

Codling Bank Wind Park Foreshore Licence Application

Supporting Information

Document Classification	
FINAL	
Issued to	
Marine Planning and Foreshore Section Department of the Environment, Community and Local Government	

Approvals

Prepared by:

Andrew Blyth Senior Project Manager

Date: 18/09/2013

Commercial Approval:

Name / Title Nancy McLean Principal Consultant

Date: 08/10/2013

Signed:

One signature required.
Handwritten or electronic.



Record of Changes

Issue	Document Date	Detail of Change
A	09/10/2013	First Issue
B	05/11/2013	DECLG Update

TABLE OF CONTENTS

1	INTRODUCTION.....	5
1.1	Aims and Objectives	5
1.2	Project Background	5
1.3	Planned Work.....	6
1.3.1	Summary of Work.....	7
2	MARINE RECEPTORS AROUND CODLING BANK WIND PARK.....	9
2.1	Natura 2000 sites	9
2.1.1	Special Protection Areas	9
2.1.2	Special Area of Conservations	10
2.2	European Protected species	12
2.3	Natural Fish.....	13
2.3.1	Important spawning grounds	14
2.1	Other Foreshore Users	14
2.1.1	Commercial and Recreational Fisheries	14
2.1.2	Shipping.....	15
2.1.3	Recreational Sailing.....	15
3	PROPOSED WORKS AND LIKELY IMPACTS.....	16
3.1	Passive Acoustic Monitoring Survey Work	16
3.1.1	Proposed Duration:.....	16
3.1.1	Methodology	16
3.1.2	Mooring methodology	17
3.1.3	Likely interactions and impacts with natural resources and other foreshore users	19
3.2	Natural Fish Survey.....	19
3.2.1	Proposed Duration:.....	19
3.2.1	Methodology	20
3.2.2	Likely interactions and impacts with natural resources and other foreshore users	20
3.3	Benthic Survey	20
3.3.1	Proposed Duration:.....	20
3.3.2	Methodology	20
3.3.3	Likely interactions and impacts with natural resources and other foreshore users	21
3.4	Met Ocean and coastal Survey	21

- 3.4.1 Proposed Duration:.....21
- 3.4.2 Methodology21
- 3.4.3 Proposed Equipment.....23

- 4 SUMMARY 24**

- 5 CONTACT DETAILS 25**

- APPENDIX 1..... 26**

1 INTRODUCTION

1.1 Aims and Objectives

The objective of this document is to outline proposed investigative works as part of developing the Codling Bank Wind Park and to inform the potential impacts this work may have on Foreshore users, Natura 2000 sites, European Protected Species (EPS) and any other environmental or human resources that may be impacted by the works. This information is part of the Investigative Foreshore Licence Application (Offshore Renewable Energy) that has been submitted to the Department of Environment, Community and local Government and covers the area shown in Figure 1.

The specific aims of this document are to:

- Provide details of the proposed works;
- Assess the impacts on human and environmental resources within the vicinity;
- Propose appropriate mitigation measures to minimise any impacts; and
- Summarise any residual impacts.

Contact details and company experience can be found at the end of this document in the Appendix.

The proposed investigative works is to commence in Autumn 2013 and aspects of the work will carry on for one year.

1.2 Project Background

Codling Wind Park Ltd (CWP) is a joint venture company between Fred Olsen Renewables Ltd and Hazel Shore Ltd and has been established to develop the Codling Bank Wind Park, an offshore wind farm located off the east coast of Ireland.

Codling Bank Wind Park is located approximately 13 km off the east coast of Ireland (off Co, Wicklow) between Greystones and Wicklow, Codling Bank Wind Park is comprised of two phases:

- Codling Wind Park - a consented development of 220 turbines;
- Proposed Codling Wind Park Extension - comprises 200 turbines for which a licence for consent has been submitted.

The turbines will be situated on the Codling sand bank in water depths ranging between 9 and 18 m.

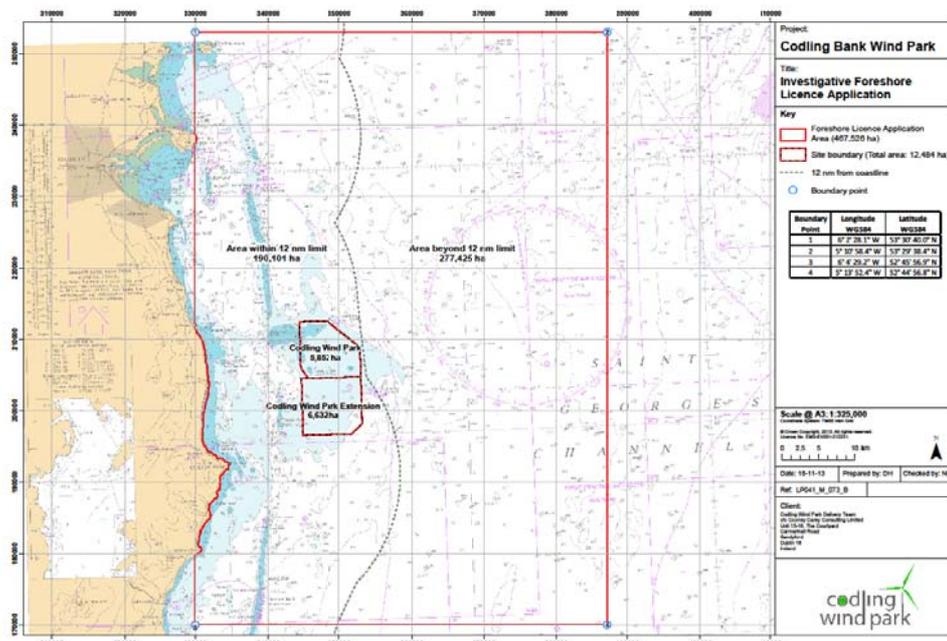


Figure 1: Foreshore Licence Application location

1.3 Planned Work

In order to inform the concept design phases at Codling Bank Wind Park, and provide update information to the Codling Wind Park Extension EIS, there is a need to carry out investigative works. The planned works are detailed in this document and cover acoustic monitoring for dolphins and porpoises, surveys to help inform the benthic habitat in the area, natural fish surveys and surveys to identify the wave and tidal resource.

