Rampion Offshore Wind Farm

ES Section 9 – Nature Conservation

RSK Environmental Ltd **Document 6.1.9**

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E.ON Climate & Renewables UK Rampion Offshore Wind Limited

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9.1 Introduction

9.1.1 This section of the Environmental Statement (ES) presents an assessment of the potential impacts on marine and intertidal nature conservation interests that might arise from construction, operation and decommissioning of the proposed Rampion Offshore Wind Farm (the Project). The assessment has been made using data from publicly available sources and consultation with stakeholders.

9.1.2 This section addresses the following topics:

- Assessment methodology;
- An overview of the baseline (nature conservation interests in the area);
- An account of potential impacts on nature conservation interests, together with discussion of appropriate mitigation, and
- A summary of residual impacts in tabular form.

9.1.3 Throughout site and cable route selection, emphasis has been placed on avoiding designated nature conservation sites and other areas of nature conservation interest.

9.1.4 This assessment includes both the intertidal (landfall) and subtidal (offshore) environments that the Project may impact. Terrestrial (onshore) nature conservation interests are covered in Section 24 - Terrestrial Ecology and are not considered further here.

9.1.5 As part of the requirement of the Planning Inspectorate's (PINS) Advice Note Ten '*Habitat Regulations Assessment relevant to nationally significant infrastructure projects (NSIP*)' a separate report has been produced relating to the potential for the project to have significant effects on European sites. That report (Document 5.3) follows the required steps in line with Advice Note Ten and concludes that there are unlikely to be any significant effects on European Sites.

9.2 Legislation and Policy Context

Planning Policy Guidance

9.2.1 The Overarching National Policy Statement (NPS) for Energy (EN-1) (July 2011) sets out policy for the Secretary of State with regard to generic impacts on designated sites.

9.2.2 Paragraph 5.3.3 states that: "*Where the development is subject to EIA the applicant should ensure that the Environmental Statement (ES) clearly sets out any effects on internationally, nationally and locally designated sites of ecological*

or geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity. The IPC should also expect the applicant to provide environmental information proportionate to the infrastructure where Environmental Impact Assessment (EIA) is not required."

9.2.3 Paragraph 5.3.4 stating that: "*The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests."*

9.2.4 The National Planning Policy Framework document (Department for Communities and Local Government, March 2012) provides guidance on "Conserving and enhancing the natural environment. A number of points are particularly relevant to Nature Conservation.

9.2.5 Point 117 includes "*To minimise impacts on biodiversity and geodiversity, planning policies should:*

- *plan for biodiversity at a landscape-scale across local authority boundaries;*
- *identify and map components of the local ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity, wildlife corridors and stepping stones that connect them and areas identified by local partnerships for habitat restoration or creation;*
- *promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species populations, linked to national and local targets, and identify suitable indicators for monitoring biodiversity in the plan;*
- *aim to prevent harm to geological conservation interests."*

9.2.6 Point 118 includes "*When determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by applying the following principles:*

- *if significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;*
- *proposed development on land within or outside a Site of Special Scientific Interest likely to have an adverse effect on a Site of Special Scientific Interest (either individually or in combination with other developments) should not normally be permitted. Where an adverse effect on the site's notified special interest features is likely, an exception should only be made where the benefits of the development, at this site, clearly outweigh both the impacts*

that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of Sites of Special Scientific Interest;

- *development proposals where the primary objective is to conserve or enhance biodiversity should be permitted;*
- *development proposals where the primary objective is to conserve or enhance biodiversity should be permitted;*
- *opportunities to incorporate biodiversity in and around developments should be encouraged;*
- *planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats…unless the need for, and benefits of, the development in that location clearly outweigh the loss; and*
- *the following wildlife sites should be given the same protection as European sites: potential Special Protection Areas (SPAs) and possible Special Areas of Conservation (SACs); listed or proposed Ramsar sites; and sites identified, or required, as compensatory measures for adverse effects on European sites, potential SPAs, possible SACs, and listed or proposed Ramsar.*

9.2.7 Point 119 notes: *"The presumption in favour of sustainable development (paragraph 14) does not apply where development requiring appropriate assessment under the Birds or Habitats Directives is being considered, planned or determined."*

Habitats Directive

9.2.8 The EC Directive 92/43/EEC on Conservation of Natural Habitats and of Wild Fauna and Flora, 1992 ('the Habitats Directive) requires Member States to take measures to maintain or restore natural habitats (listed on Annex I) and wild species (Annex II) at favourable conservation status by the designation of Special Areas of Conservation (SACs). The Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended) implement the Habitats Directive in relation to marine areas where the UK has jurisdiction beyond territorial waters (broadly 12 nautical miles to 200 nautical miles). The Conservation of Habitats and Species Regulations 2010 implement the Habitats Directive in relation to England and Wales as far as the limit of territorial waters (usually 12 nautical miles).

9.2.9 Excluding supratidal habitats, seven Annex I marine/intertidal habitats are listed as occurring in the UK (Joint Nature Conservation Committee, JNCC, 2012), i.e. shallow sandbanks; estuaries; intertidal mud and sandflats; coastal lagoons; large shallow inlets and bays; reefs; and sub-marine structures made by leaking gases.

9.2.10 Species on Annex II found in marine or intertidal environments are sea lamprey (*Petromyzon marinus*), river lamprey (*Lampetra fluviatilis*), allis shad (*Alosa*

alosa), twaite shad (*A. fallax*), Atlantic salmon (*Salmo salar*), bottlenose dolphin (*Tursiops truncatus*), harbour porpoise (*Phocoena phocoena*), otter (*Lutra lutra*), grey seal (*Halichoerus grypus*) and common seal (*Phoca vitulina*).

9.2.11 It is an offence to deliberately kill, capture or disturb European protected species, and to damage or destroy their breeding sites or resting places. Furthermore, there is a requirement to protect habitats listed in Annex I of the Habitats Directive.

Birds Directive

9.2.12 The EC Directive 79/409/EEC on the Conservation of Wild Birds, 1979 ('the Birds Directive) requires Member States to take measures for the conservation of wild birds through the designation of 'Special Protection Areas' (SPAs). The Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended) implement the Birds Directive in relation to marine areas where the UK has jurisdiction beyond territorial waters. The Conservation of Habitats and Species Regulations 2010 implement the Birds Directive in relation to England and Wales as far as the limit of territorial waters. Often sites classified as SPAs are also designated as Wetlands of International Importance under the Ramsar Convention (see 9.2.25 of this chapter).

9.2.13 SACs and SPAs are together termed Natura 2000 sites.

Habitats Regulation Assessment (HRA)

9.2.14 A Habitats Regulation Assessment (HRA) assesses the likely impacts of the possible effects of a plan or policy on the integrity of Natura 2000 sites (including possible effects 'in combination' with other projects and programmes).

9.2.15 Where a project may have impacts on a Natura 2000 site, the competent authority in the case of this Project, the Secretary of State will undertake a screening exercise to determine whether significant effects on these sites could occur. The focus of the HRA is on the designating features and conservation objectives of the site.

9.2.16 The HRA process may comprise the following steps; a screening assessment, a test of likely significant effect and appropriate assessment (AA), and review of alternatives. In cases where a significant adverse effect cannot be ruled out, there is a fourth stage. This is where imperative reasons of overriding public interest (IROPI) may occur. In such a scenario, necessary compensation or mitigation measures may be taken to ensure that the overall coherence of the Natura 2000 network is protected. An HRA screening has been carried out for the Rampion project, concluding that there are unlikely to be any significant impacts on European Sites (Document 5.3).

Wildlife and Countryside Act 1981

9.2.17 The Wildlife and Countryside Act (W&CA) 1981 protects several fish species found in the marine environment. Under the Variation of Schedule 5 (England) Order 2008, both short-snouted (*Hippocampus hippocampus*) and spiny/long-snouted (*H. guttulatus*) seahorses and their habitat are fully protected out to the 12 nautical mile limit. This protection means that it is an offence to intentionally or recklessly harm or disturb any seahorse. Protection includes a prohibition of killing, injuring or taking, damage or destruction of their places of shelter, or disturbance while such animals are occupying places of shelter. Additionally, shad (*Alosa* sp.) are protected from intentional killing, injuring or taking (allis shad, *A. alosa*) or damage to, destruction of, obstruction of access to any structure or place used for shelter/protection (both allis shad and twaite shad, A. *fallax*). Basking shark (*Cetorhinus maximus*) and angel shark (*Squatina squatina*) are also protected.

Marine and Coastal Access Act 2009

9.2.18 The Marine and Coastal Access Act 2009 created a new type of marine protected area (MPA) called a Marine Conservation Zone (MCZ), which are of national importance. MCZs are intended to protect areas that are important to conserve the diversity of rare, threatened and representative marine habitats, species, geology and geomorphology in UK waters and they, together with other types of MPAs, deliver the Government's objective for an ecologically coherent network of MPAs. As part of the MCZ process, so-called 'reference areas' will be designated, in which all extractive, depositional and/or disturbing and damaging activities are excluded.

