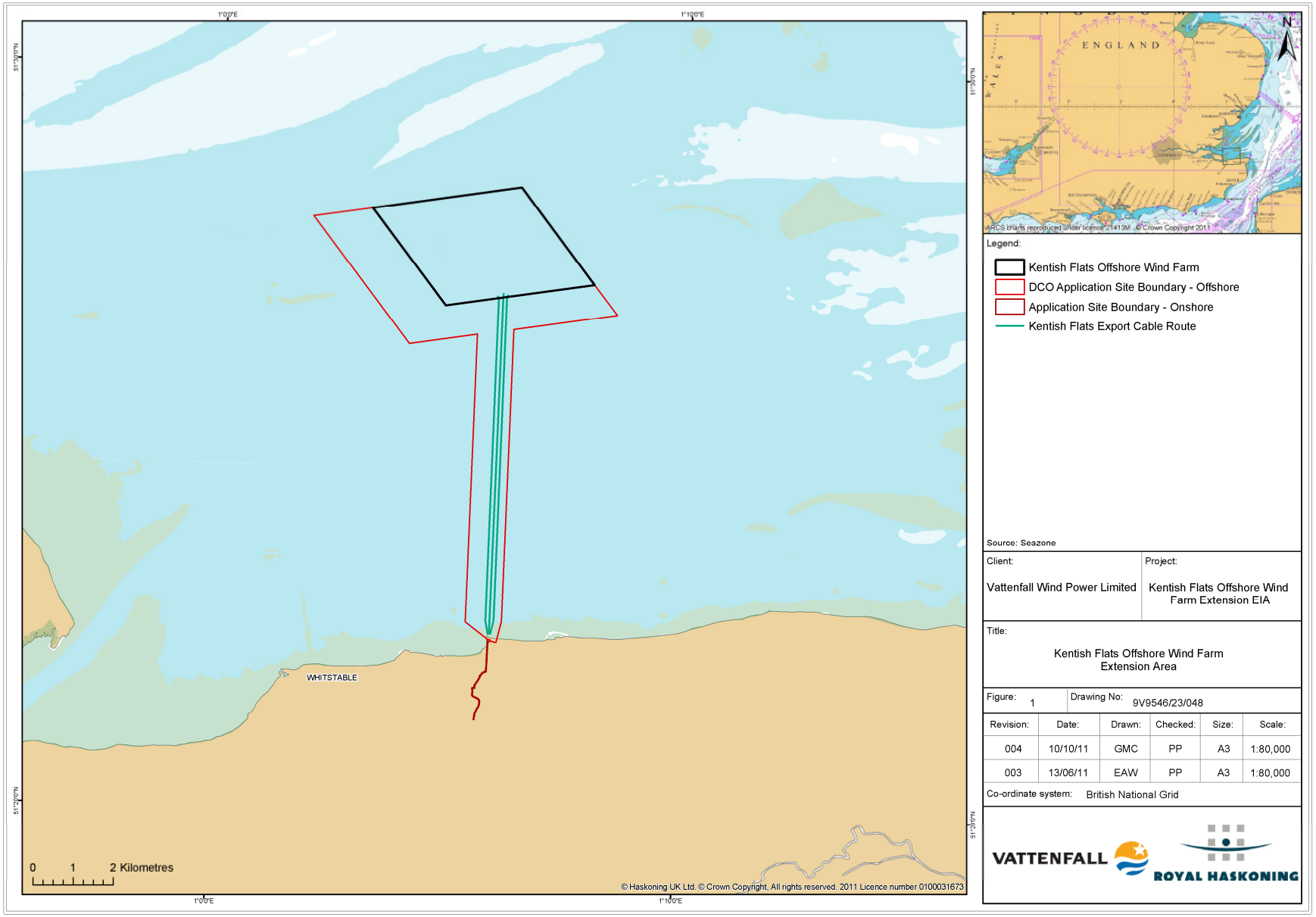
Up to two export cables will be installed alongside the existing cables and come ashore at or close to Hampton Pier. It is expected that the cable(s) will then follow the route of the Kentish Flats cable inland to the Red House Farm substation.

The extension area will cover approximately 7.8km² and is located approximately 7.8km from shore. The Kentish Flats Extension will use similar components to Kentish Flats, such as the type of foundations and wind turbines (with a maximum tip height of 145m), and cable installation methods.

The key project characteristics are summarised in Table 1. Figure 1 and Figure 2 show the development area and export cable corridor for the project offshore and onshore.

