Rampion 2 Wind Farm

Category 6: Environmental Statement

Volume 4, Appendix 9.5: Technical Note Cable Corridor area mitigation for sensitive features

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1. Introduction

1.1 Purpose of this Document

1.1.1 Following the submission of the Preliminary Environmental Information Report (PEIR) in 2021, Rampion Extension Development Limited (RED) carried out Expert Topic Group (ETG) meetings to address Section 42 (S42) consultation concerns raised by key stakeholders including Natural England, the Marine Management Organisation (MMO) and Centre for Environment, Fisheries and Aquaculture Science (Cefas), the Sussex Inshore Fisheries and Conservation Authority (Sussex IFCA), and the Sussex Wildlife Trust (SWT).

1.1.2 At the time of the ETG meeting on the 3 November 2021, RED was still in the process of assessing the full detail of S42 comments, however it was made clear during the November 2021 ETG meeting that further information was required in regard to proposed construction and mitigation approaches to avoid or reduce the potential for impact on the sensitive features identified in the offshore export cable corridor area before the consultees will be able to make a decision on whether the S42 consultation comments had been resolved.

1.1.3 This document aims to provide the required further information, specifically in respect of proposed approaches to offshore export cable installation[1] based on further engineering design work, continuing evaluation of ecological data and assessment of practical mitigation options. Following this work, the principal mitigation measures proposed comprise the following:

- commitments to ensure offshore cable routeing and micro-siting within the offshore export cable corridor area delivers avoidance of known sensitive features as far as practicable;
- offshore cable routeing design to maximise the potential to achieve cable burial, thus providing for seabed habitat recovery in sediment areas and reducing the need for secondary protection and consequently minimising any potential for longer-term residual effects;
- the adoption of specialist offshore cable laying and installation techniques to minimise the direct and indirect (secondary) seabed disturbance footprint to reduce impacts, which will provide mitigation of impacts to all seabed habitats, but particularly chalk and reef areas as well as potential (unknown) black seabream nesting locations, where avoidance is not possible; and
- adherence to a seasonal restriction to ensure cable installation activities within the export cable area are undertaken outside the black seabream breeding period (March-July) to avoid any effects from installation works on black bream nesting.

1.1.4 This document sets out details on the approaches and methodologies proposed to be employed to provide mitigation of impacts identified in the PEIR and the

[1] Note: issues relating to offshore noise and vibration are addressed in a separate Technical Note (in publication)

subsequent feedback from consultation (S42 and ETG), supported by information and examples of the types of equipment that may be used. The importance of the latter aspect is to demonstrate that such methods and techniques are deliverable for the proposed works within the offshore export cable corridor area and can therefore be relied upon to deliver the mitigation of potentially significant impacts that may arise in the absence of such.

1.1.5 The intention is to present this information to inform a discussion on the proposed measures with Natural England, the MMO and their statutory advisors Cefas, and the Sussex IFCA. This will allow us to progress the full DCO Application Environmental Statement (ES) on the basis that with these measures in place, there will be no significant residual effects on the relevant sensitive features within the Rampion 2 offshore export cable corridor area as a result of the installation of the Rampion 2 export cables.

1.1.6 Once a final form of the mitigation package is agreed, this will form the basis of an offshore export cable installation mitigation plan, which will be submitted for approval prior to the offshore construction of relevant elements or stages of the Rampion 2 works. Delivery of the plan and measures will be secured within the draft deemed Marine Licence (dML) to provide certainty to all stakeholders of the mitigation commitments made by RED in progressing the development of the Proposed Development.

2. Project Background and Context

2.1 The Proposed Development

2.1.1 The current proposal for Rampion 2 will have an installed capacity of up to 1,200MW, with the offshore components comprising:

- offshore wind turbine generators (WTGs), associated foundations and inter array cables, with the wind farm generating an installed capacity of up to 1,200MW but not exceeding a maximum number of 90 WTGs;
- up to three offshore substations;
- up to four offshore export cables, each in its own trench within the overall cable corridor area; and
- up to two offshore interconnector cables between the offshore substations.

2.1.2 The offshore elements of the Proposed Development are situated within the offshore part of the Proposed DCO Order Limits. The offshore part of the Proposed DCO Order is adjacent to the south, east and west of the existing Rampion 1 project site comprising seabed areas extending between 13km and 25km offshore, with the offshore export cable corridor area located on the western side of the area; see **Figure 1**.