9.2.19 To identify MCZs in English inshore and offshore waters Defra, Natural England and JNCC have established the Marine Conservation Zone Project, which will be delivered through four regional projects. The 'Balanced Seas' (www.balancedseas.org) MCZ project covers the south east of England and encompasses the entirety of the Project area.

9.2.20 A network of recommended MCZs (rMCZs) has been identified based on the principles outlined in the Ecological Network Guidance (ENG) by a Regional Stakeholder Group (RSG). Features proposed to be designated for protection by MCZs are all listed in the ENG and comprise 'broad-scale habitats', which comprise groups of species together into types of marine habitat; and 'Features of Conservation Interest (FOCI)'. FOCI comprise specific species and habitats for which more detailed data are available; they also already have Biodiversity Action Plan (BAP) status or protection under the Wildlife and Countryside Act 1981.

9.2.21 Habitat FOCI of particular relevance to the study area include the following:

- blue mussel (*Mytilus edulis*) beds;

- Ross worm (*Sabellaria spinulosa*) reefs;
- sheltered muddy gravels;
- subtidal chalk; and
- subtidal sands and gravels.

9.2.22 The list of benthic FOCI species includes native oysters and undulate ray (Natural England and JNCC, 2010). In addition, features (including species) not listed in the ENG may also be recommended for designation if there is reasonable scientific evidence available to support the recommendation.

9.2.23 MCZs have not been officially designated at the time of writing. However, Balanced Seas worked with sea users and interest groups to propose rMCZs and recommended MCZ reference areas (rRAs), to the Science Advisory Panel, Natural England and JNCC in September 2011. Following public consultation by Defra, it is currently anticipated that the UK Government will designate MCZs in early 2013.

Sites of Special Scientific Interest (SSSI)

9.2.24 Introduced under the National Parks and Access to the Countryside Act 1949 and strengthened by subsequent legislation (e.g. Wildlife and Countryside Act 1981 and the Countryside and Rights of Way Act 2000), SSSIs are the basic "building block" of conservation areas in the UK and underpin sites such as SPAs. SSSIs can be designated based on biological or geological interest.

Ramsar Sites

9.2.25 The Ramsar Convention 1971 (The Convention on Wetlands of International Importance, especially as Waterfowl Habitat) is an international treaty for the conservation and sustainable utilisation of wetlands, to which the UK is a signatory. In the UK, intertidal Ramsar sites often have the same boundaries as SPAs.

Biodiversity Action Plans

9.2.26 UK 'biodiversity action plans' (BAPs) are the UK's response to the Convention on Biological Diversity 1992. The UKBAPs describe the UK's biological resources, commits to a detailed plan for the protection of these resources and lists 1,149 species and 65 habitats as conservation priorities.

9.2.27 The UKBAP sets out a national strategy for the conservation of biodiversity. This is addressed at the local level by the production of 'local BAPS' (LBAPs). The LBAP relevant to the proposed scheme is the Sussex BAP (http://www.biodiversitysussex.org).

Marine Sites of Nature Conservation Importance (MSNCIs)

9.2.28 Sites of Nature Conservation Importance (SNCIs) are non-statutory and are recognised as being of county-wide importance for nature conservation. For example, they can contain good examples of a particular type of habitat or species that have a restricted distribution in Sussex. East and West Sussex County Council, and Brighton and Hove City Council, are unusual in England in designating Marine SNCIs (MSNCIs).

Voluntary Marine Conservation Areas (VMCAs)

9.2.29 VMCAs may be set up by representatives of the users of a subtidal area or an area of shore to initiate management of that area. Management may have a variety of purposes, from the conservation of an area important for marine biology to its educational uses.

9.3 Scoping and consultation

9.3.1 Initial consultation on the Project was carried out via the Rampion Offshore Wind Farm Scoping Document (E.ON/RSK, September 2010). Responses received are presented in the Infrastructure Planning Commission's (IPC) Scoping Opinion (IPC, October 2010). Further consultation exercises have also taken place in 2011/12. The information and advice received during the scoping process with regard to marine and intertidal nature conservation issues is summarised in **Table 9-1**.

Table 9-1: Scoping responses

Date	Consultee	Summary of issues	Sections where addressed
12/10/10	**West Sussex County Council**	How is the Rampion offshore wind farm development going to fit in with the MCZ schemes?	MCZ schemes are discussed from 9.5.14 onwards, and included on Figure 9.2.
8/10/10	**South Downs National Park**	The Seven Sisters Voluntary Marine Conservation Area (VMCA) lies to the west of the proposed wind farm. The EIA should include an assessment of ecological impacts including any of the VMCA.	The VMCA is considered in 9.5.26. As part of the benthic survey program, a station just offshore of the VMCA was sampled.
12/10/10 11/10/10	**West Sussex County Council; Adur District Council; Natural England**	Marine SNCIs are in close proximity to the development.	Marine SNCIs are considered, particularly in 9.5.25
12/10/10	**Brighton & Hove City Council**	The reference to the Conservation (Natural Habitats &c.) Regulations 1994 is out of date, as these have now been replaced by the Conservation of Habitats and Species Regulations 2010.	Noted, in 9.2.8

Date	Consultee	Summary of issues	Sections where addressed
11/10/10	**East Sussex County Council**	MCZs (and potential MCZs) require consideration. The MCZ process has collected a large amount of data and this effort should not be duplicated in the ES process. The interactions of the development with the MCZ process, and possible cumulative effects, should be considered.	MCZ schemes are discussed from 9.5.14 onwards, and included on Figure 9.2.
		25 MSNCIs around the coast of Sussex, important for wildlife – these should be recognised and safeguarded.	Marine SNCIs are considered, particularly in 9.5.25
		Some sites are not considered in Scoping Report. Natural England should be consulted and these sites considered.	The preliminary listing of sites presented in the Scoping Report has been expanded to a comprehensive list of sites in the current ES, incorporating feedback from consultees.
16/09/10	**Lancing Parish Council**	Widewater SNCI is a protected area of importance for wildlife at a county scale and should be considered in the ES.	This site is noted in Section 23 -Onshore Ecology. However, Widewater will not be affected by the proposed cable route and is therefore not included in the current assessment.
12/10/10	**Natural England**	The EIA should be sufficiently detailed to fulfil the requirements of Appropriate Assessment	Noted. Further information is available in the No Significant Effects Report (NSER) (Document 5.3)
		Reference to Annex I habitats, MSNCIs, and MCZs should be included	Noted in, 9.2.28 and 9.2.18.
		Nearest Natura 2000 sites are Lyme Bay, and Margate & Long Sands (both cSACs)	Natura 2000 sites are noted in 9.2.13. Distances of SACs and SPAs are noted in 9.5.3 and 9.5.11 respectively.
		Bassurelle Sandbank cSAC needs to be mentioned	Noted in 9.5.3
		Benthic survey information should be reviewed with reference to Natural England /JNCC guidance on Features of Conservation Interest (FOCIs) in MCZs	FOCIs in the nearest rMCZ are discussed in 9.5.14
		Biodiversity Action Plan fish species should be considered	These are considered in 9.5.23.
		Marine SNCIs and Adur Estuary SSSI are nearby and direct and indirect impacts on these should be considered	MSNCIs and SSSIs (inc Adur Estuary) are considered in 9.5.18 and 9.5.24. Potential impacts are considered in 9.6

Date	Consultee	Summary of issues	Sections where addressed
		Potential chalk reef habitat along the offshore cable route should be treated as an Annex I habitat and taken into account in impact assessment/mitigation, even though it is not under consideration as an SAC	This is considered in 9.5.6, 9.6.3 and 9.6.4
		A separate section entitled 'Information for Appropriate Assessment' should be included for European and Ramsar sites	Noted. The impacts on birds from local sites designated for their bird interest have been considered in Chapter 11 – Marine Ornithology, and in the No Significant Effects Report.

9.3.2 The scope of the assessment was modified accordingly to take account of the above consultee responses and the opinions of the IPC, the findings of which were reported in the draft ES and subject to stakeholder consultation.

Formal Pre-application Consultation

9.3.3 As detailed in Section 5 – EIA Methodology, an extensive programme of engagement has been undertaken with regard to the Project, details of which are provided in the Consultation Report for the Project (Document 5.1). This included publication of the Draft ES as part of the Section 42 and Section 48 consultation in June 2012.