In order to undertake these surveys, a range of vessels will be mobilised with a suite of survey equipment and devices. Where possible, all of the vessels will be local to the area, using local crews, and will naturally minimise any negative interactions with other foreshore users through their inherent knowledge and understanding of local activities and sea conditions.

As described in the Investigative Foreshore Licence Application (Offshore Renewable Energy), the involvement of a Fisheries Liaison Officer (FLO) for every aspect of the consultation around the works, the production of a Mariners Notice and updating the Codling Wind Park website with all past, current and imminently proposed works will ensure information on the timings and extent of surveys is disseminated efficiently. In this way, every effort will be made to reduce negative interactions with other foreshore users.

The specific requirements and location of the survey work, including methodologies, lighting and mooring arrangement etc. would be agreed with the Department of Environment, Community and Local Government prior to the commencement of any survey works. Further information on survey works proposed is presented in Section 3 below. An indicative layout for the CPOD devices is shown in Figure 2. Whilst the final layout is still to be determined, this figure shows the scale of the survey required and hence the size of the area under application.

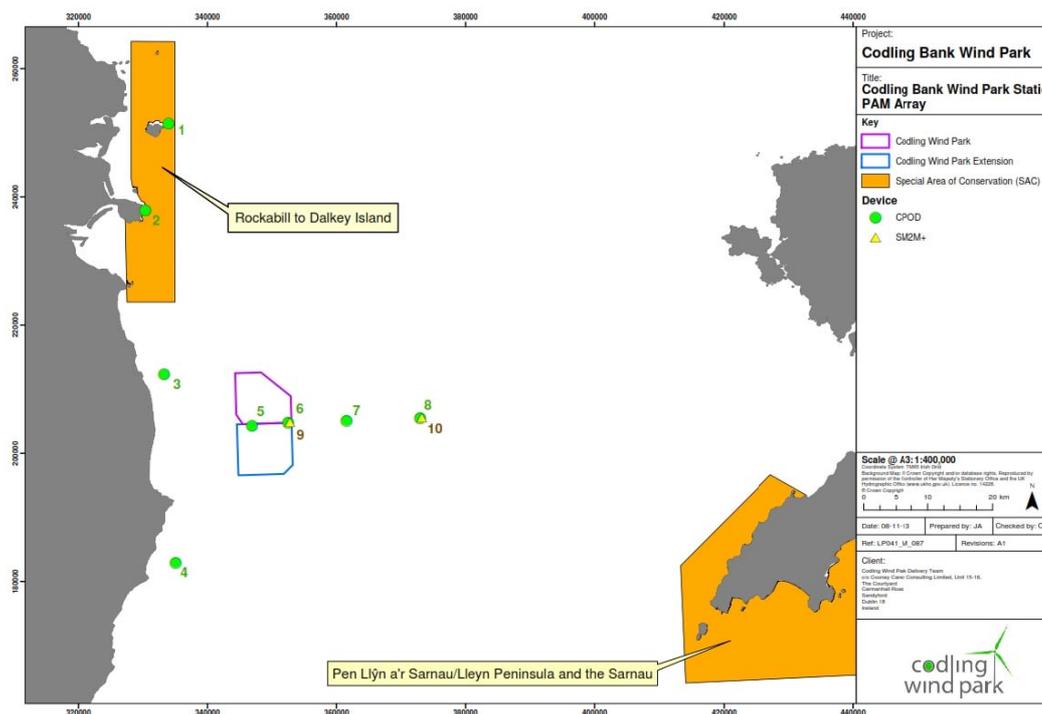


Figure 2: Indicative arrangement of C-PODS

1.3.1 Summary of Work

Table 1 below provides a summary of the proposed work and gives brief details of each different activity. These are further discussed throughout this document.

Please note Table 1 includes seal haul out counts and drop down video which are not intrusive and are understood to be outside the requirements of this investigative licence application. The full suite of surveys have been included for completeness.

Table 1: Summary of proposed investigative work covered in the Investigative Foreshore Licence Application (Offshore Renewable Energy)

Method	Details
Passive acoustic monitoring	Up to 15 C-PODs deployed in locations within the proposed sites and surrounding area, targeting recording of vocalisations of harbour porpoise and other cetaceans.
Seal haul out counts	Count number of seals hauled out at sites local to Codling Bank Wind Park and other Offshore Wind Farm sites.
Drop-Down Video	Up to 40 stations within the wind farm boundary, 40 stations within one tidal excursion and 10 – 20 reference stations beyond one tidal excursion.
Seabed sampling using a 0.1 m2 Hamon grab	The grab gear will be deployed following recovery of the drop-down video equipment where seabed conditions are suitable for grab sampling. All 90-100 drop down video stations will be sampled if possible.

Epibenthic Beam/ prawn Trawl	Up to 20 trawl stations (up to one survey every quarter,) will be surveyed within the wind farm sites, 4 stations within one tidal excursion and 2 reference sites beyond one tidal excursion.
Commercial Otter Trawl Survey	Sampling of commercially important species will be conducted using commercial otter trawl gear. Eight trawls will be conducted within the wind farm sites and 4 within one tidal excursion. Trawl durations will be approximately 30 minutes. The surveys will be repeated quarterly; once during each season.
Metocean Characteristics	One year measurement campaign to determine the met-ocean characteristics. Data gathered to include: wave data, turbidity data, tidal range and speed, sediment collection to inform settling velocity.