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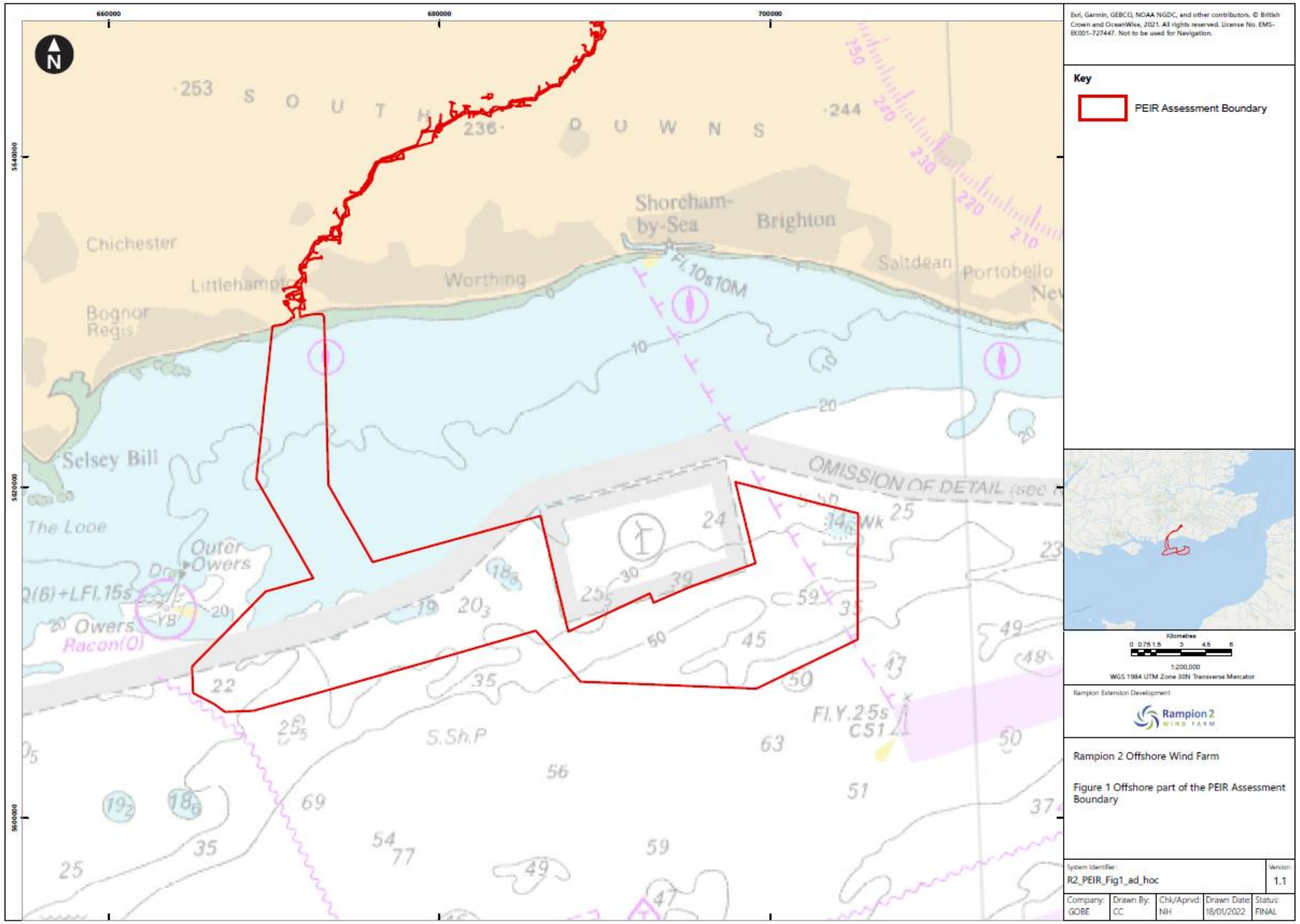
Figure 1 Rampion 2 Proposed development location. Figure extract from PEIR Volume 2, Chapter 4 The Proposed Development, RED, 2021



2.2 Overview of sensitive receptors in the vicinity of the offshore export cable corridor area

Black Seabream

2.2.1 Black seabream are recognised as a significant interest to commercial and recreational fishers with spawning grounds within the region that are considered important within regional Marine Plan Policies. Kingmere Marine Conservation Zone (MCZ) was designated in part to protect areas of spawning importance in the region for this species, although areas outside of the designated site also provide suitable and active spawning of black seabream. Kingmere MCZ lies to the north (inshore) of the offshore part of the Proposed DCO Order array area off the coast of Worthing, and adjacent to the offshore export cable corridor area Proposed DCO Order (see **Figure 2**). More details on the Kingmere MCZ are presented in the dedicated section below.

2.2.2 It is reported that the Black seabream stock within the English Channel area overwinters in water depths of between 50 to 100m, prior to migrating inshore to breed between May and June in suitable habitats (Vause and Clark, 2011). The specified breeding season (and therefore sensitive period for black seabream in this area was considered (up to 2020) as being between April and June, however this has since been updated (in 2021) to reflect an extended breeding season between March and July (Natural England, 2021)

2.2.3 Black seabream are known to nest in areas around the south coast of the UK with extensive nesting grounds off the West Sussex coast to the Isle of Wight and Dorset (Collins and Mallinson, 2012; EMU Limited, 2009; Southern IFCA, 2014). Targeted studies identified black seabream nest areas off the coast of Littlehampton to Bogner Regis (EMU Limited, 2009), to Shoreham harbour in the east and to the north of Kingmere MCZ (EMU Limited, 2012a).

2.2.4 Historical analysis of black seabream monitoring data identified black seabream nesting areas tend to correspond to shallow waters (<10m) environments with thin layers of coarse sediments (10 to 30cm deep) overlying bedrock within the general vicinity of rocky outcrops (GoBe, 2015). British Geological Survey (BGS) data identified areas of chalk beds within the infralittoral zone of the offshore export cable corridor area and within the north-eastern tip of the array area (see **PEIR Volume 2, Chapter 8: Fish and shellfish ecology, Figure 8-13**).

2.2.5 The broader nearshore area, both within the proposed offshore export cable corridor area and outwith the offshore part of the Proposed DCO Order is of noted importance for black seabream, with a significant body of evidence, albeit focused on the MCZ and control sites in the vicinity, compiled by the marine aggregate industry (via the (Marine Aggregates levy Sustainability Fund (MALSF) and site-specific monitoring) contributing to the understanding of black seabream spawning within the area.