9.3.4 Key consultees (i.e. Natural England; Marine Management Organisation; Sussex Inshore Fisheries and Conservation Authority (IFCA); Sussex Wildlife Trust) provided responses to the draft ES on offshore nature conservation. The main responses, and the modifications subsequently made to the final ES, were as follows:

- The extent of habitats of conservation interest (e.g. blue mussel reefs, subtidal chalk and *Sabellaria spinulosa* reefs) reported in the draft ES was not deemed sufficient to assess potential impacts, and responses to the draft ES included requests for an integrated habitat map that drew together data from both the broad-scale geophysical survey (conducted by Osiris in 2010) and the point-sampling methodology of the benthic survey (conducted by Emu in 2011). As a result, Emu Ltd were commissioned to produce an integrated, predicted habitat map to a methodology agreed in consultation with the Sussex IFCA (teleconference between RSK, Emu and Sussex IFCA, 14 September 2012). The maps and further details of the methodology used, are presented in Section 7 – Benthos and Sediment Quality and Figure 7.6 and 7.7; The results of these studies were then used to inform detailed consultation with the relevant agencies regarding the need for micro-siting of the turbines and cable route to avoid sensitive features;

- The potential impact of piling noise on specific conservation components:

- Black bream off the Kingmere rMCZ was raised as a concern, especially given the proposed 'recover' status of this species at this site. The use of data from a similar, 'surrogate' species (red bream *Pagrus major*) to model black bream responses to noise is explained in Section 8 – Fish and Shellfish Ecology and in detail in Appendix 8.6.

- Indirect impacts on breeding terns in nearby SPAs, through potential impacts of piling noise on their prey (herring), were also raised as a concern by Natural England. In response, additional data on herring spawning intensity were collated and mapped against potential noise impacts, and the feeding range of the terns present at these sites was examined in more detail. Further details are presented in Sections 8 (Fish & Shellfish Ecology) and 11 (Marine Ornithology).

- Impacts to short-snouted seahorse (W&CA, MCZ FOCI and BAP species). The draft ES used bass as a surrogate species for seahorses, as the two species have similar audiograms. However, in response to comments on the draft ES, further noise modelling was commissioned using recent audiogram data from a closely related seahorse species, to better understand potential impacts.

- The results of these studies were then used to inform detailed consultation with the relevant agencies including discussions on the possible need for mitigation such as piling restrictions.

- Other minor changes, such as expansion or clarification of draft ES text (e.g. on details of protected areas and species), have been noted and incorporated.

9.4 Assessment Methodology

Establishment of Baseline Environment

9.4.1 Designated nature conservation areas that are partly or wholly in the marine or intertidal environment within ~100km of the Project site (the 'study area') are considered in this section. Designated nature conservation areas that are entirely terrestrial are considered in Section 23.

Identification and Assessment of Impacts and Mitigation Measures

9.4.2 Impacts were identified and assessed based on expert judgement. The sensitivity of different nature conservation interests were considered as part of the impact assessment (Table 9-2).

9.4.3 As noted above, potential impacts of piling noise on fish contributing to the status of both Kingmere rMCZ and nearby SPAs were raised during the consultation process. A detailed desk-based assessment of noise was performed (Appendix 8.6), a summary of which is presented in Section 8 – Fish and Shellfish

Ecology. Audiograms (i.e. scientific data on hearing sensitivities) are used to predict (or 'model') responses of each fish species to noise. Where no audiogram data are available for a specific species, the best available evidence (i.e. audiograms from the most similar species both taxonomically and in terms of physiology) was used.

Table 9-2: Sensitivity of nature conservation receptors

Receptor sensitivity	Example
High	An internationally or nationally designated site (e.g. SPA, SAC, Ramsar site, SSSI), including those that are draft/under consideration (e.g. rMCZs, cSACs). Wildlife & Countryside Act species (e.g. seahorses)
Medium	BAP priority habitats and species A regionally designated or voluntary site (e.g. MSNCI, VMCA) 'Potential Annex I Habitat' (e.g. subtidal chalk) MCZ FOCI habitats and species (not as part of a rMCZ)
Low	Established semi-natural or artificial habitats of limited ecological value when assessed in isolation but which offer a range of opportunities for widespread and commonly occurring species within the wider environment.

9.4.4 The magnitude of impact was then assessed according the criteria presented in Table 9-3.

Table 9-3: Magnitude of impact

Magnitude	Definitions
Large	Impacts affect the extent/quality/abundance of habitats and species that contribute towards the nature conservation value of a site to such an extent that the conservation status may be compromised.
Medium	Impacts affect the habitats/species of conservation interest to an extent that there is a reduction in population or range.
Small	Impacts may affect habitats/species of conservation interest, but these are not detectable and within the range of natural variability.
Negligible	Impacts do not affect conservation interests.

Significance of Residual Effects

9.4.5 The overall significance of residual impacts was determined by combining sensitivity of the receptor (Table 9-2) and the magnitude of the impact (Table 9-3), as presented in Table 9-4.

Table 9-4: Significance of impact

	Sensitivity		
Magnitude	**High**	**Medium**	**Low**
Large	Major	Major/Moderate	Moderate
Medium	Major/Moderate	Moderate	Minor
Small	Moderate	Minor	Minor
Negligible	Minor	Negligible	Negligible

Uncertainty and Technical Difficulties Encountered

9.4.6 No particular difficulties were encountered. It is noted in Appendix 8.6 that noise modelling for black bream (re: the Kingmere rMCZ) uses a similar species (red bream *Pagrus major*), as no audiograms are available for black bream; results for this species are therefore tentative.

9.5 Baseline

9.5.1 Marine and intertidal nature conservation areas within the vicinity of the Project site are illustrated in Figure 9.1, and discussed in the following section.

Special Areas of Conservation (SACs)

9.5.2 Designated SACs in the study area are as follows:

- **Solent Maritime** (38km to the west): primary features of estuaries and saltmarsh vegetation; secondary features include subtidal sandbanks, intertidal mud and sandflats and coastal lagoons.
- **South Wight Maritime** (42km to the west): primary interest features of reefs (both sub- and inter-tidal) and sea caves. Also maritime vegetation.
- **Solent and Isle of Wight Lagoons** (~40km to the west)**:** primary interest feature of coastal lagoons.

9.5.3 The only Site of Community Importance (SCI, i.e. sites that have been formally approved by UK government and formally recognised by the EU, but not yet formally designated as an SAC by the UK government) in the area is:

- **Bassurelle Sandbank** (60km to the east): primary feature being subtidal sandbanks. Located in the mid-English Channel.

9.5.4 The only Candidate SAC (cSAC, i.e. submitted by the UK government to the EU) in the area is:

- **Wight-Barfleur reef** (56km to the southwest): primary feature being reefs. Located in the mid-English Channel due South of the Isle of Wight.

9.5.5 Several other SACs occur in the study area, which are outlined below for completeness. However, due to their distance from the development, and designated features of limited relevance to the intertidal/marine environment of western Sussex, these are not considered any further.

- Dungeness (Kent): Supratidal vegetation (annual drift line and perennial stony); also great crested newts;
- Hastings Cliff (East Sussex): vegetated sea cliffs; and
- Pevensey Level (West Sussex, inland): ramshorn snail (freshwater).

9.5.6 Although not currently designated or known to be under consideration as SACs, habitats listed on Annex I are either present, or potentially present, in the development area (see Section 7 – Benthos and Sediment Quality, for details).

9.5.7 Of the seven marine/intertidal habitats listed on Annex I, only 'reef' is considered to be both present (or have a high potential of occurring) and have the potential to be impacted by the proposed development. The definition of 'reefs' includes both bedrock and stony (e.g. subtidal chalk) and biogenic (e.g. blue mussel, or *Sabellaria spinulosa*) structures.

9.5.8 Potential reefs (including both stony and biogenic reefs) recorded in the 2011 benthic survey were subject to reef definition criteria (see Appendix 7.2); of these, one location (blue mussel reef, close inshore in the export cable corridor) could be confirmed as a 'reef' based on the information available. A further single inshore location was identified as a blue mussel reef, but this was outside the eastern margin of the cable route corridor (Figure 7.4). Excepting these two locations (where mussels were recorded on camera), assessment of the geophysical data did not fully discriminate mussel beds. Instead, an area that has the potential to support mussel bed was identified in the most inshore ~2 km of the export cable corridor. The predicted habitat map could not identify other habitats of conservation interest.

9.5.9 The potential for the Annex I habitat 'shallow sandbanks' (i.e. sandbanks typically covered by less than 20m water depth) in the survey area was considered, but the characteristics of the area did not fit the criteria for this habitat (see Appendix 7.2).

Special Protection Areas (SPAs)

9.5.10 There are only three entirely marine SPAs in the UK, the closest of which to the Project site is the Outer Thames Estuary SPA, designated for its wintering red-throated diver populations.

9.5.11 SPAs with intertidal and/or marine components in the area of the Project are summarised in Table 9-5. All of these SPAs have also been designated as Ramsar sites.

Table 9-5: Summary of Special Protection Areas in the region

Name	Distance from Wind farm area	Qualifying features of SPA		
		Wintering	Breeding	Passage
Chichester & Langstone Harbours	35km	Bar-tailed & black-tailed godwit; little egret; brent goose; dunlin; grey plover; redshank; ringed plover; wintering assemblage of >20,000 waterfowl	Little tern; sandwich tern	Little egret; ringed plover
Solent Marshes & Southampton Water	49km	Black-tailed godwit; brent goose; ringed plover; teal; wintering assemblage of >20,000 waterfowl	Common, little, sandwich and roseate tern; Mediterranean gull.	-
Pagham Harbour	28km	Ruff, pintail	Little tern	-
Portsmouth Harbour	53km	Brent geese	-	-
Dungeness to Pett level	54km	Bewick's swan, shoveler	Common and little tern; Mediterranean gull	Aquatic warbler

9.5.12 It should be noted that for three of these SPAs (Chichester and Langstone Harbour; Pagham Harbour; and Dungeness to Pett Level) there is ongoing work to potentially add, a marine aspect, to encompass the foraging area of terns (Natural England, response to draft ES, 8th August 2012).