2 MARINE RECEPTORS AROUND CODLING BANK WIND PARK

This section identifies the potential marine receptors around Codling Bank Wind Park. It identifies both the potential natural resources and designated sites, and the other foreshore users that may or are likely to be encountered during the investigative works.

2.1 Natura 2000 sites 2.1.1 Special Protection Areas

There are seven Special Protection Areas (SPAs) designated for breeding or migrating seabirds located within 60 km of the zone (Figure 3 and Table 2). These SPAs are designated for various gull, tern and auk species in addition to fulmar, cormorant and shag.

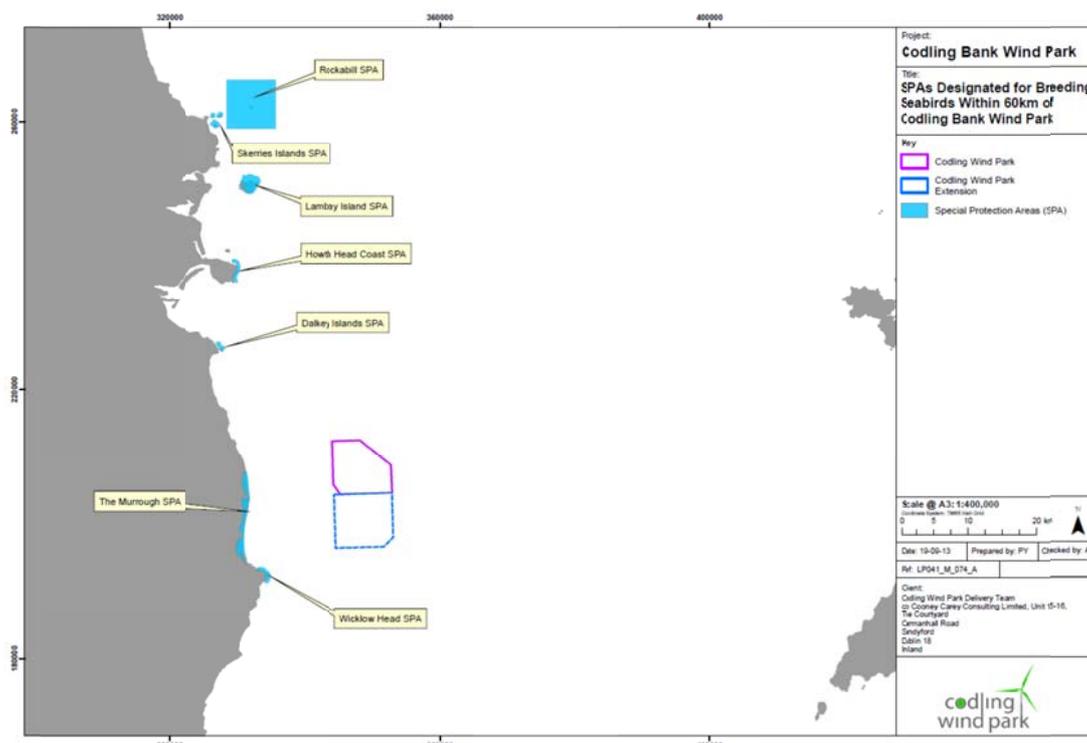


Figure 3: Map of SPAs within 60km of Codling Bank Wind Park

Table 2: SPAs within 60km of Codling Bank Wind Park (Key: pr – pairs; ind – individuals).

SPA	Distance from site	Designated species (population sizes per SPA citations)
The Murrough	13.5 km	Herring gull (506 pr) Little tern (30 pr average 1999-2002, 100 pr in 2005)
Wicklow Head	19 km	Kittiwake (956 pr)
Lambay Island	44 km	Fulmar (635 pr) (2009 – 530 prs) Cormorant (675 pr) (2009 - 363 pr) Shag (1122 pr) (2009 - 1129 pr)

		Kittiwake (4091 pr) (2009 – 4182 pr) Lesser black-backed gull (309 pr) (476pr) Herring gull (1806 pr) (766pr) Great black-backed gull (193 pr) (236 pr) Guillemot (59824 ind.) (67300 ind.) Razorbill (4337 ind.) (6400 ind.)
Rockabill	56 km	Roseate tern (611 pr) Common tern (610 pr) Arctic tern (89 pr)
Dalkey Islands	21 km	Important autumn staging area for common, Arctic and roseate terns. (small numbers also breed: common tern 62 pr, Arctic tern 24 pr, roseate tern 11pr)
Howth Head Coast	27.5 km	Kittiwake (2269 pr)
Skerries Islands	50 km	Cormorant (558 pr) Herring gull (150 pr) Great black-backed gull (25 pr)

2.1.2 Special Area of Conservations

Under the Habitats Directive, six SACs with marine mammals as qualifying features have been designated within the Irish Sea and two SACs located just outside the Irish Sea regions which are of importance to grey seals. Further to this there have been six SACs designated for habitats within close proximity of the Codling Bank Wind Park (Figure 4 and Table 3 and 4)