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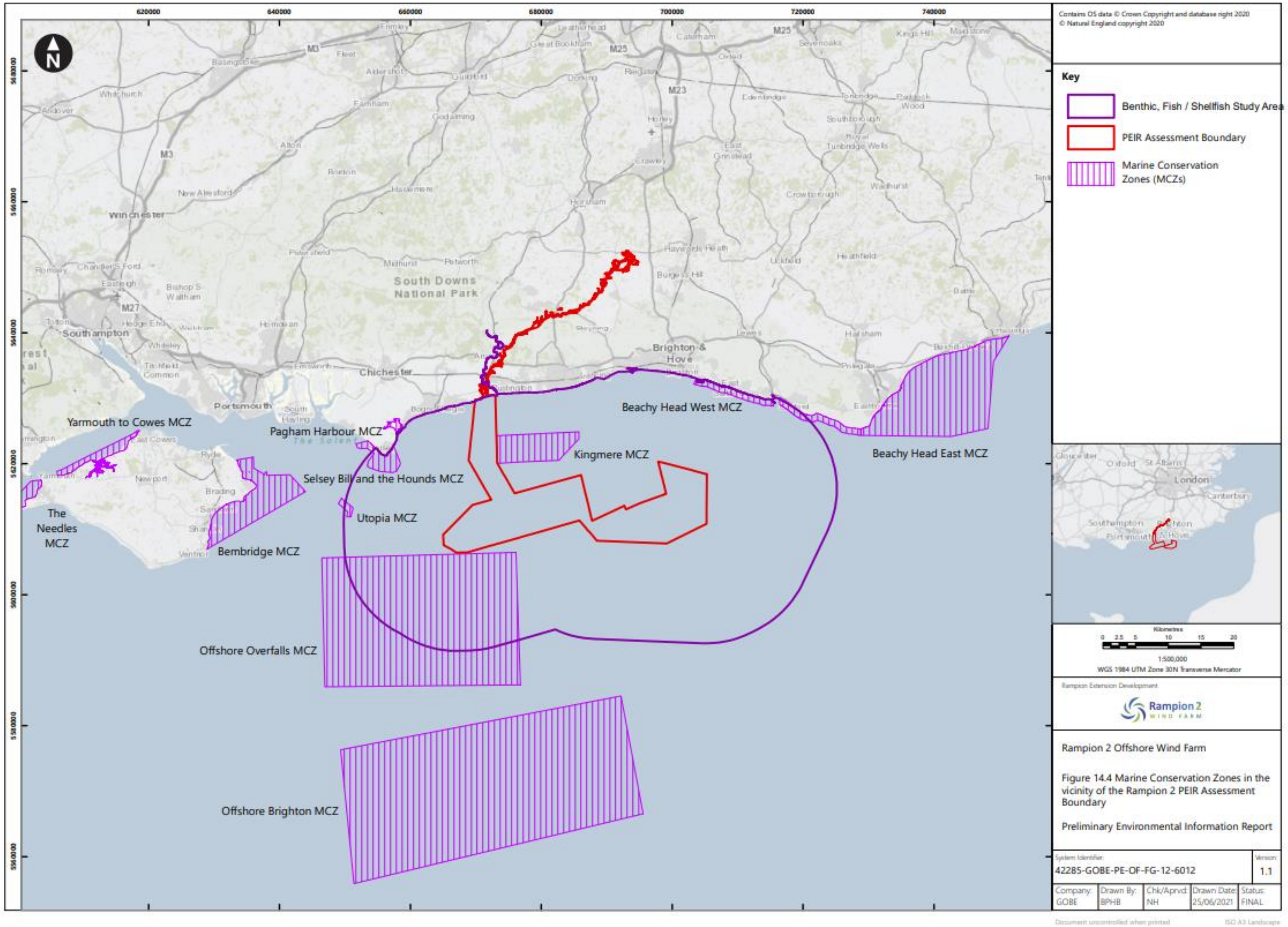
Figure 2 Location of Rampion 2 in relation to the Kingmere MCZ. Figure extract from PEIR Volume 2, Chapter 14: Nature conservation, RED, 2021



NERC (UK BAP) Reef habitat features

2.2.6 Outcrops of bedrock forming reef features, some of which comprise chalk substrata, are known to occur through the inshore portion of the benthic subtidal ecology study area. These features were positively identified in the existing Rampion 1 offshore wind farm characterisation study (EMU Limited, 2011) and have been identified through the predictive habitat mapping process undertaken for Rampion 2 based on geophysical survey data as being characterised by two principal biotopes '*Sabellaria spinulosa* with kelp and red seaweeds on sand-influenced infralittoral rock (A3.215)' and 'Piddocks with a sparse associated fauna in sublittoral very soft chalk or clay (A4.231)' (see **PEIR Volume 2, Chapter 9: Benthic, subtidal and intertidal ecology, Figure 9-4**).

2.2.7 The specific biotopes characterising the outcropping rock and chalk areas within the offshore export cable corridor area subject to further verification following a benthic survey undertaken in 202/21, however both bedrock and chalk reef habitats are listed as UK Biodiversity Action Plan (UK BAP) and comprise habitats identified as requiring conservation action under the UK BAP, being listed under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.

Kingmere MCZ

2.2.8 Kingmere MCZ is located in the English Channel, between 5 and 10km off the West Sussex coast to the South of Littlehampton and Worthing. It covers an area of around 47km^2. Although the initial site selection for Rampion 2, including the offshore export cable corridor area, has ensured avoidance of any direct overlap with the Kingmere MCZ, the site is in proximity to the proposed development area and therefore subject to potential indirect effects from construction activities.