Table 1 Summary of the key project characteristics

Key project characteristics	
Maximum Kentish Flats Extension capacity	51MW
Number of proposed wind turbines	10 to 17
Kentish Flats Extension area	Approximately 7.8km²
Minimum distance from Kentish Flats Extension to shore	Approximately 7.8km
Average water depth over wind farm site	Approximately 3 to 5m Chart Datum (CD)
Indicative proposed turbine capacity	Under evaluation, but likely to be of a 3 to 4 MW model
Maximum turbine rotor diameter	120m
Maximum hub height	85m
Maximum tip height	145m
Minimum clearance above sea level	22m above mean high water springs level (MHWS)
Foundation type	Monopile, 6m maximum diameter
Inter-array cables	1 or 2 cables
Export cables	One or two underground 33kV cables
Onshore cable distance	Approximately 2km
Onshore cables	One or two 33kV cables
Onshore connection	Red House Farm, Herne Bay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Legend:
Kentish Flats Offshore Wind Farm
DCO Application Site Boundary - Offshore
Application Site Boundary - Onshore
Kentish Flats Export Cable Route
Source: Seazone
Client: Vattenfall Wind Power Limited
Project: Kentish Flats Offshore Wind Farm Extension EIA
Title: Kentish Flats Offshore Wind Farm Extension Area
Figure: 1
Drawing No: 9V9546/23/048
Revision: 004 | Date: 10/10/11 | Drawn: GMC | Checked: PP | Size: A3 | Scale: 1:80,000
Revision: 003 | Date: 13/06/11 | Drawn: EAW | Checked: PP | Size: A3 | Scale: 1:80,000
Co-ordinate system: British National Grid
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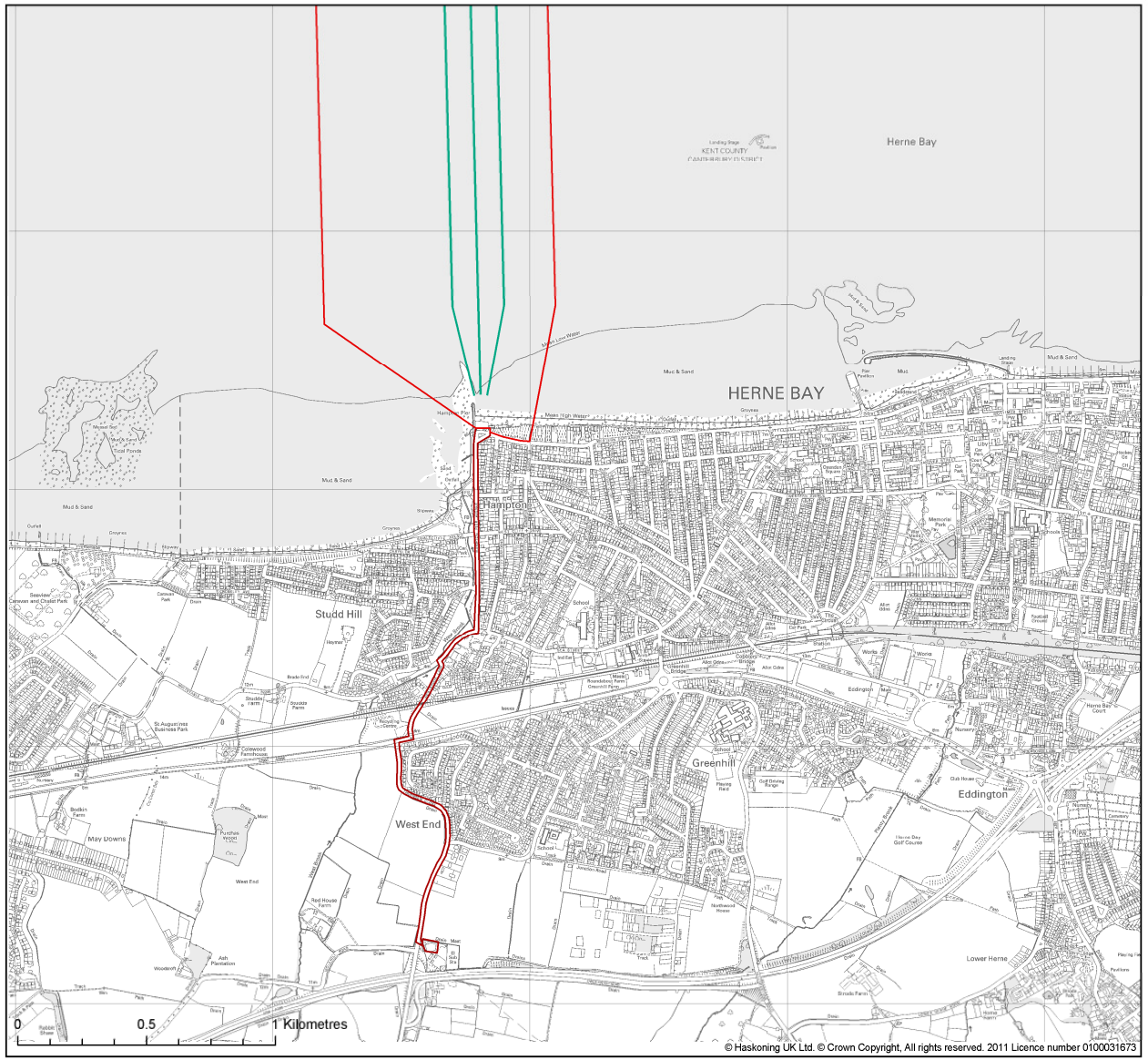