9.5.13 In addition to the SPAs designated on the English coast, there are also a number which are designated on the French coastline, and these are described in Section 11 – Marine Ornithology.

Marine Conservation Zones (MCZs)

9.5.14 In September 2011, Balanced Seas submitted (to Natural England and JNCC) 30 recommended MCZs (rMCZ), and 25 recommended Reference Areas (rRA) in their Final Recommendations Report. Based on this information, Natural England and JNCC submitted recommendations to Defra in 2012. Around 17 of these sites were in the English Channel, with the remainder being in the Thames Estuary/southern North Sea area.

9.5.15 No rMCZs are located in the development area. rMCZs within ~80km of the Project site are as follows (see Figure 9.2):

- **Kingmere (rMCZ 16)**: situated within the 6nm limit, lies approximately 4.1km to the Northwest of the Project site, and within 1km to west of the cable corridor. Features of conservation interest include subtidal chalk; subtidal sands and gravel; and native oyster; in addition, black bream is proposed as a non-FOCI species, based on the importance of the area for nests of this species.

- **Beachy Head East & West (rMCZ 13):** From 100m west of Brighton Marina to near Hastings, and including both the intertidal (up to MHW) and subtidal, with the boundary extending 0.5nm out to sea. At its closest point the boundary of this rMCZ is around 12.5km from the Project site. Features of conservation interest include subtidal chalk and associated littoral chalk communities, mussel beds and native oyster, and seahorses. This rMCZ includes the draft reference area Belle Tout to Beachy Head to (just west of Eastbourne), which includes both intertidal and shallow subtidal elements (rRA 9).

- **East Meridian (rMCZ 29)**: Located offshore, approximately 6.4km to the south and east of the Project site; features of conservation interest are the mixture of sediment types and benthic diversity;

- **Offshore Overfalls (rMCZ 17)**: Features of conservation interest include mixed sediments (sands and gravels) distinct from the surrounding sandstone and chalk rock, and characterised by unusual morphological features (e.g. sand-waves, meg-ripples); also seahorse and undulate ray have been recorded. Located offshore, approximately 12.5km to the west and southwest of the Project site;

- **Offshore Brighton (rMCZ 14**): Located approximately 23.5km to the south of the Project site in deeper waters of the mid-English Channel. This site contains a range of rock seabed types, along with sands and gravels. Benthic species richness and benthic biotope distinctness is high. This rMCZ includes the draft reference area at Dolphin Head, which includes both intertidal and shallow subtidal elements (**rRA 10**), located 35km from the wind farm.

9.5.16 In addition, there is a rRA at Mixon Hole (**rRA 12**, and also an MSNCI), which is an underwater cliff feature reef feature located off the coast of Selsey Bill approximately 28km to the west of the Project site.

9.5.17 In addition, survey and other data supported the presence of the following MCZ FOCIs in the development area:

- Habitats:

    - Blue mussel beds; sheltered muddy gravels; subtidal chalk; subtidal sands and gravels were confirmed.

- A further 4 habitat FOCI (littoral chalk communities; native oyster (*Ostrea edulis*) beds; peat and clay exposures; Ross worm *Sabellaria spinulosa* reefs) may occur, or have the potential to occur, in the development site.

- Species:
  - Undulate ray and short-snouted seahorse were confirmed as occurring in the development area (see Section 8 – Fish and Shellfish Ecology)
  - Two other species (smelt and European eel), were not recorded in surveys but are likely to be found on the site at least occasionally.
  - Other FOCI species of limited mobility were not recorded in surveys, although some could theoretically be present.

Sites of Special Scientific Interest (SSSIs)

9.5.18 Coastal SSSIs within the study area between Sisley Bill and Beachy Head (i.e. within approximately 30km; Section 6 - the Physical Environment, covers this area within its "wider far field region" of assessment in Appendix 6.4) are summarised below (NB only marine/intertidal features are noted here):

- **Brighton to Newhaven Cliffs** (13.5km to the north): chalk cliff and wave-cut platform; also maritime vegetation and locally important seabird colony (the only breeding colony of kittiwakes in Sussex, with breeding fulmar and herring gull);
- **Seaford to Beachy Head** (14.5km to the northeast): geology (foreshore and chalk cliffs), coastal habitats (saltmarsh; vegetated shingle) and marine habitats (complex intertidal including piddocks, rock pools, eroded reef);
- **Adur Estuary** (13km to the north): saltmarsh, intertidal mudflats; wading birds, including wintering population of ringed plovers (1% of GB population) as well as redshank and dunlin;
- **Climping Beach** (18km to the northwest): vegetated shingle; wintering sanderling;
- **Felpham** (24km to the northwest): beach of geological (quaternary ecology) interest;
- **Bognor reef** (25km to the west): intertidal geological interest (fossiliferous rocks) and vegetated shingle habitats;
- **Pagham harbour** (28km to the west): extensive saltmarsh and intertidal mudflats, and associated habitats; importance for waders/wildfowl including international importance for wintering ruff and brent geese; national importance for wintering pintail, ringed and grey plover and black-tailed godwit; also of geomorphologic interest;

- **Selsey, East Beach** (30km to the west): geological interest.

Ramsar

9.5.19 UK Ramsar sites with intertidal and/or marine components in the area of the Project site share the same (or similar) boundaries as SPAs, and are noted in Table 9-5. French Ramsar sites in the vicinity of the Project site are not always combined with a designated SPA. Sites that are listed as both SPA and Ramsar sites are listed in Table 9-5.

Biodiversity Action Plan

Habitats

9.5.20 The following intertidal and/or marine habitats are recorded in the Sussex BAP:

- Coastal habitats:
  - saltmarsh;
  - sand dunes;
  - vegetated shingle;
  - saline lagoons;
- Intertidal habitats:
  - mudflats;
  - chalk;
  - underboulder communities;
- Intertidal and/or subtidal habitats:
  - blue mussel beds on sediment;
  - Ross worm *Sabellaria spinulosa* beds;
  - seagrass beds;
  - peat and clay exposures;
- Subtidal habitats:
  - mud habitats in deep water;
  - subtidal chalk; and
  - subtidal sands & gravels.

9.5.21 Of the coastal BAP habitats, saltmarsh and sand dunes are not present near the landfall. The nearest saline lagoon is Widewater Lagoon at Lancing, the western end of which is approximately 5km from the proposed landfall location. Widewater Lagoon is a SNCI and a LNR. While shingle habitat that is sparsely vegetated was recorded at the landfall during the May 2011 survey, the landfall location is not considered to be a priority area for this habitat (Sussex

Biodiversity Partnership, 2010). No intertidal BAP priority habitats were recorded during the intertidal survey in May 2011.

9.5.22 For the subtidal area, Section 7 -Benthos and Sediment Quality provides details of conservation features of interest, which are summarised below:

- Blue mussel beds: the most inshore part of the cable route was found to support a blue mussel reef (recorded by drop-down photography), and a band of ~2km in this area was deemed to have potential to support mussel beds;
- Ross worm *Sabellaria spinulosa* beds: although *Sabellaria spinulosa* aggregations have been recorded in the area previously, the benthic survey (or predicted habitat map) could not confirm the presence or absence of these in the survey area;
- Peat and clay exposures: no examples of this habitat were recorded in the development area. A single distant reference station (RE10, approximately 20 km to the west of the wind farm zone) was identified as having clay bedrock with burrowing piddocks.
- Subtidal chalk: hard substrate/rock (some or all of which may be exposed chalk) was recorded mainly in the central part of the wind farm zone, and in the central-southern part of the cable route corridor;
- Subtidal sands and gravels: Large areas of both the wind farm zone and the cable route corridor are consistent with 'subtidal sands and gravels'.

Species

9.5.23 The following are BAP priority species that have been recorded in Sussex (Sussex Biodiversity Partnership (2011)):

- Native oyster (this species was recorded in the development area; see Section 8 – Fish and Shellfish Ecology);
- Fish:
    - Exclusively marine species: undulate ray, herring, short- and long-snouted seahorse, plaice, mackerel, horse mackerel, and Dover sole. Of these, all except longsnouted seahorse have been recorded from the development area (see Section 8 – Fish and Shellfish Ecology);
    - Diadromous species: allis shad, twaite shad, European eel, smelt, Atlantic salmon and sea trout. Individuals of both allis and twaite shad were recorded from the development area; while the other species were not, all are likely to occur there at least occasionally (see Section 8 – Fish and Shellfish Ecology).

- Leatherback turtle; common seal; and several species of cetacean (including harbour porpoise, common dolphin and long-finned pilot whale). All of these species are addressed separately in Section 10 - Marine Mammals).