2.2.9 Within the MCZ, the seabed features include rock habitats and outcrops of chalk reef systems. Much of the moderate energy infralittoral rock habitat is covered by a thin veneer of mixed sediments. This creates a complex mosaic of habitats, some of which are noted as being of particularly importance to black seabream during spawning (nesting) as noted above. Kingmere MCZ is designated for several marine features including:

- Black seabream, (*Spondyliosoma cantharus);*
- Moderate energy infralittoral rock and thin mixed sediment; and
- Subtidal chalk.

2.2.10 There are two marine Sites of Nature Conservation Interest (mSNCI) within the boundaries of the Kingmere MCZ; Kingmere Rocks and Worthing Lumps. SNCI are non-statutory sites identified for their local conservation and geological values. Further details are provided in the site factsheet[2]:

[2] Natural England (2013). Kingsmere MCZ Factsheet (MCZ035). (Online) Available at: http://publications.naturalengland.org.uk/publication/5715535983542272?category=1721481 (Accessed January 2022).

Spatial distribution of habitats and features within the offshore export cable corridor area - summary

2.2.11 Sediment habitats make up the majority of the seabed biotopes recorded in the offshore export cable corridor area (**Figure 3**). They consist mainly of Infralittoral mobile clean sand with sparse fauna, Infralittoral mixed sediments, *Flustra foliacea* and *Hydrallmania falcata* on tide-swept circalittoral mixed sediment.

2.2.12 Reef habitats are present in varying density across the width of the offshore export cable corridor area primarily in the mid-central band of the area (**Figure 3**). Reef habitats recorded include *Laminaria hyperborea* forest and foliose red seaweeds on moderately exposed upper infralittoral rock; Piddocks with a sparse associated fauna in sublittoral very soft chalk or clay; and *Pomatoceros triqueter* with barnacles and bryozoan crusts on unstable circalittoral cobbles and pebbles.

2.2.13 Black seabream nests evident from the Rampion 2 and the targeted repeat aggregate industry surveys are often recorded in association with chalk reef features identified in the offshore export cable corridor area (**Figure 4**).

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Figure 3 Level 5 Predictive benthic habitat map of the Rampion 2 offshore area, using ground truth survey data collected 2020