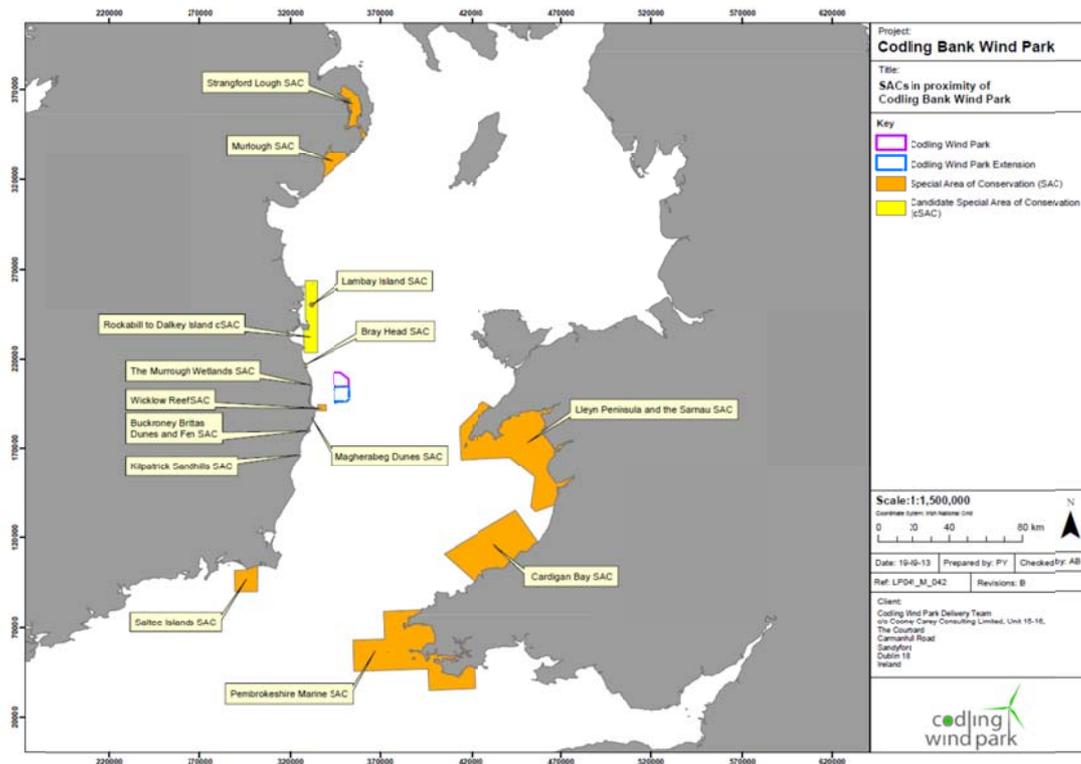


Figure 4: SACs in proximity to Codling Bank Wind Park

Table 3: Marine Mammal SACs in proximity to Codling Bank Wind Park

Special Area of Conservation (SAC)	Location	Relevant Notified Features	Approximate Distance from site (km)
Rockabill to Dalkey Island Reefs (Proposed)	Irish Sea (East coast of Ireland from Rockabill to Dalkey Island)	Harbour porpoise (<i>Phocoena phocoena</i>)	20
Lambay Island	Irish Sea (Ireland)	Grey seal (<i>Halichoerus grypus</i>)	46
Llyn Peninsula and the Sarnau/ Pen Llyn a'r Sarnau	Irish Sea (Wales)	Bottlenose dolphin (<i>Tursiops truncatus</i>), grey seal (<i>Halichoerus grypus</i>)	70
Cardigan Bay/Bae Ceredigion	Irish Sea (Wales)	Bottlenose dolphin (<i>Tursiops truncatus</i>), grey seal (<i>Halichoerus grypus</i>)	112
Murlough	Irish Sea (Northern Ireland)	Harbour seal (<i>Phoca vitulina</i>)	113
Saltee Islands	Close proximity to the Irish Sea (Ireland)	Grey seal (<i>Halichoerus grypus</i>)	121
Pembrokeshire Marine	Close proximity to the Irish Sea (Wales)	Grey seal (<i>Halichoerus grypus</i>)	131

Strangford Lough	Irish Sea (Northern Ireland)	Harbour seal (<i>Phoca vitulina</i>)	134
------------------	------------------------------	--	-----

Table 4: Habitat SACs in proximity to Codling Bank Wind Park

Special Area of Conservation (SAC)	Location	Relevant Notified Features	Distance from site (km)
Bray Head	Coastal site is situated in north-east Co. Wicklow between the towns of Bray and Greystones.	European dry heaths and Vegetated sea cliffs.	16
The Murrogh Wetlands	Coastal wetland complex which stretches for 15 km from Ballygannon to north of Wicklow town, and in parts, extends inland for up to 1 km.	The site supports a number of habitats listed on Annex I of the EU Habitats Directive	12
Wicklow Reef	Situated just to the north of Wicklow Head on the east coast of county Wicklow.	Reefs	6
Magherabeg Dunes	Situated at Ardmore Point, about 5 km south of Wicklow Head. The Three Mile Water River enters the sea through the dunes.	The site supports a number of habitats listed on Annex I of the EU Habitats Directive	15
Buckronev Brittas Dunes and Fen	Complex of coastal habitats located about 10 km south of Wicklow town.	Ten habitats listed on the EU Habitats Directive, including two priority habitats, occur within the site.	23
Kilpatrick Sandhills	8km south of Arklow town, and just south of the Wicklow/ Wexford county border.	The site supports a mosaic of coastal habitats listed on Annex I of the EU Habitats Directive, but primarily a mature sand dune system.	

2.2 European Protected species

Published data shows that 26 marine mammal species have been recorded in the Irish Sea – including 24 cetaceans. Most of these species, however, are considered to be rare or occasional visitors, or are documented only from stranding's (for example white beaked dolphins, killer whales and humpback whales; Irish Whale and Dolphin Group, 2013).

Of the cetacean species recorded, only those observed regularly are considered relevant to the work and location of this work are: minke whale, Risso's dolphin, bottlenose dolphin, common dolphin and harbour porpoise.