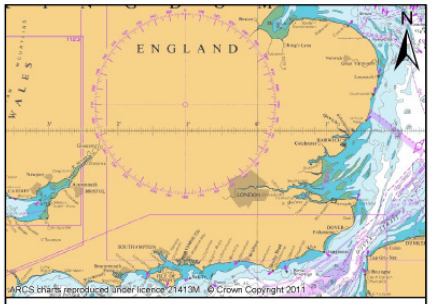

Legend:

- DCO Application Site Boundary - Offshore
- Application Site Boundary - Onshore
- Kentish Flats Export Cable Route

Source Info:

Client:	Project:
Vattenfall Wind Power Limited	Kentish Flats Offshore Wind Farm Extension EIA

Title: Onshore Cable Route

Figure: 2 | Drawing No: 9V9546/23/050

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
004	10/10/11	GMC	PP	A3	1:15,000
003	13/06/11	EAW	PP	A3	1:15,000

Co-ordinate system: British National Grid

VATTENFALL ROYAL HASKONING

Regulatory Consents and the Environmental Statement

Under the provisions of the Planning Act 2008, all new offshore renewable energy generation developments over 100MW and projects where an extension to an existing project takes the cumulative capacity to over 100MW are Nationally Significant Infrastructure Projects (NSIP) which require development consent.

Under the Planning Act, it is possible for a Development Consent Order (DCO) to cover a number of the consents required for a particular NSIP. In the case of the Kentish Flats Extension, the development consent to be sought would authorise the construction and operation of the offshore elements of the project up to and including the cable transition pit and including the landfall where the export cables come ashore. Following consultation with Canterbury City Council, Vattenfall will be making a separate planning application for the onshore grid connection works located within the public highway to run concurrently with the DCO application.

Royal Haskoning was commissioned by Vattenfall to undertake an Environmental Impact Assessment (EIA) for the offshore and onshore elements of the project. This NTS is part of the Environmental Statement (ES) that presents the findings of the EIA as part of the consent application process

DEVELOPMENT PROGRAMME

Vattenfall's aim is for the Kentish Flats Extension to be operational in 2014. To achieve this, a programme of environmental assessment and consultation has taken place, leading up to the submission of an application for development consent to the Infrastructure Planning Commission (IPC) in Autumn 2011.

Table 2 Kentish Flats Extension Project Milestones

Milestone	Date
Scoping Report submitted	October 2010
Scoping Opinion received	December 2010
Statement of Community Consultation advert published	31st January 2011
Community Consultation period	31st January – 4th March 2011
Technical and Landowner Consultation period	April 2011
Development Consent Order application	Autumn 2011
Decision on consent	Early 2013
Final design & procurement	Autumn 2012 until September 2013
Onshore construction works	Autumn 2013 to Spring 2014
Offshore construction works	Possible start in 2013 (Summer/Autumn)
Commissioning	Autumn 2014

Construction activity at Kentish Flats

In October 2010, Vattenfall submitted a request for a Scoping Opinion for the Kentish Flats Extension to the IPC. The request was supported by a Scoping Report which provided an overview of the baseline conditions of the physical, biological and human environment; identified potential environmental impacts of the construction, operation and eventual decommissioning of the project and presented Vattenfall's approach to carrying out the EIA. This was followed in 2011 by the statutory section 47 Community Consultation and section 42 Technical Consultation which was supported by the Preliminary Environmental Information (PEI) and draft ES. All of these documents are available on the Vattenfall website

http://www.vattenfall.co.uk/en/kentish-flats-extension.htm

In addition to these formal consultations, Vattenfall has been liaising with all relevant stakeholders, advisors and regulators from early 2010 up to submission of the application. The consultation as a whole is collated and summarised in the Consultation Report (Document 3.1) which accompanies this application. These consultations and the feedback received shaped the final scheme and the ES, of which this document is the summary.