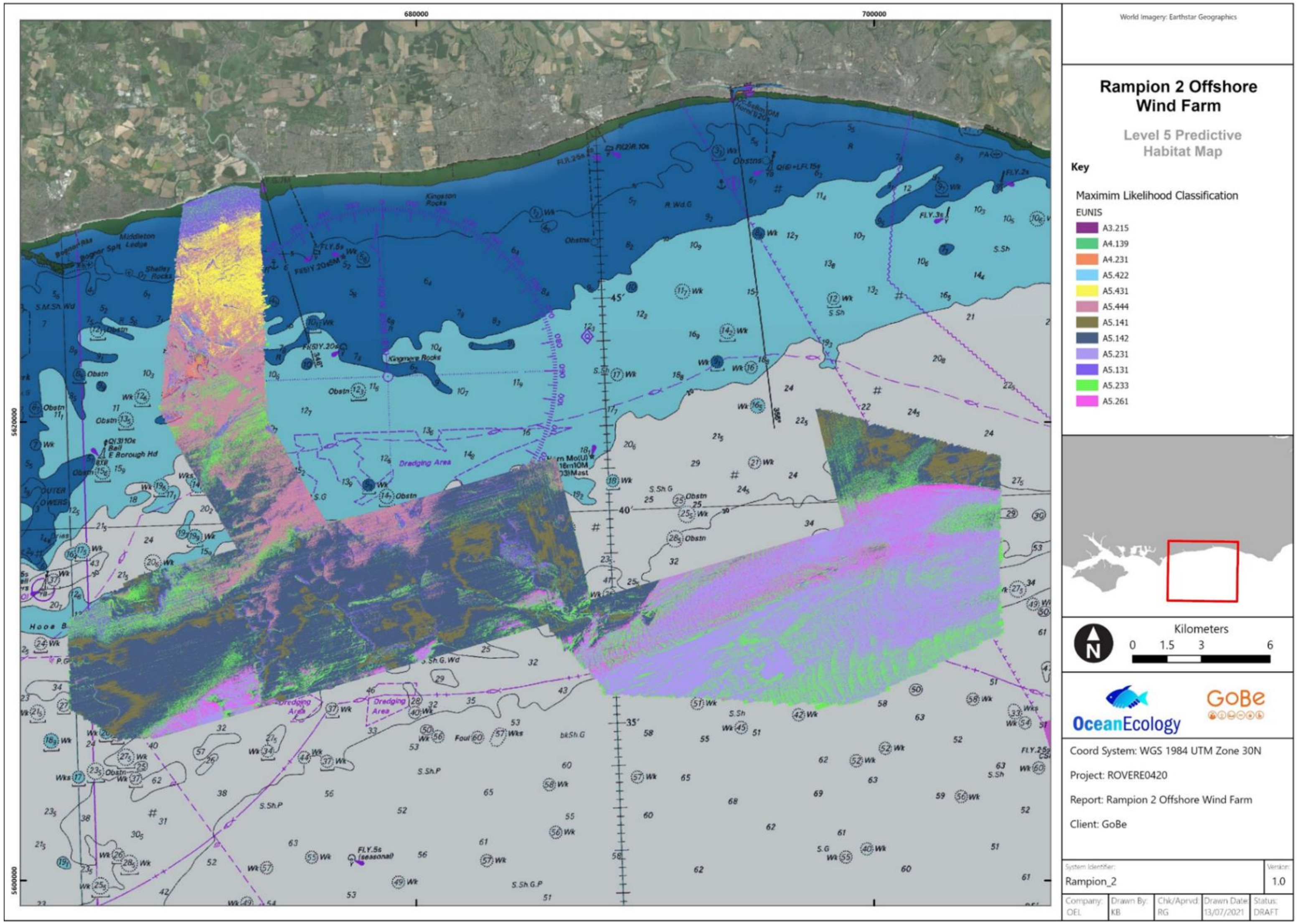
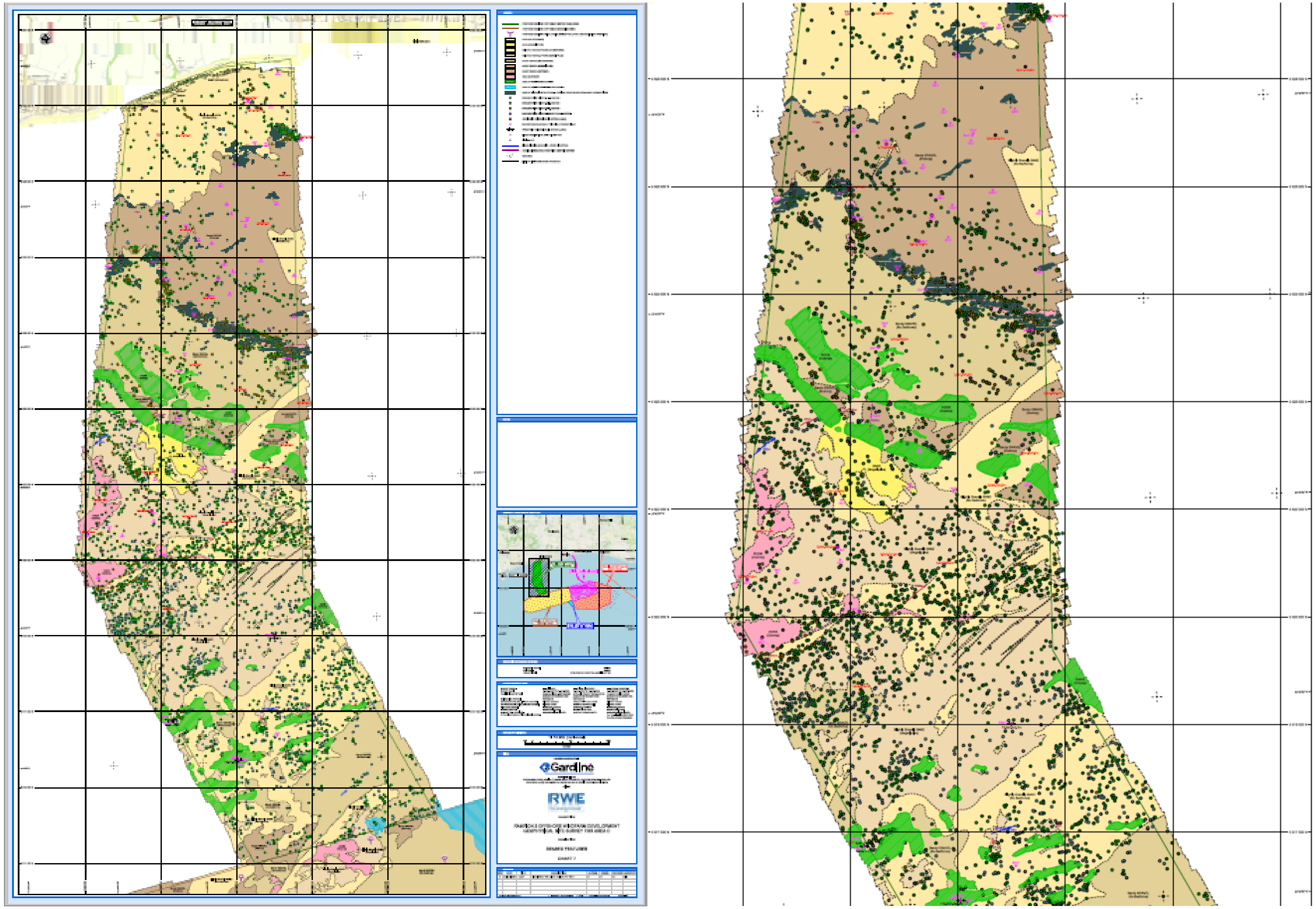


Figure 4. 4a. Black seabream nest distribution within the offshore export cable corridor area. Extract from PEIR Volume 2, Chapter 9: Benthic, subtidal and intertidal ecology, Appendix 9.4: Geophysical survey; Seabed Features Chart 7. Page 189. Figure 4b. closer detail of sensitive features chalk, reef and areas of sediment



3. Consultation

3.1.1 RED has sought to engage with Natural England, Sussex IFCA, and the MMO (and their advisors Cefas) from the earliest stages of the process. This has included focused discussions relating to the known presence of black seabream nesting locations in the area to seek agreement on the methodological approach for assessment as well as potential mitigation, should a significant impact risk be identified. Further concerns were raised however during S42 consultation in 2021 relating to impacts on other sensitive features in the offshore export cable corridor area, in addition to Black seabream nests, including NERC (UK BAP) reef habitats (specifically chalk reef and *Sabellaria spinulosa* reef).

3.1.2 The key issues relevant to offshore export cable works (and the mitigation proposals put forward in this document) communicated by stakeholders following consultation on the PEIR (2021) and through the ETG meetings are summarised below:

The need for avoidance of direct impacts on bream nesting habitats, sensitive chalk reefs and chalk habitats, rock reef habitats and biogenic reef habitats.