Marine Sites of Nature Conservation Importance (MSNCIs)

9.5.24 Twenty-four MSNCIs (Figure 9.1 and Figure 9.2) are recognised by the Councils of East and West Sussex, and Brighton & Hove (East Sussex County Council, 2011). These sites have been identified based on dive surveys by the Sussex Seasearch project, and many of the Sussex MSNCIs are associated with bedrock or wreck features and their associated biota (e.g. Seasearch 2009; Williams and Clark, 2010).

Table 9-6: Marine Sites of Nature Conservation Importance (MSNCI) within 20 km of the Project site

SMSNCI Ref #	Name	Feature
7	*H.M.S. Northcoates*	Wreck
8	Worthing Lumps	Sublittoral chalk cliffs
9	South-West Rocks	Exposed vertical chalk cliff
10	Looe Gate	Low-lying chalk cliff
11	Seaford Head Gullies	Chalk gullies and ridges
16	Kingmere Rocks	Boulder community
17	Ship Rock	Low-lying chalk cliff
18	Brighton Marina	Epifauna on pontoons
19	Marina Reef	Reef
20	*City of Waterford*	Wreck
21	Subtidal wave-cut chalk platform (Brighton – Newhaven)	Wave-cut chalk platform
22	Subtidal wave-cut chalk platform (Hope Point – Beachy Head) Adjacent to the Seven Sisters chalk cliffs (8km).	Wave-cut chalk platform
23	Subtidal wave-cut chalk platform (Hope Point – Beachy Head) Between 0 and1 km S & SE of the lighthouse.	Wave-cut chalk platform

9.5.25 The MSNCIs in closest proximity to the Project site are:

- *City of Waterford* wreck (ref 20), lies along the north-eastern boundary of the proposed offshore wind farm site. This wreck, which sank in 1949, has been surveyed by Sussex Seasearch and is covered in dead men's fingers *Alcyonium digitatum* and a variety of anemones (Seasearch, 2009)

- Looe Gate (ref 10), South-West Rocks (ref 9), and Ship rock (ref 17) which are inshore sites in <10m water depth within 3.5km of the export cable corridor. All of these sites are of interest for subtidal chalk features.

- Worthing Lumps (ref 8) and Kingmere Rocks (ref 16) lie approximately 4.5km and 8km to the west of the cable route corridor, respectively.

Voluntary Marine Conservation Area (VMCA)

9.5.26 There is one VMCA near the Project site, on the coast approximately 14km to the northeast of the Project site. Seven Sisters VMCA extends out to sea for approximately 2km and runs from the Martello Tower at Seaford to the Wish Tower at Eastbourne. The VMCA covers the wave cut chalk platform and recognises its significant biological, geological and archaeological interest (East Sussex County Council, 2011).

9.6 Predicted Impacts

Rochdale Envelope

9.6.1 In line with the use of the "Rochdale Envelope" (see Section 5), the assessment in this section has been based on a development scenario which is considered to be the worst case in terms of impacts to designated features. Table 9-7 lists the components of the design of the marine part of the project that could influence the magnitude of impacts. The realistic worst-case scenario in terms of number of turbines, seabed take, turbine diameters and source noise levels are presented in Section 2a - Offshore Project Description.

Table 9-7: Wind farm design features and their influence on the Rochdale envelope for Nature Conservation

Design feature	Design options
Wind farm site layouts	Avoid UK BAP and Annex I habitats. Compressed option could increase piling noise effects on Kingmere rMCZ (black bream)
Wind turbines	See Section 11 - Marine Ornithology
Foundations	Choice of pile size and foundation type could dictate level of noise effect on herring spawning area (and birds from SPAs reliant on these) and Kingmere rMCZ. Gravity bases are considered to have the greatest effect on sediment hydrodynamics, higher numbers of gravity bases used gives the highest potential for effect on coastal SSSIs.
Cables	Routing of cables to avoid UK BAP and Annex I habitat.
Construction and installation	Timing of piling works could affect herring (SPAs) and black bream (Kingmere rMCZ).
Decommissioning	Assumed to be similar to installation.

Construction

Direct disturbance/damage to nature conservation sites

9.6.2 The vast majority of nature conservation sites described in the Baseline section above are outside the limits of the Project development, and therefore do not have the potential to be directly impacted by construction. The single exception to this is The *City of Waterford* wreck MSNCI, which lies within the main wind farm site. The worst-case significance of this unmitigated impact would be

major/moderate, based on medium sensitivity (MSNCI) and large magnitude (factors contributing to the nature conservation status of the MSNCI would be compromised).

Direct disturbance/damage to habitats or species of conservation importance

9.6.3 Excluding highly mobile species (e.g. most fish) that will be able to avoid direct impacts to the seabed, species and habitats of conservation interest that are present (or may be present) in the development area may also be directly impacted, even if they do not currently contribute to the designation of a specific site. These species and habitats, and the associated impacts, are discussed in detail in Sections 7 - Benthos and Sediment Quality and 8 - Fish and Shellfish Ecology but can be summarised as follows:

- Potential Annex I reef habitat: i.e. a single blue mussel reef confirmed in shallow water in the cable route corridor;
- BAP and MCZ FOCI habitats: blue mussel beds; sheltered muddy gravels; subtidal chalk; subtidal sands and gravels (also possibly littoral chalk communities; native oyster beds; peat and clay exposures; and Ross worm reefs); and
- BAP and MCZ FOCI species: Native oyster, short-snouted seahorse (the latter also a W&CA species).

9.6.4 For all of these (except subtidal sands and gravels; see below), there is the potential for their nature conservation value to be negatively impacted by direct damage/disturbance during the following construction activities (NB excepting seahorses (high sensitivity) medium sensitivity is used for all receptors here, given 'Potential Annex I' habits and BAP habitats/species, and the presence of the MSNCI within the wind farm):

- Permanent impact to:
    - Habitats from turbine foundation installation (including scour protection) and long-term placement of cable mattressing (NB for species, this will be either a permanent or a temporary impact, as they may be able to re-colonise the surrounding area). The worst-case significance of this unmitigated impact would be moderate, based on a medium magnitude (reduction in population or range of conservation features).
    - Mortality of seahorses (highly limited in their mobility): The worst-case significance of this unmitigated impact would be moderate, based on high sensitivity and a small magnitude (i.e. death of a few individuals is likely to be within the range of natural variability).
- Temporary impacts to habitats and species from:

- Installation of the inter-array and export cables and jack-up vessel spud can footprint. Worst-case significance of this unmitigated impact would be moderate, based on medium magnitude (reduction in population or range of conservation features).

- Increases in suspended sediment: as noted in Section 7 – Benthos, worst-case significance of impact would be minor. This is based on a magnitude of small (for most habitats; also seahorses which are deemed to have very low sensitivity to this impact: Sabatini and Ballerstedt, 2007) or negligible (for *Sabellaria* and native oyster).

- Resuspension of contaminated sediment: based on negligible magnitude (see Section 7), worst-case significance is negligible.

9.6.5 As the broad-scale BAP/MCZ FOCI habitat of subtidal sands and gravels is considered to be the most common subtidal habitat in the UK (JNCC, 2008), and is also widespread throughout the eastern English Channel (e.g. James *et al*., 2010, 2011), magnitude is considered negligible (i.e. impacts do not affect conservation interests), giving overall significance of negligible.

Piling noise – direct impacts

9.6.6 Underwater noise from piling of turbine foundations has the potential to affect nature conservation sites or protected species. This could be through either:

- Direct impact on the species (or group of species), such as black bream or seahorses. These impacts are considered in the sections immediately below; or

- Indirect impact, whereby designated species (or species contributing to designated sites) are secondarily impacted via impacts to species on which they depend, such as prey. These impacts are discussed in 9.6.11.

9.6.7 It is not thought that underwater piling noise could directly impact sites designated for marine mammal interest (there are none in the region), benthos, or birds (which are not thought to be significantly impacted or at risk from underwater noise).

9.6.8 Potential impacts to fish and shellfish, including black bream and seahorses, are summarised in Section 8 (Fish and Shellfish Ecology). In summary, the worst-case scenarios (i.e. piling a 6.5m monopile) for black bream (using red sea bream as a surrogate species) and short-snouted seahorses (using lined seahorse as a surrogate species) are as follows:

- Mortality up to 10m from source and both physical injury/traumatic hearing damage up to 65m from source (both species). These impacts will therefore only affect receptors within the wind farm site, and will not affect black bream in the Kingmere rMCZ. Although black bream are likely to be able to

rapidly flee from noise of this intensity, seahorses are much more limited in their ability to swim and could potentially be exposed to these levels;

- Strong avoidance reaction by nearly all individuals of up to 11.8km and 10.4km from source for black bream and seahorses, respectively. For black bream (Figure 8.9), this area of impact can extend into a significant portion of the Kingmere rMCZ (depending on the location of the piling). For seahorses (Figure 8.7), the strong avoidance impact area could result in these species being excluded from areas of up to 20km in diameter (extending up to ca. 10km from the wind farm boundary) for the duration of piling works (as noted in Section 8 – Fish and Shellfish Ecology a piling event will last for on average 2 hours).