Service vessel at the Kentish Flats

Site Selection and Alternatives

Identification of the proposed development area for the Kentish Flats Extension was informed by Vattenfall's detailed knowledge of the area gained from the surveys and monitoring work undertaken for Kentish Flats.

Due to the nature of the requirements set out by The Crown Estate, alternative options for an extension to Kentish Flats were limited. A constraints assessment identified five potential development areas which were progressively narrowed down, following environmental, engineering and financial studies. Extension to the north would encroach upon the shipping lanes of the Thames Estuary and to the east would impinge upon the Margate and Longsands candidate Special Area of Conservation (cSAC). The site boundaries were refined and reduced in consultation with key stakeholders such as the Port of London Authority and Natural England, resulting in the preferred option that is now being taken forward as the Kentish Flats Extension.

Original Data Collection and Surveys

Given that there was already a large amount of information available for the site from surveys and monitoring associated with the existing wind farm, the need for additional data collection and survey for the Kentish Flats Extension was limited to the following areas, which were judged to be key considerations:

- Geophysical survey to understand the characteristics and features on the surface and subsurface of the seabed;
- Boat-based and shoreline ornithological surveys;
- Marine biological survey including sampling and analysis of organisms living in the sediments of the seabed and on the surface of the seabed;
- Activity survey of local fishermen;
- Landscape, seascape and visual impact assessment;
- Marine traffic survey;
- Archaeological assessment of geophysical data; and
- Terrestrial ecological survey to identify the main habitats and presence of any protected species.

ENVIRONMENTAL IMPACT ASSESSMENT

EIA is a tool for systematically examining and assessing the impacts and effects of a development on the environment. The ES is the formal reporting of the EIA process and contains:

- A description of the development, including any alternatives considered;
- A description of the existing environment at the site and surrounding areas;
- A prediction of the potential impacts on the existing human, physical and natural environment at the site and assessment of subsequent effects;
- A description of mitigation measures to avoid or reduce such effects; and
- A Non-Technical Summary.

The ES is structured around the potential environmental impacts of the Kentish Flats Extension, both onshore and offshore. For each feature of the environment (referred to as a 'parameter'), the existing conditions are described and the key potential impacts resulting from construction, operation and decommissioning activities are outlined. In addition, potential cumulative effects are outlined in respect of other wind farms and activities in the vicinity of the Kentish Flats Extension. Potential transboundary effects have also been considered and it has been concluded for all parameters that no such effects will occur.

The impact assessment was undertaken using standard methodologies. Significance of impacts were assigned to each parameter using a consistent framework. Where a parameter used a different methodology this is fully explained in the relevant section. The approach to impact assessment has been communicated via the consultation process and has been amended, as necessary, based on responses received. Table 3 shows the terminology used in the ES to classify the impacts.

Table 3 Impact classification terminology

Impact Significance	Definition
No impact	There is an absence of one or more of the following: impact source, pathway or receptor.
Negligible	The impact is not of concern.
Minor adverse	The impact is undesirable but of limited concern.
Moderate adverse	The impact gives rise to some concern but is likely to be tolerable (depending on the scale and duration).
Major adverse	The impact gives rise to serious concern; it should be considered as unacceptable.
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.

Potential Environmental Issues – Offshore Environment

Physical Environment

The assessment includes consideration of the potential changes to geology, waves, currents, sediment, seabed features (such as sandwaves) and water quality.

The underlying geology around the Kentish Flat Extension will not be significantly impacted by the construction, operation or decommissioning of the project.

Elements of the wind farm that are in contact with the seabed including foundations, cables and jack up vessel legs have the potential to affect waves, currents, sediment movement and seabed features during construction, operation and decommissioning. However, all such changes will be highly localised and will not occur outside the footprint of the wind farm. Overall, effects on the waves, currents and sediment movement are assessed as being of **negligible** significance.

Changes in water quality could occur as a result of re-suspension of sediments and/or the use of chemicals and oils. Against natural background levels, changes due to suspended sediment are considered to be **negligible**. Vattenfall will develop a standard pollution contingency plan that will be adhered to throughout the project lifecycle and monitor levels to ensure that changes to water quality are **negligible** and that there will be **no impact** on sediment quality.