3.1.3 Concerns were raised over the potential for direct impacts to sensitive features within the offshore export cable corridor area arising from the proposed construction works. This applies to all habitats within the area but is of particular importance for black seabream nesting areas and both geogenic (rock or chalk) reefs and biogenic reef (*S. spinulosa*). In order to reduce the risk of significant effects arising, there is a need to avoid direct impacts to features within the offshore export cable corridor area where practicable; spatially and temporally.

3.1.4 In the view of Natural England, the MMO, Sussex IFCA and SWT, the issue around the ability to avoid such features is compounded for black seabream nesting areas by uncertainty over where nesting occurs outside the focused aggregate industry survey boxes or the locations identified from the Rampion 2 surveys. This concern arises as the Rampion 2 surveys undertaken to inform this wider spatial distribution were completed in July/August; the surveys are therefore viewed as having overlap with only the later part of the spawning season (March to July), as well as comprising surveys over the course of a single year only.

3.1.5 Therefore, whilst the Rampion 2 surveys provide coverage of the entire Proposed Development boundary area, concerns remain that the survey may not have captured all relevant nesting areas as the nest features can be ephemeral, being re-covered by sediment under the natural sediment transport regime once the male fish have ceased maintaining excavated areas. Longer term temporal trends in nesting are also not captured by a single year of survey effort in the wider area.

3.1.6 Stakeholders also highlighted that direct impacts have the potential to include long-term or permanent habitat loss (of chalk, chalk and rock reef, and black seabream nesting habitats) as a result of the installation of secondary protection where cable burial is not possible, or permanent habitat loss for geogenic reef features subject to direct impacts from cable trenching.

3.1.7 The issues highlighted by stakeholders in relation to direct effects on sensitive receptors was linked through to disagreement on some of the PEIR significance assessment findings for black seabream. This related to issues around the potential for impact magnitudes to be greater than those presented within the PEIR, in part due to a lack of supported avoidance mitigation (spatial and temporal) leading to direct impacts, long term or permanent habitat loss and the importance of the areas subject to impacts from the proposed offshore export cable corridor works.

The need to reduce indirect impacts on bream nesting habitats, sensitive chalk reefs and chalk habitats, rock reef habitats and biogenic reef habitats

3.1.8 Concerns were raised over the potential for indirect impacts (suspended sediment concentrations (SSC) and subsequent sediment deposition) to sensitive features within the offshore export cable corridor area arising from the proposed construction works. Again, this applies to all habitats within the offshore export cable corridor area, however of principal concern was the potential for impacts relating to sediment deposition on black seabream nesting areas during the breeding season arising from seabed disturbance during cable installation activities. The deposition of significant amounts of sediment on nests during the breeding season could disturb spawning and nesting, and/or potentially place an energetic burden on male fish to maintain the nests, leading to the potential smothering of eggs. In addition, longer term changes to the nature of seabed habitats as a result of sediment deposition in areas where black seabream nesting currently occurs has the potential to impact the suitability of such areas for future spawning.

3.1.9 Secondary effects arising from SSC plumes and subsequent sediment deposition was also raised as a concern for the Kingmere MCZ, particularly again on relation to black seabream nesting areas and spawning success during the breeding season and also over the longer term if sediment deposition changed the nature of seabed habitats previously suitable for nesting.

The issues highlighted by stakeholders in relation to indirect effects on sensitive receptors was also linked through to disagreement on some of the PEIR significance assessment findings for black seabream. Again, this related to issues around the potential for impact magnitudes to be greater than those presented within the PEIR. Much of this related to a lack of clarity around SSC and deposition during the breeding season, which could lead to disturbance as well as the energetic burden on the fish noted above, and the longer term consequence of sediment deposition that could lead to a change in the suitability of seabed areas for black seabream nesting part due to a lack of supported avoidance mitigation (spatial and temporal) leading to direct impacts, long term or permanent habitat loss and the importance of the areas subject to impacts from the proposed offshore export cable corridor works.

4. Developing mitigation measures

4.1.1 In developing mitigation measures for the proposed works within the offshore export cable corridor area, the following sensitivities and constraints have been carefully considered in order to refine the routeing proposals to minimise the potential for significant adverse effects on sensitive receptors:

- Black seabream nesting sites (known and unknown); and
- NERC (UK BAP) reef habitat designations.

4.1.2 To ensure that mitigation proposals are deliverable, a range of environmental factors that fundamentally affect engineering practicalities have also been taken into consideration in developing the proposed routeing design, as well as in the identification of installation methodologies and equipment, as follows:

- Presence of chalk and quasi-lithified rock and very hard soils at seabed;
- Complex geological and geotechnical conditions, including paleochannels; and
- Limited available water depth in the shore approach, which presents engineering and logistical difficulty.

4.2 Overview of potential impacts

4.2.1 The section below summarises the main impacts associated with works within the offshore export cable corridor area. As noted previously, the focus of this paper is on construction activities relating to the cable installation, including direct disturbance, SSC and smothering, it does not include impacts from noise/piling, which will be addressed in a separate technical note.

Direct impacts

4.2.2 Direct disturbance will occur during the installation of the offshore export cable corridor area, from the use of seabed trenching equipment. Following construction, direct impacts may occur over the period of the project lifetime where secondary protection has been required over the installed cables.

4.2.3 Within the context of the key concerns raised, this has the potential to affect sediment habitats, reef habitats and black seabream nesting sites.