2.3 Natural Fish

There is a large amount of information relating to fish populations in the Irish Sea, and this is covered in detail in the Codling Wind Park Environmental Statement². The EIS identified the following species (Table 5) as of particular importance, and these constitute species that are benthic / demersal or pelagic but will include species that utilise the local area as a spawning / nursery ground. The sensitivity may come from:

- Commercial importance;
- Rarity, and in many cases protected status;
- Importance in the local ecosystem

Table 5: Important fish Habitat SACs in proximity to Codling Bank Wind Park

Species	Sensitivity*	Level of Importance
Plaice	Medium	Local Area
Dab	Medium	Local Area
Dover Sole	Medium	Local Area
Cod	Medium	Regional
Haddock	Medium	Local Area
Poor Cod	Medium	Local Area
Herring	Medium	Local Area
Sprat	Low	Local Area
Sandeel	Low	Local Area
Mackerel	Medium	Local Area
Whiting	Medium	Local Area
Common Goby	High	International
Bass	Medium	Local Area
Dragonet	Medium	Local Area
Basking Shark	High	International
Tope	Medium	Local Area
Lesser spotted dog fish	Medium	Local Area

Thornback Ray	Medium	Local Area
---------------	--------	------------

2.3.1 Important spawning grounds

Fish spawning data is limited in the immediate area around Codling Bank possibly reflecting the low importance of the area as a fishing ground.

Ellis et al. (2012) conducted a review of all extant data to determine the distribution of potential spawning grounds for a number of marine fish species. The spawning grounds are provided as indicative only and may be liable to vary as a result of changing population sizes and environmental conditions since this review. A number of species have been reported to use the Codling Bank area as spawning or nursery grounds (table 6). The EIS for Codling Wind Park reports anecdotal information that the Codling Bank represents an important spawning ground for sea bass (*Dicentrarchus labrax*) (NPC, 2004). The species may take advantage of tidal currents to rapidly disperse eggs during spawning. Bass tend to spawn in estuarine habitats with varying salinity (Fahy et al., 2000), therefore, due to the location the site is unlikely to be an important spawning resource for the population.

Table 6: Potential Important fish Habitat SACs in proximity to Codling Bank Wind Park

Species	Potential Resource Use
Plaice	Low intensity spawning and nursery grounds.
Sole	Low intensity spawning and nursery grounds.
Cod	At the southern edge of low intensity spawning grounds. At the southern edge of high intensity nursery grounds.
Sandeel	Low intensity spawning and nursery grounds.
Mackerel	At the southern edge of low intensity spawning grounds.
Whiting	At the southern edge of low intensity spawning grounds. At the southern edge of high intensity nursery grounds.
Tope	Low intensity ground.
Thornback Ray	Low intensity ground.
Spotted Ray	Low intensity ground.
Angler Fish	Low intensity ground.
Ling	At the southern edge of low intensity spawning grounds.

2.1 Other Foreshore Users

2.1.1 Commercial and Recreational Fisheries

Due to the physical characteristics and it's, location Codling Bank area is not trawled commercially, and recreational angling is also very unlikely to occur. Therefore, the direct impacts from the proposed survey works for interference on both commercial and recreational fisheries will be highly unlikely. Indirect effects through disturbance of fish species has been considered in the natural fish and spawning section of this document.

The Investigative Foreshore Licence Application encompasses an area up to the coast line, which is likely to be subject to greater recreational fishery interests.

2.1.2 Shipping

The Irish Sea contains very busy shipping routes in both north/south and east/west directions, and traffic separation schemes are in operation in the North Channel and St Georges Channel. As ships are not obliged to report their origins and destinations to a central authority, precise information on routes and traffic densities are not available¹.

Sea navigation in the area of the Codling Bank is generally limited to commercial fishing vessels, recreational fishing and recreational sailing vessels. The shallow nature of the bank means that it is a potential hazard to larger vessels.

Consultations with the local Harbour Master at Wicklow Port, for the EIS for Codling Wind Park, has determined that there are no specific navigation routes in the vicinity of the proposed wind farm site. There are a number of vessels entering in and out of the Wicklow and Dublin ports which pass by the Codling Bank, smaller vessels tend to stay inshore (approximately 6km west of the wind farm area) and larger vessels keep beyond the bank in the deep channel which exists approximately 6km to the east².

2.1.3 Recreational Sailing

The dominant sea users in the Codling Wind Park area are related to leisure and fishing activity. There are 21 sailing clubs on the east coast affiliated to the Irish Sailing Association, with Greystones SC being the closest. This is predominantly a dinghy sailing club whose normal area for racing lie within 3-4 km of the shore. The other clubs in the area would not normally use the area around Codling Bank as their normal racing area. There is however one race to Codling Bank area once a year by Wicklow Sailing Club².

¹ Marine Institute, Ireland's Marine and Coastal Areas and Adjacent Seas- An Environmental Assessment (1999).

² Codling Wind Park, Environmental Statement (1999).

3 PROPOSED WORKS AND LIKELY IMPACTS

The following information identifies the different types of activities proposed in the Foreshore Investigative Works and the likely impacts on foreshore users and Natura 2000 sites.

3.1 Passive Acoustic Monitoring Survey Work

3.1.1 Proposed Duration:

The acoustic monitoring surveys will take place for a year to ensure the devices collect data that are representative of a year, ensuring seasonal variability of cetaceans are recorded.

3.1.1 Methodology

CPODs/ SM2s are static acoustic monitoring devices with automated data-loggers deployed on moorings and used to detect the echolocation sounds produced by dolphins and porpoises (cetaceans), by recording the ultrasonic tonal sounds (clicks) that they produce. For each click detection, the time of occurrence, centre frequency, intensity, duration, bandwidth and frequency trend is recorded. The data gathered are processed offline to identify click train patterns attributable to cetacean echolocation signals, which can then be used to assess distribution and relative use of the site.