Biological Environment

Designated Sites

There are a number of designated sites of local, national and international nature conservation importance in the Outer Thames Estuary. The majority of these are some distance from the Kentish Flats Extension. As the impacts of the construction, operation and decommissioning of the Kentish Flats Extension will be of low magnitude, highly localised and temporary there will be **negligible** or **no impacts** upon designated sites.

Both the existing Kentish Flats and the Kentish Flats Extension lie within the Outer Thames Estuary Special Protection Area (SPA), which is designated for the conservation of a particular species of birds – red-throated diver. Detailed impact assessment was conducted with regard to this site and it is considered that any impact arising will be of **negligible** significance. The Kentish Flats Extension is not expected to contribute significantly to any cumulative impact with other wind farms in the Thames Estuary.

Ornithology

Nine years of site specific survey have been used together with contextual data to inform this assessment. Once the data were collected, the methods for analysis and initial results were discussed and refined through consultation with Natural England and the Royal Society for the Protection of Birds (RSPB). 35 species of bird were recorded in the study area during the most recent surveys from 2009–2011. Of these species, relatively low numbers of birds were seen on the site and the key issues centered on the potential impacts upon the red-throated diver. Potential impacts are the risk of collision with the wind turbines and the potential for displacement or disturbance of the birds due to the presence of the proposed wind farm. Results showed that impacts from the Kentish Flats Extension either on its own or cumulatively with other developments in the Thames would be **minor adverse** on very high sensitivity species with **negligible** impacts to less sensitive species**.**

As part of the application process, Vattenfall has provided a 'Habitats Regulations Assessment' report which includes a 'No Significant Effects' report and a Report to Inform an Appropriate Assessment. This report considers the potential impacts of the Kentish Flats Extension, both in isolation and cumulatively with other developments, on the integrity of designated sites, such as the Outer Thames Estuary SPA. The report will be used by the IPC to undertake a process known as 'Appropriate Assessment' to ensure that the effects of the project, both alone and in combination with other projects, on sites of European importance are fully considered.

Red-throated diver

Benthic and Intertidal Ecology

Marine life on the seabed and on the seashore in the area have been studied both in survey and monitoring for Kentish Flats and in dedicated survey conducted for the Kentish Flats Extension. The plants and animals present are typical for the Outer Thames Estuary and no species of conservation interest are found in the area. The area immediately to the east of Kentish Flats Extension is currently in the process of designation and is a candidate SAC (cSAC) due to its sandbanks.

The potential impacts on the marine life of the seabed from construction and operation will arise from changes to the physical environment including disturbance and loss of habitat, increases in suspended sediment, resuspension of contaminated sediments and colonisation of foundations. As discussed, changes to waves, currents and seabed sediments that could result in impacts on marine life will be negligible. As a result, impacts on the marine life itself will also be **negligible**.

Any loss of habitat (e.g. underneath a foundation) is considered **negligible**, due to both the very small overall area of loss in relation to the size of the outer Thames Estuary and the similarity of the marine life found in the area.

Impacts on the marine life of the seashore will largely be restricted to the construction phase when the export cables are installed. Seashore life is adaptable to disturbance and exposure to the elements and will recover readily once construction works are completed. The overall impact is considered to be **negligible**.

Marine Mammals

There are two key marine mammal species that are seen around the Kentish Flats Extension, harbour porpoise and common seal (also know as harbour seal). These species are the only marine mammals recorded to date during boat based ornithological survey at Kentish Flats and the Kentish Flats Extension from 2002–2011 (where they were recorded as incidental sightings). Both species were seen in very small numbers.

Impacts on marine mammals are most likely to occur during the construction phase and include noise impacts, barrier effects, indirect impact via impacts upon prey species and collision risk. These impacts were assessed as being of **negligible** significance even though marine mammals are considered highly sensitive due to their protected status, largely due to the very small numbers of animals in the area.

There is a potential for cumulative impacts during the construction phase of the Kentish Flats Extension if pile driving is undertaken simultaneously at other wind farms. The other wind farms in the Outer Thames Estuary are at a distance which makes it is unlikely that the ranges of piling noise perception could overlap, however, there is potential for simultaneous piling to create a **minor adverse** cumulative avoidance impact.

A Marine Mammal Mitigation Protocol (MMMP) will be developed in conjunction with the regulators prior to commencement of works and a soft start procedure adopted for piling works; these measures will ensure that best practice is followed during the lifetime of the project to minimise potential impacts to marine mammals.