- Significant avoidance by the majority of individuals (but habituation or context may limit effect) of up to 43.1km and 40.6km from source for black bream and seahorses, respectively. For black bream (depending on the location of piling), the worst-case area of impact can extend inshore to the coast, including the entire Kingmere rMCZ. For seahorses, the worst-case impact zone of up to 40km extends across the entire inshore area to the coast, and out nearly to the central English Channel.

9.6.9 Therefore, unmitigated underwater piling noise has the potential to directly impact the status of nature conservation as follows:

- The black bream component of the Kingmere rMCZ (and its proposed 'recover' conservation objective) may be impacted due to strong and/or significant avoidance reactions of this species. Worst-case unmitigated impacts for black bream from strong/significant avoidance of piling noise could therefore be major (i.e. with unrestricted piling during peak spawning; though this would be lowered to medium if restrictions were applied during the peak spawning period), given high sensitivity and large magnitude (i.e. Kingmere rMCZ is compromised by piling the largest piles in the west of the site during peak spawning). It should be noted that this magnitude is worst-case, and actual magnitude of impacts to the black bream components of Kingmere rMCZ will vary from none (e.g. piling when black bream are not present or scarce in winter months; installation of gravity base foundations) to small (piling with smaller piles in the west of the site; piling with larger piles in the east of the site), giving overall significance of moderate-negligible.

- Mortality, injury or disturbance of seahorses (in any location where they occur that is impacted). The overall worst-case significance of this could be major-minor, based on high sensitivity (protected species) and medium-small magnitude (damage to/disturbance of this species).

9.6.10 Other fish species with nature conservation designations (e.g. undulate ray, shad) are either not thought to be sensitive to, or significantly affected by, the proposed piling scenarios (see Section 8 - Fish and Shellfish Ecology).

Piling noise – indirect impacts

9.6.11 During the consultation process, Natural England raised concerns that, should there be any impacts to herring from piling noise, tern species from nearby SPAs (such as Dungeness to Pett Level) which depend on herring as prey might also be impacted. This indirect impact is discussed in Section 8 -Fish and Shellfish Ecology) and Section 11 - Marine Ornithology). Following assessment of potential impacts of piling noise on herring (see Section 8 – Fish and Shellfish Ecology; Figure 8.5), it was identified that there could potentially be significant impacts on spawning areas of herring in the mid English Channel.

Indirect disturbance/damage to nature conservation sites

9.6.12 Increased suspended sediment concentrations from construction activities has the potential to damage the integrity of nature conservation sites located outside of the Project site. Potential increases in suspended sediment and seabed thickness were modeled as part of the impact assessment, which are discussed in Sections 6 - Physical Environment and 7 - Benthos and Sediment Quality. In summary, the study found that impacts would be minor, temporary and localised. The slight increase in suspended sediment that might be experienced would be in the context of levels than can vary widely with natural conditions, particularly in shallow waters. It is likely that any change in suspended sediment concentrations would only be detectable at the nearby MSNCIs (i.e. *City of Waterford,* Worthing Lumps, Kingmere Rocks, Looe Gate, South west Rocks, Ship rock), but this would be only be for a brief duration and within the range of natural variability, and would not affect the habitats or species for which they are designated. It is not anticipated that any more distant sites (e.g. SACs) would be impacted. The overall worst-case impact is therefore considered to be of negligible (i.e. medium sensitivity, combined with negligible magnitude).

9.6.13 The potential for eggs of nesting black bream (Kingmere rMCZ) to be impacted by minor temporary increases in suspended sediment levels was considered. However, increased suspended solid levels from construction operations are predicted to exist for a distance of <1km (see Section 6 – Physical Environment), and therefore will not reach the rMCZ. In addition, based on a five-year monitoring study of black bream nesting sites around Kingmere reef, Emu (2010) found no evidence to suggest observed changes to nest distribution and concentrations was as a result of secondary impacts from dredging. Overall impacts are therefore considered to be negligible.

9.6.14 While no designated bird areas will be directly affected by construction activities, there is the potential for seabirds from SPAs, Ramsar sites and SSSIs (e.g. Brighton to Newhaven Cliffs) in the region to be displaced by construction vessel activity in the development area. This aspect is discussed by principal species in Section 11 -Marine Ornithology, but can be summarized as being 'not significant', based on negligible magnitude.

9.6.15 There is the potential for damage to the integrity of designated sites and species from accidental events. This could range from spillage of a small amount (1l) of lubricating oil over the side of a construction vessel, to, in a worst-case scenario, the collision of a construction vessel with another vessel, and the loss of a full inventory of bunker fuel. The latter could potentially have impacts of 'major' significance on surface swimming and/or moulting seabirds from designated sites, or on intertidal sites such as the VMCA, due to their high sensitivity.

Operation

Direct impacts

9.6.16 No impacts are anticipated to the *City of Waterford* wreck MSNCI during operation.

Indirect impacts: bird and turbine interactions

9.6.17 The main potential impact on nature conservation during operation of the Project is through interactions (e.g. barrier effects, disturbance and displacement, and collision) between birds from designated sites and the wind turbine structures.

9.6.18 Possible barrier effects, and disturbance and displacement, are considered in detail in Section 11 - Marine Ornithology. Potential impacts were predicted to be of negligible magnitude and not significant.

9.6.19 Risk assessments for bird collisions are presented in Section 11, which found potential impacts to be not significant. Based on the results of this, it is anticipated that the impact on designated bird sites will also be not significant.

Decommissioning

9.6.20 Potential impacts of decommissioning the Project will be similar to those produced during the construction phase (such as potential damage to the *City of Waterford* wreck MSNCI), although this will be dependent on whether infrastructure is retained *in situ* or removed. Decommissioning impacts will be fully considered at the time according to appropriate legislation and any relevant additional or revised conservation designations.

9.7 Mitigation Measures

9.7.1 Mitigation measures are summarised in Table 9-8.

During Construction

Direct disturbance/damage to nature conservation sites

9.7.2 For the *City of Waterford* wreck MSNCI, any potential impacts will be avoided in the design stage by locating turbines and/or cables away from this site. In

addition, an appropriate exclusion zone will be placed around this site during construction to ensure that no vessels directly damage it (e.g. through anchoring).

Direct disturbance/damage to habitats or species of conservation importance

9.7.3 For 'Potential Annex I' and BAP habitats, potential impacts of installation of cables/turbine foundation installation are likely to be significantly reduced through detailed design informed by pre-construction surveys. Due to engineering considerations, the export cable route will be designed to maximize usage of areas of soft sediment (such as gravel-filled palaeochannels), and preferentially avoid areas of exposed bedrock (including BAP 'subtidal chalk'). Any areas of important habitat (such as blue mussel reefs in the inshore part of the route) identified will be discussed in consultation with regulators, and options such as micro-siting of both cable routes and foundations to avoid impacts will be considered. Any such mitigation of this type in project design will be expected to considerably reduce impacts from the predicted, pre-mitigation worst-case moderate impact.

9.7.4 Although accidental events are possible, there will be a number of measures in place to minimize risk to very low (negligible magnitude). Appropriate measures will be undertaken to ensure navigational safety (such as communication of the nature and location of construction works to the maritime community) and to minimise the risk of accidental events such as collisions. The construction vessels will have an approved oil-spill response plan, which crews will be trained to use in an emergency. All construction vessels will operate within relevant International Maritime Organisation (IMO) and/or local regulations for pollution prevention, and will operate waste-management plans. Vessels and plant operating in the landfall area will be equipped with facilities to deal with minor spills on board (e.g. spill kits and crews trained in their use). Therefore, overall impact is considered to be not significant.

Piling noise

9.7.5 As noted in Section 8 - Fish and Shellfish Ecology a 'soft start' procedure will be used at the commencement of each piling event to allow species sensitive to noise (including black bream at Kingmere rMCZ, and seahorses across the area) to swim away from the area. The impact of piling noise will also be mitigated in that it will be temporary and intermittent (average piling noise duration of two hours, only for on average ~8.5% of any given monthly period), taking place only in suitable weather, and limited to a period of around 12 months within the construction period.

9.7.6 Noise modelling indicates that there may be a requirement for seasonal and/or spatial restrictions on piling to minimise impacts on fish species as follows:

- **Herring**: installation of monopiles will create noise levels that could disturb herring in their spawning areas during their spawning period. However,

installation of smaller piles in the west of the wind farm during this time only affects a small part of the wide spawning area. Applying a peak spawning period restriction to allow only the installation of smaller piles towards the west of the project site would mitigate potential impacts on spawning herring. Common and Little terns from the coastal Dungeness to Pett Levels SPA feed on species such as herring, and consideration has been given to whether noise effects on spawning herring could impact the food source of those terns. Latest research on foraging distances for the species present at Dungeness to Pett Level indicates that the $75dB_{ht}$ noise contour for herring is beyond the foraging range of both Common (30km) and Little (10km) terns, hence noise from piling operations are unlikely to have an indirect effect on terns from the SPA;

- **Black bream**: During the spawning period for black bream, installation of monopiles in the western part of the project site will create levels of noise that are likely to disturb this species within the Kingmere rMCZ. However, the same is not the case for installation of monopiles to the east of the site where modelling shows a reduced impingement of the $75dB_{ht}$ contour into the Kingmere site. In addition, installation of smaller piles in the east of the site is predicted to have no impingement of the $75dB_{ht}$ contour into the Kingmere rMCZ, or shallow areas around the 10m depth contour.