4.2.4 For sediment seabed areas, the disturbance arising from the offshore cable installation works will be temporary, being limited to the anticipated four months of offshore export cable installation activity. Once the construction works have ceased, it is expected that natural processes will re-work mobile sediments characteristic of the area and return the seabed to pre-construction conditions where cables have been successfully buried below the seabed surface. It is therefore predicted that habitats will naturally revert to baseline condition over the course of weeks rather than months, once the works have completed, with no long-term change to the nature of the seabed habitats anticipated. With reference specifically to sediment habitats suitable for black seabream nesting, the return to baseline condition following completion of the offshore cable installation in areas where cables have been buried will therefore maintain habitat suitability for black seabream nesting where this occurred pre-construction.

4.2.5 For geogenic rock and reef habitats, where avoidance is not possible, direct impacts from offshore cable installation will lead to a loss in habitat. Where geogenic reef have been crossed by the cables, this loss will be permanent.

4.2.6 For biogenic reef, impacts arising from direct disturbance impact would again be predicted to be temporary. Whilst, as noted in the literature and from a range of previous studies, *Sabellaria* reef habitats are sensitive to disturbance and abrasion, the recovery of reef habitat is also noted (MarLIN) as being rapid following short term or intermediate levels of disturbance as found by Vorberg (2000) and recovery is accelerated if some of the reef is left intact following disturbance as this promotes larval settlement. The offshore cable works will be short term and temporary and even if reef was impacted, the area involved will be limited in extent and any surrounding reef areas would be left intact; the works are, therefore, clearly within the condition criteria for promoting rapid recovery. Even so, and more importantly, the baseline surveys of the export cable corridor area showed that, with the exception of a small area of potential biogenic reef (or possible bream nest site) at the western border of the inshore part of the offshore export cable corridor area (see **Figure 5**), no prominent *Sabellaria* reef features exist within the proposed offshore export cable corridor area. Even if this location does comprise *Sabellaria* reef feature, the routeing of the cables will ensure avoidance of any direct impact and therefore no impacts to any such established forms of *Sabellaria* biogenic reef will arise during the construction of the Proposed Development.

4.2.7 Even if this location does comprise *Sabellaria* reef feature, the routeing of the cables will minimise any direct impact and therefore impacts to any such established forms of *Sabellaria* biogenic reef arising during the construction of the Proposed Development will be limited.

Indirect impacts

4.2.8 Indirect disturbance will occur during the installation of the offshore export cable corridor area, in the form of temporary raised SSC and subsequent sediment deposition of/smothering from the mobilised sediment material disturbed by the use of seabed trenching equipment. Within the context of the key concerns raised, this has the potential to affect sediment habitats, reef habitats and black seabream nesting sites.

4.2.9 Within the area of active trenching, very high plume concentrations are expected. SSC could be tens to hundreds of thousands of mg/l, though this will be very localised, occurring only within approximately 5m of the location of the active works and over a period of seconds to a few minutes. Levels of SSC in the order of thousands to tens of thousands of mg/l would extend further, but will again be spatially limited, in this instance to within 100 to 200m downstream from active trenching (depending on the initial height of ejection and the local current speed) and arising as a relatively narrow plume (up to tens of metres wide), being comprised mainly of resuspended sands and gravels. SSC will be increased for fine sediment fractions which have not settled to the seabed by low tens of mg/l in a narrow plume (tens to a few hundreds of metres wide), up to one tidal excursion in length (up to 11 to 16km on spring tides and 5 to 8km on neap tides) aligned to the tidal stream downstream from the source. Sufficiently fine sediment may persist in suspension for hours to days or longer but will become diluted to very low concentrations (less than 5mg/l, indistinguishable from natural background levels and variability) within timescales of around one day.

4.2.10 Sediment that is disturbed and put into suspension will resettle gradually to the seabed over a timescale largely proportional to the individual grain size and the height above the seabed to which it was initially suspended. In the time it takes for sediment grains to settle back to the seabed, they will be advected (transported) by the ambient currents which, being mainly tidal, may vary in speed and direction over that time. The pattern and local thickness of sediment deposition will, therefore, depend on the combination of initial suspension height, the tidal current transport path and speed, the total amount of sediment in suspension, and the distribution of grain sizes within the sediment. Although the pattern of deposition may be variable, the volume of sediment disturbed is finite, and so there is a limited range of sediment deposit area and thickness combinations that can realistically occur.

4.2.11 For the subsequent deposition of mobilised sediments, the maximum expected average local thickness of deposition in the case of predominantly gravelly sediments is 30 to 60cm, over an area up to 5 to 10m downstream of the trenching as the work proceeds along the length of the trench. The maximum expected average local thickness of deposition in the case of predominantly sandy sediments is 3 to 6cm, over an area up to 100 to 200m downstream of the active trenching location as installation proceeds along the length of the trench.

4.2.12 Fine sediment material is expected to become widely dispersed and is not predicted to resettle on the seabed with measurable thickness locally.

4.2.13 Both the sediment and reef biotopes identified in the offshore export cable corridor area are either not sensitive or have low sensitivity to raised SSC and sediment deposition based on Marine Evidence based Sensitivity Assessment (MarESA) assessments.

4.2.14 Where offshore export cable installation is undertaken in proximity to bream nesting areas, there is the potential for sediment deposition impacts to arise. However, the physical processes assessment findings summarised above indicate that no significant deposition of gravels will occur beyond the immediate vicinity of the trenching works (i.e., within 5-10m down tide of the trencher). Beyond this area, and extending some 100-200m, deposition depths of sand fraction sediments will be in the range of 3-6cm). This level of deposition could have potential energetic impacts to black seabream if this occurs during the breeding season or lead to smothering of eggs on the nest. However, the low levels of deposition and the limited areas over which these might occur, are not considered likely to persist for a long period of time, with natural processes redistributing deposited sediments over a few tidal cycles and return to baseline conditions would be expected within weeks.