Natural Fish and Shellfish Resource

The Outer Thames Estuary has been well studied and a variety of different sources provide information on the fish and shellfish populations within in it. The Estuary is known to support a diverse range of fish, with many commercially important species using the area for spawning and nursery grounds.

There is potential for several different impacts to occur across all stages of the project (construction, operation and decommissioning). Impacts may occur as a result of underwater noise and vibration, electromagnetic fields (EMF) emitted from cables and habitat disturbance. The majority of these impacts have been assessed as **negligible**.

The impact of greatest significance is likely to be from underwater noise caused by pile driving on herring. A minor adverse impact of underwater noise on herring is predicted based on the sensitivity of this species and the proximity of a known spawning ground inshore of the proposed development at Herne Bay. This impact will be mitigated by a license condition restricting piling activity to avoid peak herring spawning times.

Human Environment

Commercial Fisheries

An assessment of the commercial fishing activity relevant to the Kentish Flats Extension and the wider region was undertaken by Brown & May Marine. The principle species landed from the Thames Estuary are sole and bass which are predominantly caught using fixed and drift nets. Other fishing activities include an important cockle and oyster fisheries and a number smaller demersal and shellfish fisheries. The fisheries within the region are highly seasonal with different fisheries operating at different times of year.

A number of impacts to commercial fisheries were identified and the majority were judged to be negligible, however two impacts were considered to be of a greater significance. These impacts were: restricted access to fishing grounds and interference with fishing activities. Both relate to the construction and decommissioning phases of the Kentish Flats Extension.

Impacts upon commercial fisheries are considered to be highly variable depending on the scale of assessment, for instance at a local scale the impact of restricted access to or loss of traditional fishing grounds is judged to be moderate adverse for a limited number of local vessels. However, on a larger scale (both national and regional), this impact would be far less significant. With appropriate mitigation such as the establishment of close working relationships between Vattenfall and the fishing community, this impact can be reduced to **negligible** on a regional and national scale and to **minor adverse** at a local scale.

Interference to fishing activities is identified to be a **moderate adverse** impact at a local level. This assessment is based on the fact that during construction static fishing gear will have to be removed from certain areas of the project footprint and as a result there is the potential for damage.

Throughout the lifetime of the project, direct liaison will be maintained with local fishermen and local Marine Management Organisation (MMO) and Kent and Essex Sea Fisheries Committee (KESFC) personnel to ensure that everyone is aware of works being undertaken and to prevent undue impact upon the industry.

Landscape and Seascape Visual Character

Landscape, seascape and visual receptors were identified through a combination of consultation with the IPC and statutory consultees, site specific desk studies and field work undertaken by SKM Enviros for this assessment. The baseline was established for a study area with a 35km radius from the development. Following discussions with Natural England it was agreed that the assessment should consider the worst case of seventeen 145m wind turbines.

The assessment concluded that there will be a **significant impact** on the North Kent Shoreline and The Isle of Sheppey Regional Seascape Character Areas and locally, in corresponding parts of the Greater Thames Estuary and North Kent Plain National Landscape Character Areas. However, the turbines will be located adjacent to one of the busiest shipping channels around the UK and will, therefore, be seen in the context of other existing structures. Where direct views are possible from the coast, the proposal will be seen as a prominent new element in the foreground of Kentish Flats.

At Leysdown-on-Sea, Whitstable and Herne Bay, the towns closest to the site, the impact on visual amenity will be major and represents a **significant impact**. However, in considering these effects it must be noted that the Kentish Flats Extension will be seen in the context of the existing wind farm, an active sea area, with constant movement of vessels and other fixed structures visible on the sea surface in proximity to the turbines.

The cumulative assessment concludes that the addition of the Kentish Flats Extension to the existing Kentish Flats scheme will give rise to **significant** local cumulative impacts. Whilst the Kentish Extension will be seen in combination with other offshore wind farms in the Outer Thames Estuary, no significant impacts arise due to the distance of these other wind farms to the receptors.


Viewpoint 3: Herne Bay, Existing View (75° Angle of View)
Viewpoint 3: Herne Bay, Proposed View (75° Angle of View)

Shipping and Navigation

A full navigational risk assessment (NRA) was completed for the Kentish Flats Extension by Anatec Ltd. The Kentish Flats Extension has been purposely sited to the south of Kentish Flats to avoid impinging upon the shipping lanes to the north and to cause as little impact to shipping as possible. Due to the increase in vessels in the area during the construction phase, the majority of impacts are likely to occur during this period. A number of potential impacts were identified; however the majority of these are considered to be **negligible** or will cause **no impact**.