Devices will be placed at locations within the survey area. Each mooring will consist of a seabed weight marked with an International Association of Lighthouse Authorities (IALA) compliant buoy. The acoustic device will be tethered by a rope spur 10m from the seabed, allowing the acoustic device to be orientated vertically in the tidal stream.

The devices will be lifted every three months to service and in order to download data from the internal SD memory card and to swap over the battery.

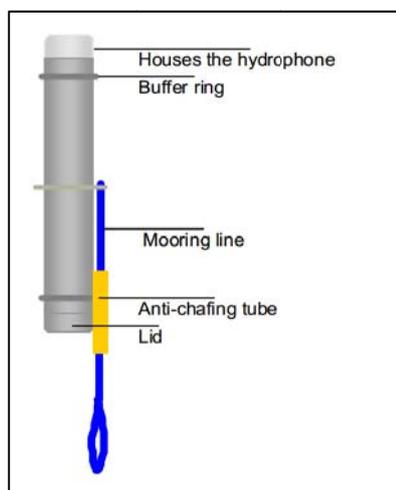


Figure 5: Schematic of C-POD and its constituent components.



Figure 6: Photograph of an SM2M+ device, taken from the Wildlife Acoustics Website - <http://www.wildlifeacoustics.com/products/song-meter-sm2-plus-submersible>.

The proposed methodology for use of passive acoustic monitoring at the CWP site is attached in Appendix 1, to help provide an understanding of the reason for the extent of the

survey and hence the boundary of the Foreshore Licence application. The indicative layout is also provided in Figure 7 below.

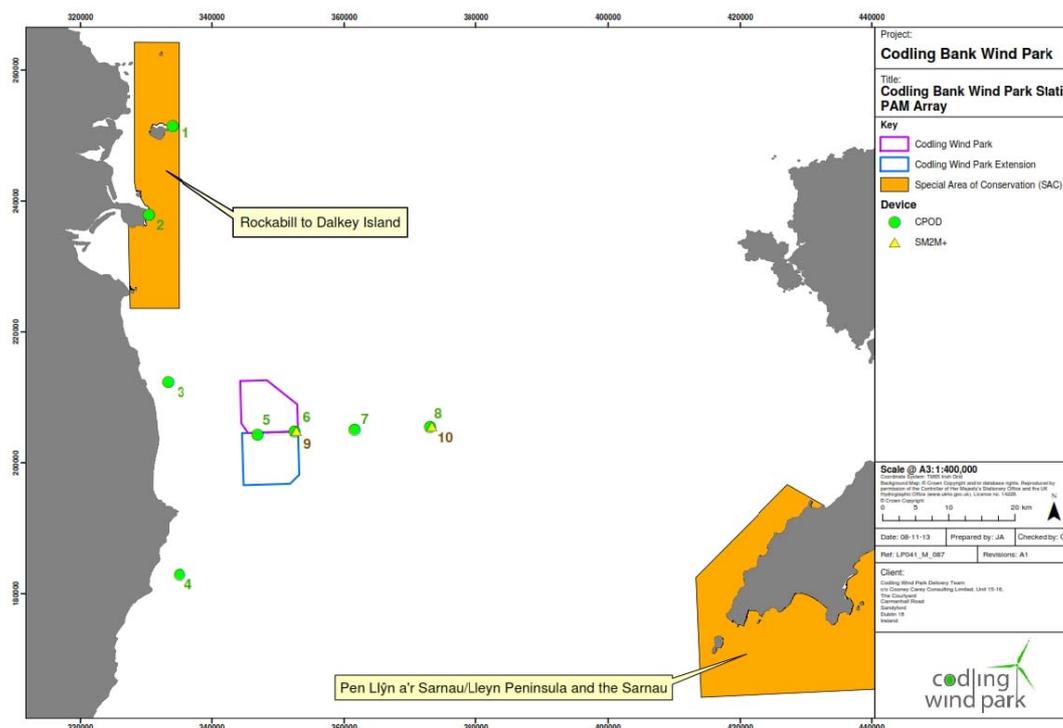


Figure 7: Proposed locations of static PAM devices at Codling Bank Wind Park.

3.1.2 Mooring methodology

Due to the busy nature of the proposed deployment area, and its use by local fishermen and other vessel traffic, NPC proposes to deploy the PAM devices using moorings located on the seabed with no surface presence. This should minimise disruption to vessels operating at the surface.

Devices will be deployed on the seabed using a 100 kg (approx.) anchor weight and weighted groundline (Figure). The groundline will be attached to a polypropylene rope riser to which is attached an acoustic release and the PAM device. At the top of the riser will be a small trawl-float to aid in finding the device during retrieval. The overall height of the riser will not exceed 5 m from the seabed. Exact height will vary with water depth at individual locations.