9.7.7 The periods of geographical restrictions applicable to the installation of certain pile sizes will be subject to further study post-submission of the ES, after the foundation types to be used are finalised.

Indirect disturbance/damage to nature conservation sites

9.7.8 As potential impacts from increased suspended sediment are anticipated to be negligible, no further mitigation is proposed.

9.7.9 As impacts for possible disturbance to birds during construction are deemed to be not significant, no mitigation measures are proposed.

During Operation

Direct impacts

9.7.10 As no impacts are anticipated, no mitigation is proposed.

Indirect impacts; bird and turbine interactions

9.7.11 As the potential impact of possible barrier effects, disturbance and displacement are considered to be not significant, no mitigation is proposed.

9.7.12 As the potential impact of collisions is considered to be not significant, mitigation is not proposed.

During Decommissioning

9.7.13 Impacts and any appropriate mitigation measures will be reviewed near the time of decommissioning, in line with current legislation and best practice. It is likely that an exclusion zone will be placed around the *City of Waterford* wreck MSNCI.

9.8 Significance of Residual Effects

9.8.1 Residual effects are summarised in Table 9-8.

During Construction

Direct damage to nature conservation sites

9.8.2 As the *City of Waterford* Wreck MSNCI will be avoided and have an exclusion zone (based on archaeological interest) placed around it, no residual impacts to its nature conservation interest are anticipated.

Direct disturbance/damage to habitats or species of conservation importance

9.8.3 A pre-construction survey will aim to reduce, update and refine potential significance of impacts to sensitive 'Potential Annex I' and BAP habitats. Based on currently available information, potential worst-case impact (of turbine foundation installation (including jack-up footprint and scour protection) and cable installation (including mattressing)) could be moderate in some areas where habitats such as subtidal chalk could not be avoided. Habitats conforming to reef criteria will be avoided, wherever possible, in the detailed design stage of the cable route. Residual impacts related to suspended sediment will be minor-negligible.

Piling noise – indirect impacts

9.8.4 The significance of impacts presented in the above sections takes account of the standard soft start mitigation measure. Geographic and/or spatial piling restrictions proposed for specific species (e.g. black bream, herring) will result in reduced magnitudes of impact to other species of fish and shellfish, including seahorses, with resultant lower significance of impact.

Accidental events

9.8.5 As the risk of a significant pollution event is considered to be very low, the residual impact to marine/intertidal nature conservation is considered to be not significant.

During Operation

Direct impacts

9.8.6 No residual impacts are anticipated.

Indirect impacts; bird and turbine interactions

9.8.7 The residual impact of possible barrier effects, disturbance and displacement is considered to be not significant.

9.8.8 The residual impact of bird collisions is considered to be not significant.

During Decommissioning

9.8.9 Residual impacts will be reviewed near the time of decommissioning, in line with current legislation and best practice.

9.9 Cumulative Impacts

9.9.1 Most nature conservation sites in the study area are designated for their benthic features of interest. Possible cumulative impacts to benthic environments are discussed in detail in Section 7 - Benthos and Sediment Quality.

9.9.2 Possible cumulative impacts to benthic habitats may occur from suspended sediment arising from both the Project construction and nearby aggregate extraction areas that are in the planning process (see Section 19 – Other Marine Users, particularly Figure 19.1). This has the potential to affect nature conservation sites, including sensitive benthic habitats and fish (e.g. black bream nests). However, possible cumulative impacts resulting from the construction of the Project and other adjacent planned aggregate sites are considered to be negligible, therefore impacts to nature conservation interests are considered to be unlikely.

9.9.3 There is potential for combined impact of construction of the Project (including noise, habitat loss, introduction of artificial habitat), and ongoing aggregate extraction and commercial fishing to cumulatively impact on populations of seahorses in the area. However, once the wind farm is operational, vessels (including fishing vessels using trawling/scalloping gear) may be excluded from within 50m of the turbines; it is possible that these areas could therefore provide a refuge for both seahorse species. It should be noted that seahorses are likely to be present in the array area only during the winter months, as they tend to preferably inhabit shallower waters in summer.

9.9.4 The potential for impacts to birds from the Rampion project, in combination with the other proposed offshore developments, both in the UK and France, are discussed in Section 11 – Marine Ornithology. Navitus Bay (west of the Isle of Wight) is the closest site, while developments in the France are proposed on the Channel coast.

Table 9-8: Summary of Residual Effects and Mitigation Measures

Aspect	Effect	Proposed Mitigation Measures	Sensitivity	Magnitude	Residual Effect
Construction Phase					
Installation of turbines, scour protection & inter-array and export cables; jack-up vessel spud can footprint	Direct disturbance/damage to nature conservation sites (*City of Waterford* MSNCI)	The array layout will be designed to locate any turbines or cabling away from the MSNCI, and therefore avoid any direct impacts. Exclusion zone to be placed around this MSNCI during construction.	Medium	Large	None
	Direct disturbance/damage to habitats or species of conservation importance	Pre-construction survey to update locations of any such habitats and avoid them as far as possible, in consultation with regulators. Cabling to avoid subtidal chalk, where possible. Turbines or cabling will be located away from known location of sensitive habitats as far as possible.	Medium (all other habitats/species) High (seahorses)	Medium-Small (most habitats/species) Negligible (highly mobile species; subtidal sands and gravels BAP habitat)	Moderate or less - pending mitigation (most habitats) Moderate (seahorses) Negligible (highly mobile species; subtidal sands and gravels BAP habitat) None (habitats defined as 'reef')

Aspect	Effect	Proposed Mitigation Measures	Sensitivity	Magnitude	Residual Effect
Piling noise	Strong/significant avoidance reaction of black bream contributing to the Kingmere rMCZ	Soft start procedure Restriction on piling during the peak spawning season, limiting installation of the largest piles to the eastern part of the wind farm site.	Medium (High with unrestricted piling during spawning)	Medium-none	Moderate-negligible
	Injury/death of seahorses (winter)	Soft start procedure Piling restrictions for both herring and black bream during their peak spawning periods will reduce overall impacts to seahorses in the wider area.	High	Small	Moderate-minor
	Strong/significant avoidance reaction of seahorses		High	Medium-small	Major-minor
	Indirect piling noise effects on SPA tern species (disturbance of herring as a prey species of terns)	Restriction on piling during the peak spawning season, limiting work to the installation of smaller piles in the western part of the Project Array.	Medium (High with unrestricted piling during spawning)	Medium	Moderate
Construction	Increased suspended sediment	None proposed	Medium	Negligible	Negligible
Construction vessel activity	Possible displacement of birds from designated sites (SPAs, Ramsars, SSSIs) from their feeding habitat	None proposed	Various – see Section 11 Marine Ornithology	Negligible-low	Not significant
Accidental event (e.g. fuel spillage)	Possible oiling of protected sites or species form them (e.g. seabirds)	Various (e.g. navigational safety measures, waste management, crew training)	High	Negligible	Not significant

Aspect	Effect	Proposed Mitigation Measures	Sensitivity	Magnitude	Residual Effect
Operational Phase					
Presence of wind turbines	Possible barrier effect or displacement/disturbance of birds from designated sites (SPAs, Ramsars, SSSIs)	None proposed.	Various – see Section 11 Marine Ornithology	Negligible	Not significant
Rotation of wind turbines	Possible collisions between birds from designated sites (SPAs, Ramsars, SSSIs) and turbines.	Site design (see Section 11 _ Marine Ornithology)	Various – see Section 11 Marine Ornithology	Negligible-low	Not significant
Decommissioning Phase					
Aspects likely to be similar to construction.	Likely to be similar impacts to those for construction.	To be discussed with regulators prior to decommissioning. Probable exclusion zone for vessels around *City of Waterford* wreck MSNCI	Will be dependent upon changes to nature conservation designations and priorities at the time of decommissioning	Physically these will be similar to those generated during the construction phase. However magnitude is also dependent on the characteristics of the receptor.	Not possible to determine at this stage