The impacts of greatest significance are likely to be upon commercial fishing vessels which use the Kentish Flats Extension area for either trawling or steaming to or from other fishing grounds. The Kentish Flats Extension could lead to increased steaming times and collision risk. These impacts were considered to either **minor** or **moderate** depending upon the number of vessels involved.

Safety zones around the works and infrastructure during construction and operation will be sought and these, together with appropriate marking of the wind turbines which is a requirement of the Marine Licence, will help to further mitigate the potential impacts.

Maritime Archaeology

An archaeological desk-based assessment was produced by Wessex Archaeology using new geophysical data collected for the Kentish Flats Extension. There are no known submerged prehistoric sites within the offshore development footprint. However, five maritime sites have been identified within the vicinity of the study area (which for marine archaeology includes a 1km buffer beyond the development footprint), with one overlapping the footprint. These sites contain the potential for wrecks or their associated debris to be in some form of preservation, buried beneath seabed sediments.

Although there are no known features of archaeological interest within the study area, various data sources indicate that there is plenty of potential for undiscovered features. For example sub-bottom profiler data suggests the presence of a system of palaeo-channels which are believed to relate to the Thames-Medway river complex and may contain artefacts relating to early human populations. Geophysical studies have also identified numerous magnetic anomalies thought to be of potential archaeological significance.

It is not possible to accurately assess the impacts of the Kentish Flats Extension on as yet undiscovered marine archaeological sites, but the majority of potential impacts relate to the construction phase. Impacts on features of archaeological interest have the potential to be of major adverse significance. As secured by the Marine Licence, during the period before

construction, further surveys will be carried out to investigate potential archaeological interest and these sites will then be mitigated, primarily through avoidance, thereby ensuring the impacts are **negligible**.

Aviation Radar

Wind farm developments can impact aviation and radar interests in two main ways. This can be either through the physical obstruction created by the turbines – usually only a problem where a development occurs in close proximity to an aerodrome –, and/or the impact that the turbines have upon radar systems. The assessment undertaken as part of this EIA revealed that the radar systems located at Manston and Southend Airports could be adversely affected by the development.

In the case of Manston airport in particular, the proximity of inbound flight routes to the Kentish Flats Extension means that radar performance would be degraded in an area of busy airspace. Thus, through ongoing consultation between Vattenfall, Manston and Southend Airports and the Civil Aviation Authority, a suite of mitigation measures is being developed. In addition to the work that is already underway at both airports to replace their existing radars with new systems that can accommodate the effects of wind turbines this is likely to involve the creation of a new area of airspace above and around the Kentish Flats Extension and, if necessary, the introduction of software for their primary radar systems which effectively 'blanks' the erroneous returns generated by the turbines.

Consultation with National Air Traffic Services (NATS) revealed that no impacts are anticipated upon their national network of en-route radar, navigation and communications infrastructure.

Ministry of Defence (MoD)

There are a number of MoD Practice and Exercise Areas (PEXA) within the Thames Estuary, however these are all located some distance from the Kentish Flats Extension and, therefore, **no significant impacts** are expected as a result of construction operation and decommissioning of the wind farm.

Unexploded Ordnance (UXO)

There is potential for UXO to be present within the Kentish Flats Extension site. As the consequences of accidentally detonating UXO are potentially catastrophic there is a need for dedicated UXO surveys to be carried out prior to any activities that involve direct contact with the seabed.

During these surveys any UXO will be identified and disposed of in an appropriate manner. A full risk assessment will be carried out prior to the planned disposal of UXO in line with HSE guidelines.

Other Human Activities

The baseline identifies a number of other potential sea bed uses of the area around the Kentish Flats Extension including, cables, oil and gas exploitation, aggregate extraction, and marine disposal. Through a process of data collection and through consultation with various stakeholders it was considered that there would be **no significant impacts** from Kentish Flats Extension upon other human activities.

Potential Environmental Issues – Onshore Environment

Physical Environment

Geology, Groundwater and Water Quality

Land use types within the onshore area have been predominantly residential and agricultural, from the 1800s to the present day. This suggests few potential contamination sources in terms of land quality.

A desk based assessment of existing environmental conditions was conducted to establish the baseline and to identify potential pollutant linkages associated with the onshore works. Impacts are most likely to occur during the construction and decommissioning phases of the development. With the application of best practice during construction and specific mitigation measures, impacts are considered to range from to **minor adverse** to **negligible**.