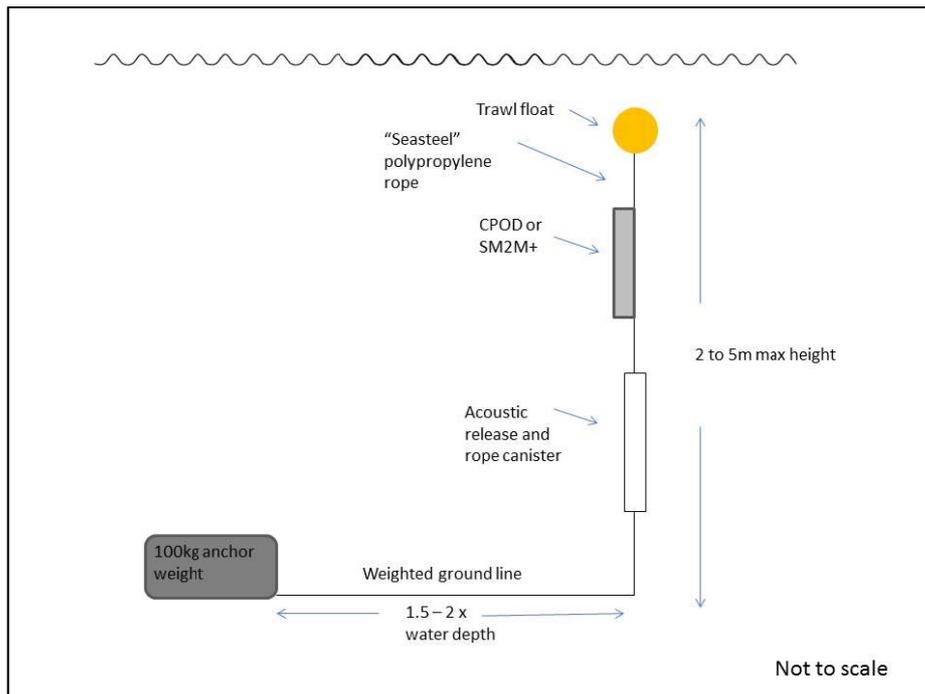


Figure 8: Schematic drawing of the mooring components intended for use at for the Codling Bank Wind Park deployments. The mooring is made up of an anchor, groundline, and riser which will sit on the seabed and have no presence above the sea-surface.

An acoustic release (Figure) is a device used to recover equipment deployed on the seabed. Upon receiving a command from a control device contained on the vessel, the release will trigger an electric motor which will propel the device to the surface. The device is not strong enough to lift the anchor weight, but will be sufficient to lift the ground-line and riser which will be recovered at the surface. The PAM unit will then be serviced and re-deployed.

The use of a ground-line also facilitates the possibility of grappling for the device in the event of an acoustic release malfunction, increasing the likelihood of retrieving the device. Upon completion of the year-long deployment, anchor weights can be retrieved using a winch on-board the service vessel, ensuring nothing is left on the seabed.

The devices will be lifted every three months to service and in order to download data from the internal SD memory card and to swap over the battery.



Figure 9: Photograph of a Sonardyne acoustic release and rope canister; an example of the type of device under consideration for use at the Codling Bank Wind Park

3.1.3 Likely interactions and impacts with natural resources and other foreshore users

Devices will be deployed at various locations throughout the Foreshore Application Area. The exact locations will be made available after detailed consultation with relevant stakeholders has been undertaken and a survey design is agreed. A mariners notice will be prepared to ensure other foreshore users are made aware of the operations.

The acoustic devices do not emit any noise frequency and therefore the impacts to marine mammals and fish using the vicinity in which they are placed is minimal. During the deployment, service and the final retrieval of the devices there will be a short and limited disturbance impact. This impact will neither be long-term or significant.

The devices will be in place for one year. Industry standard marking and lighting of the moored devices will be deployed to ensure other users of the marine environment will be made aware. Due to the small number and actual footprint of the devices, the impact during the year in which the devices are in place will be minimal.

The devices will need to be installed, calibrated and maintained and after one year removed. This will involve the use of a vessel which has the ability to temporarily disturb other users. Due to the frequency, small vessel required and the location of the site these interactions will be minimal and therefore have limited impact to other foreshore users.

Natura 2000 sites: negligible; due to the type and small footprint of the surveys.

European Protected Species: negligible; due to the type and small footprint of the surveys.

Natural Fish: negligible; due to the type and small footprint of the surveys.

Other Foreshore Users: negligible; due to the type and small footprint of the surveys

3.2 Natural Fish Survey

3.2.1 Proposed Duration:

Quarterly over one year to ensure annual variation is accounted for.

3.2.1 Methodology

The Otter Trawls surveys will use set gill or trammel nets to characterise the fish assemblages in the region. This method has been considered most suitable due to the potentially high number of boulders across the site limiting the efficacy of trawl gear. Numerous net locations will be surveyed (number and location to be confirmed) across the development footprint, with an additional four net locations within one tidal excursion (all locations will fall within Investigative Foreshore Licence Application area identified in Figure 1).

At each sampling station the nets will be deployed for 24 hours. The position, time and haul and depth at deployment and recovery location will be recorded. All fish species retained in the net will be identified to species level and enumerated. Fish assemblages in the Irish Sea are known to fluctuate seasonally as a result of reproductive and feeding behaviour. To ensure adequate characterisation of the fish assemblages throughout the year one survey will be completed within each season.

Exact survey methodology and locations will be consulted upon and agreed prior to work commencing.

3.2.2 Likely interactions and impacts with natural resources and other foreshore users

Natura 2000 sites: negligible; due to the type and small footprint of the surveys. The surveys will not take place in any of the designated sites and will be sited sufficiently far away not to have an impact. There's the potential for indirect impacts on species qualifying for the SACs or SPAs, through the disturbance and displacement of prey species during the survey work. However due to the low frequency of the work and the small number of proposed nets the impacts on prey species will be negligible.

European Protected Species: negligible; due to the type and small footprint of the surveys.

Natural Fish: negligible; due to the small number and extent of the netting sites proposed. of haulage sites type and small footprint of the surveys.

Other Foreshore Users: negligible; due to the type and small footprint of the surveys

3.3 Benthic Survey

3.3.1 Proposed Duration:

Periodically throughout the course of one year.

3.3.2 Methodology

Benthic survey work is needed to ensure consistent and confident assignment of biotopes across Codling Bank Wind Park. To do this, both infaunal and epifaunal components of the benthos will be investigated using survey techniques suited to sampling the substrate type present across the site.

Drop-down Video surveys will be required throughout the wind farm boundary and at reference stations on one tidal excursion and one reference station beyond one tidal excursion.

Grab surveys will be carried out using a 0.1m² Hamon grab (Figure 10). The grab gear will be deployed following recovery of the drop-down video equipment where seabed conditions are suitable for grab sampling. All drop down video stations will be sampled if possible Epibenthic Beam Trawl surveys (Figure 11) will be carried out within the within the wind farm site, 4 within one tidal excursion and reference sites beyond one tidal excursion.