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Rampion Offshore Wind Farm

ES Section 9 – Nature Conservation Figures

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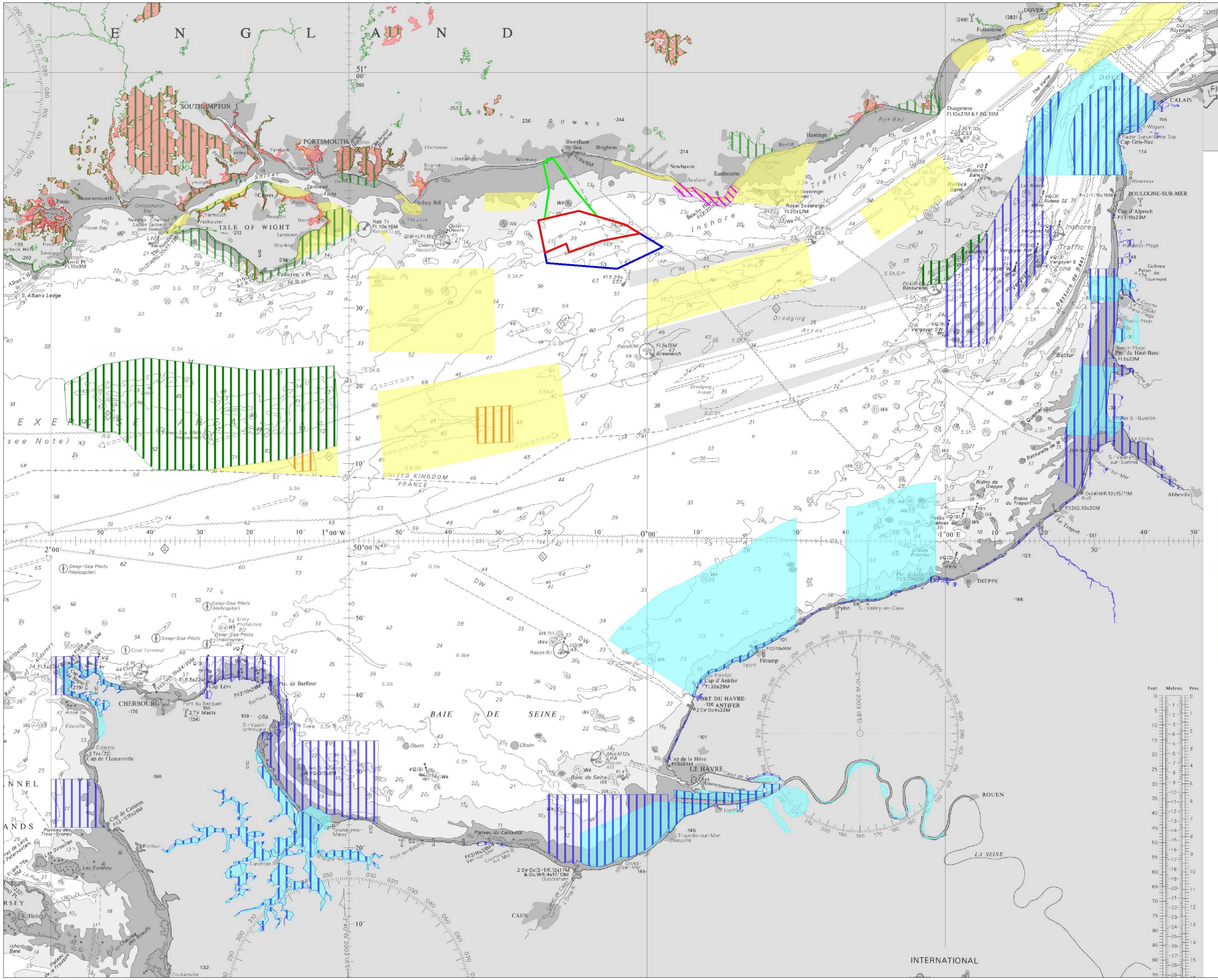
December 2012 **APFP Regulation 5(2)(a)**

Revision A

E.ON Climate & Renewables UK Rampion Offshore Wind Limited



Legend

- Crown Estate Zone 6
- Rampion Offshore Wind Farm Site
- Export Cable Corridor
- Voluntary Marine Conservation Area
- SAC (UK)
- SPA (UK)
- SAC (France)
- SPA (France)
- rMCZ
- rMCZ Reference Areas

Rev	Date	Description	Drn	Chk	App
01	18-10-12	New Boundary	LH	AM	DW
00	03.05.12	First Draft	LH	AM	DW

Rampion Offshore Wind Farm

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Title :

Figure 9.1 Marine and intertidal nature conservation areas near the Project

0 20 40
kilometres
Scale = 1:900,000 @ A3

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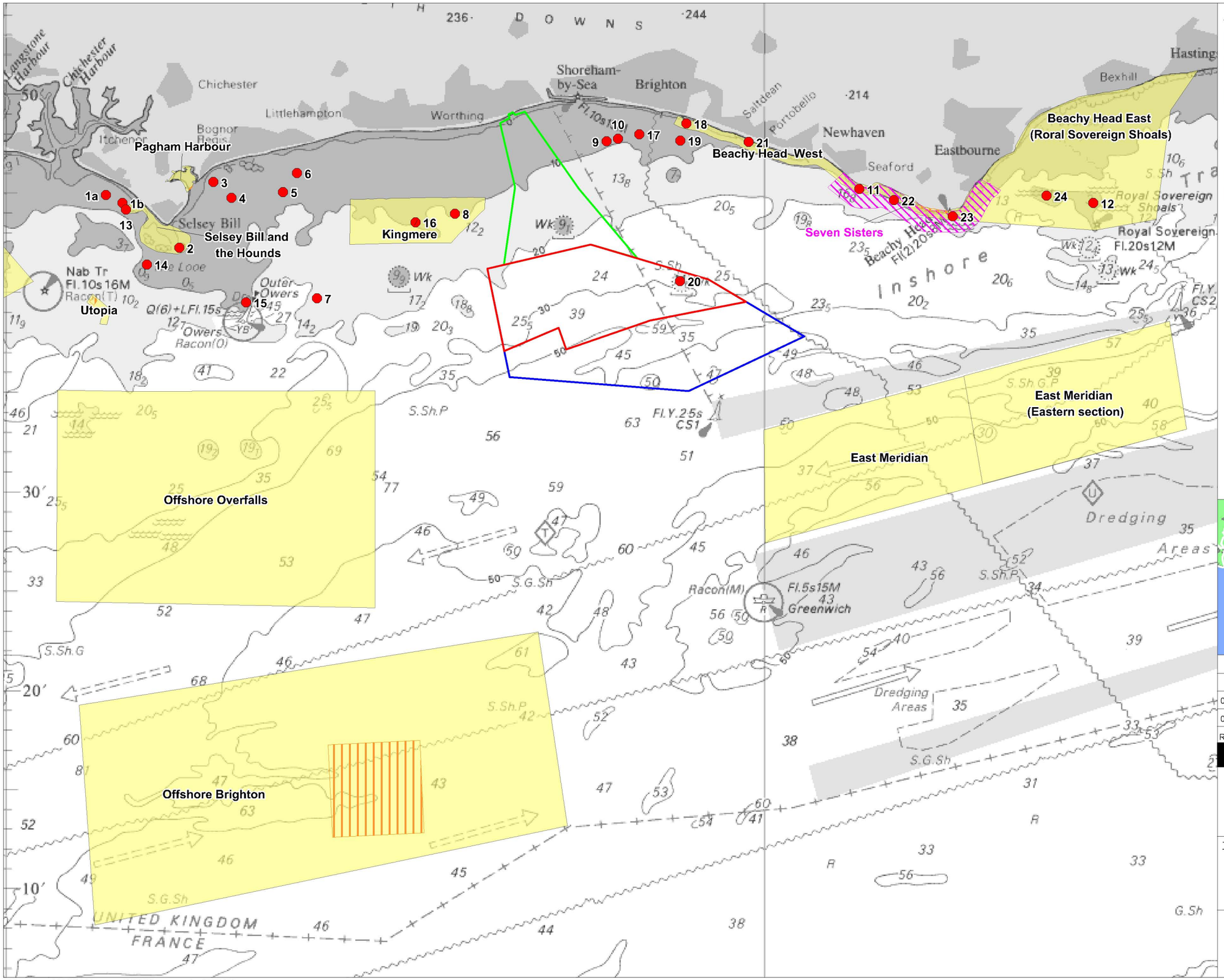
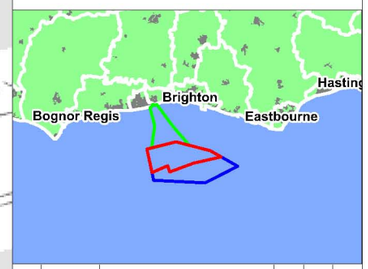


Legend

- Crown Estate Zone 6
- Rampion Offshore Wind Farm Site
- Export Cable Corridor
- Voluntary Marine Conservation Area
- MSNCI
- rMCZ
- rMCZ Reference Areas



Rev	Date	Description	Drn	Chk	App
01	18.10.12	New Boundary	LH	AM	DW
00	11.05.12	First Draft	LH	AM	DW

Rampion Offshore Wind Farm

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Title :

Figure 9.2 Marine and intertidal nature conservation areas in proximity of the Project site

0 6 12
kilometres
Scale = 1:350,000 @ A3

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FILE NAME: P41318 - Rampion Offshore Wind Farm\05 - GIS\ES_Fig 9-2 Detailed Offshore Nature Conservation.wor