Biological Environment

Onshore Ornithology

There is potential for the onshore works for the export cable(s) landfall to disturb waders and, in particular, a colony of turnstone at Hampton Pier. If landfall works occur between October and April (the overwintering season for several wader species) construction will be timed to avoid the sensitive period two hours either side of high water and prevent disturbance of the birds.

Terrestrial Habitats and Species

A desktop study and an Extended Phase 1 survey were conducted to establish the baseline for the assessment. A number of habitats were identified within the study area including coastland, grassland, woodland and shrub, hedgerows, tall ruderal (plants that grow on disturbed land) and open water. It was also established that bats, water voles, badgers, reptiles and amphibians are likely to use the study area. None of the habitats or species were considered rare within the context of the surrounding area.

The impacts to the terrestrial environment are likely to be greatest during the construction phase and will (if not mitigated) range from minor adverse to negligible. However, with suitable mitigation secured by a requirement in the DCO and by following established ecological management practice on site, these impacts will be reduced to **negligible**.

Human Environment

Archaeology and Cultural Heritage

An archaeological desk-based assessment was produced by Wessex Archaeology. Archaeological interest within the onshore grid connection study area includes 13 grade II listed buildings, isolated archaeological material dating to the period prior to the Iron Age, post Iron Age evidence relating to occupation and settlement and World War II structures. All works associated with the Kentish Flats Extension will be buried, so no permanent impact on the visual setting of these important sites will occur.

The majority of impacts will occur during the construction phase and as any damage of these sites will be permanent, impacts could be of major adverse significance.

A range of mitigation measures will be implemented, secured by a condition of the planning permission, which include the siting of the cable route along existing roads. It is, therefore, considered that the impacts can be reduced to **negligible** significance.

Transport

A transport statement and a desk based assessment has been completed for the Kentish Flats Extension.

Most of the impacts on transport are likely to occur during the construction phase of the project. Impacts of greatest significance are considered to be driver delay, accident and safety, and impacts on pedestrian access. Herne Bay, which the cable works pass through, is heavily reliant on tourism and, during the tourist season, traffic volume in the area increases dramatically.

All works will be undertaken in agreement, and with the consent of Kent Highways Services and the Environment Agency. To obtain the required consents from Regulatory Authorities, mitigation of impacts will need to be demonstrated and works will be subject to site inspection and supervision. As a result, **no adverse** impacts are predicted.

Noise

The area surrounding the cable landfall is semi-rural and set in a coastal location. The main source of background noise in the area is from road traffic, primarily from the A2990, but also from smaller side roads, and with contributions from wind and waves.

Noise impacts will occur at all stages of development (construction, operation and decommissioning). However, the impacts with the greatest significance are likely to occur during construction and will be perceived on land.

During the onshore construction activity, an adverse impact is predicted due to the close proximity of residential properties to the onshore grid connection route. Mitigation measures will be put in place in the form of best practice noise control and management techniques and the restriction of construction activity to daytime hours only. With these measures in place the level of impact is expected to be **minor adverse**.

Air Quality

The majority of impacts are considered to occur during the construction and decommissioning phases of the project. Impacts of greatest significance relate to the excavation of trenches and associated earthworks. The potential air quality impact was assessed based on the proximity of identified receptors to the onshore grid connection cable route and the prevailing meteorological conditions. Provided appropriate dust mitigation measures are implemented throughout the construction phase, the potential air quality impact is predicted to be localised, short-term and **minor adverse**.

Other impacts resulting from construction traffic during the construction phase and maintenance traffic during the operation phase were also identified, but these were considered to be **negligible**.

Socio-economics

Information to establish the baseline socio-economic environment has been collated through data and literature reviews.

It has been predicted that there will be a range of economic benefits for the UK due to employment and expenditure associated with the developing offshore wind farm industry, and it is possible that there may be some small scale benefits for the Canterbury County Council area and wider region as a result of the Kentish Flats Extension. However, these impacts are not anticipated to be significant and, primarily due to the scale of the Kentish Flats Extension project, it is likely that this project alone will not greatly affect the local, regional, or national economy.

Tourism and recreational activity are key industries in Kent and contribute significantly to the local economy throughout the year. Activities take place all year round, although there is seasonal variation with the peak seasons occurring during the summer months. It is anticipated that there could be a short term, **minor adverse** impact on tourism and recreation during the construction phase, however it is not anticipated that tourism and recreational activities will be significantly impacted by the development as a whole.

Vattenfall will work with local stakeholders to avoid construction during important periods for tourism and recreation and to minimise the impacts of activities occurring at these times.