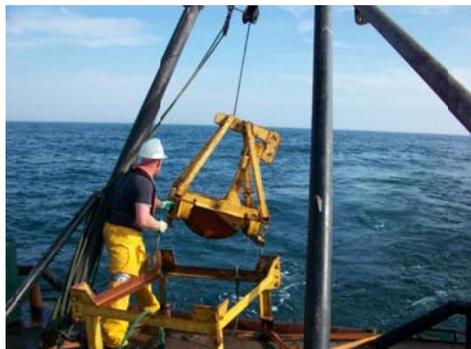


Figure 10: Hamon Grab



Figure 11: Beam Trawl

3.3.3 Likely interactions and impacts with natural resources and other foreshore users

Natura 2000 sites: negligible; due to the type and small footprint of the surveys. Siltation related to the grab surveys will be very localised and short-lived and will be cited at a sufficient distance not to cause impact on Natura 2000 sites.

European Protected Species: negligible; due to the type and small footprint of the surveys.

Natural Fish: negligible; due to the type and small footprint of the surveys.

Other Foreshore Users: negligible; due to the type and small footprint of the surveys

3.4 Met Ocean and coastal Survey

3.4.1 Proposed Duration:

Data collection for one year is required to gather sufficient information to give a representative account of the met ocean conditions in the development area to inform coastal processes modelling.

3.4.2 Methodology

The devices will be in place for one year. Industry standard marking and lighting of the moored devices will be deployed to ensure other users of the marine environment will be made aware. Due to the small number and actual footprint of the devices the impact during the year in which the devices are in place will be minimal.

The monitoring campaign will involve the measurement of deployment of:

- Wave measurement over 12 months
- Tidal measurement over 12 months including currents
- Turbidity measurement over 12 months
- Sediment transport and settling velocity measurement campaigns every 3 months over a 12 month cycle

It is likely that 4 sampling stations will be required throughout the site.

Acoustic Doppler Current Profiler (ADCP) (Figure 12) and Waverider devices (Figure 14) are most likely to be used.

Devices will be attached to moorings or to the seabed (Figure 13) and will be in place for one year. Periodic calibration and maintenance of the devices will be required involving a small vessel to visit each of the devices in place. A vessel will be required at the initial deployment and when fetching the devices at the end of the year's survey.

Turbidity will be measured using an optical backscatter sensor (OBS) used to determine the turbidity of the water in-situ. The instrument will be deployed with an automated wiper system, allowing it to collect good quality data over long periods of time between service intervals, without fouling occurring.



Figure 12: ADCP and Frame

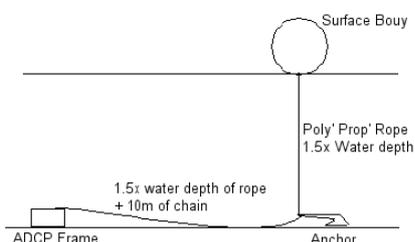


Figure 13: ADCP Basic Mooring



Figure 14: Waverider buoy with mooring chain and bungee

The exact instruments and locations will be agreed through consultations prior to the deployment and commencement of works.

Sediment sampling will be carried out to inform the settlement settling velocity and will be collected during the benthic surveys (see section 3.3 above).

3.4.3 Proposed Equipment

Acoustic Doppler Current Profiler; is a hydroacoustic current meter similar to a sonar which will measure water current velocities. The ADCP transmits and receives sound signals.

As an acoustic device it contributes to noise pollution in the ocean and may interfere with cetacean navigation and echolocation. Although the exact device has not been determined, in general the ADCPs range in frequency for use on site will be from 600 kHz – 1 MHz.

Likely Interactions and Impacts with Natural resources and other Foreshore users The use of ADCP devices and the associated works with deploying them into position, periodic calibrations and maintenance can increase anthropogenic noise in the marine environment. This in turn has the potential to impact species designated by Natura 2000 sites and other marine receptors. However due to the range of sound emitted by the devices there will be negligible impacts on any species sensitive to sound disturbance.

Natura 2000 sites: negligible; due to the type and small footprint of the surveys.

European Protected Species: negligible; due to the footprint of the surveys. The peak hearing sensitivity of species most likely to be encountered falls outwith the noise produced by the devices, and therefore will not have an adverse effect on any EPS.

Natural Fish: negligible; due to the type and small footprint of the surveys

Other Foreshore Users: negligible; due to the type and small footprint of the surveys

4 SUMMARY

The assessment presented here predicts that the primary response to the proposed surveys will be a potential short-lived and localised disturbance and behavioural response from some animals. Potential impacts of this are predicted to have a no or minor effect on Natura 2000 sites, species designated at these sites, EPS populations in the vicinity of the Codling Bank Wind Park, fish populations and other foreshore users. The other impacts will be the potential for short term siltation due to some of the investigative works, however due to the limited intrusive works, the small scale operations the impact from this is also believed to be minor. Through the use of the FLO, and consultations with relevant bodies throughout the duration of the works impacts on other foreshore users will be minimised. It is anticipated there will be **no residual impacts**.

5 CONTACT DETAILS

Andy Precious

The Green House,
Forrest Estate
Dalry, Castle Douglas
DG7 3XS
Scotland, UK

Tel: +44 (0) 1644 430 704

Nichola McLaughlin

The Green House,
Forrest Estate
Dalry, Castle Douglas
DG7 3XS
Scotland, UK

Direct Dial: +44 (0) 1644 408 020

Mobile: +44 7979 590 486

APPENDIX 1

PROPOSED METHODOLOGY – PASSIVE ACOUSTIC MONITORING