4.2.15 Sediment that is disturbed, displaced and redeposited to the seabed within short distances (e.g. up to 100-200m) from an activity is very likely to be similar in grain size and mineral composition to the existing natural seabed. The redeposited sediment will immediately re-join and become indistinguishable from the natural local sedimentary environment at that point and will be subject to the same natural rates and directions of sediment transport as the surrounding seabed. Sediment that remains in suspension for longer periods of time will also be subject to continuous diffusion and dispersion, which will progressively reduce the local suspended sediment concentration, and so the thickness of sediment that might be redeposited in any particular location.

4.2.16 Active deposition of sediment thicknesses greater than one centimetre is only likely to occur during and up to a few minutes after the end of the associated activity causing sediment disturbance. Following deposition, sediment that is disturbed and put into suspension will resettle gradually to the seabed over a timescale largely proportional to the individual grain size and the height above the seabed to which it was initially suspended. In the time it takes for sediment grains to settle back to the seabed, they will be advected (transported) by the ambient currents which, being mainly tidal, may vary in speed and direction over that time.

4.2.17 The pattern and local thickness of sediment deposition will, therefore, depend on the combination of initial suspension height, the tidal current transport path and speed, the total amount of sediment in suspension, and the distribution of grain sizes within the sediment. Although the pattern of deposition may be variable, the volume of sediment disturbed is finite, and so there is a limited range of sediment deposit area and thickness combinations that can realistically occur.

4.2.18 The existing nature of the seabed associated with black seabream nest habitat (mixed gravels and sands overlying hard substrate), prior to the deposition is indicative of sediment transport patterns that will naturally winnow and remove any excess of finer sediment over time. Where a measurable thickness of sand or finer material is deposited, the timescale for natural dispersion of the material will depend on the thickness and extent of the deposit around the nest site, and the naturally occurring rate and direction of net sediment transport.

4.2.19 There is therefore no potential for indirect impacts to continue to affect the nature of the seabed long term or cause any issue outside of a period when black seabream might be actively spawning during the cable installation works.

4.3 Mitigation approach

4.3.1 There are a range of complex interdependencies common to all offshore wind farms in the early (pre-consent) project development stages. These include the selection of specific infrastructure, equipment, and collection and analysis of more detailed site engineering data, which means that design work continues up until the immediate pre-construction period.

4.3.2 Key outstanding areas of uncertainty that will be addressed post consent/pre-construction include:

- The precise extent and location of Geotechnical and environmental constraints. This will be informed by Geotechnical surveys following DCO award prior to cable installation; and

- The detailed installation methodology, cable crossings and requirement for any cable protection. This will be further informed by pre-construction surveys which must be undertaken no earlier than 12 months prior to offshore cable installation.

4.3.3 This follows through to the final design selection, including aspects such as WTG layout, actual cable route selection within the offshore export cable corridor area and contract placement for precise installation methodologies and equipment. As a result, much of this detail is necessarily determined later in the process, at the pre-construction stage. Whilst there is therefore a requirement for the retention of flexibility in terms of precise details of final design and construction methodologies, the parameters for mitigation and related design principles can be set out pre-consent where these are to be relied upon for the purposes of assessment.

4.3.4 The following therefore provides as much detail as possible in terms of cable routeing (refined cable corridors within the wider offshore export cable corridor area), and examples of the technology currently available to deliver the mitigation measures needed to achieve sufficient reduction in impact magnitude to ensure significant adverse effects will not arise.

4.3.5 Once the mitigation measures are agreed, these will be applied within the EIA process, which will be reported in the ES, with the measures secured as set out earlier in this technical note (**paragraph 1.1.6**). Within the ES, commitments will be made to utilise the technologies set out below or comparable alternatives. Additionally, should improved technology become available nearer the time of construction, then utilising such equipment will also be considered. It should be noted that for the purposes of agreeing the mitigation plan, the focus is not on specific equipment, but on the objective that the required level of impact reduction is achieved; the use of example equipment that could be deployed has been detailed in the sections below to provide confidence that such mitigation is practical and can be delivered at the construction stage.

4.3.6 As noted in the introduction section, the proposed mitigation measures developed in response to the ecological sensitivities within the export cable corridor area and consultation comments comprise the following:

- Refined cable routeing:
  - This aims to deliver avoidance of known sensitive features within the offshore export cable corridor area as far as practicable, as well as maximising the potential to achieve cable burial, thus providing for seabed habitat recovery in sediment areas and reducing the need for secondary protection, consequently minimising any potential for longer-term residual effects;
- Use of specialist cable laying and installation techniques:
  - This aims to minimise the direct and indirect (secondary) seabed disturbance footprint to reduce impacts, which will provide mitigation of impacts to all seabed habitats, but particularly chalk and reef areas as well as potential (unknown) black seabream nesting locations, where avoidance is not possible; and
- Seasonal restriction for cable installation works:

- This will ensure offshore export cable corridor installation activities are undertaken outside the black seabream breeding period (March-July) to avoid any effects from installation works on active black bream nesting.

4.3.7 The way in which each of these mitigation measures has been developed is presented in the sections below. In order to provide confidence in the practicality of the mitigation commitments proposed, RED have carried out a routeing exercise to ascertain the feasibility of avoiding sensitive features such as Black seabream and NERC (UK BAP) reef features as well as the opportunity for implementing additional buffers to ensure that the features are not significantly impacted, either directly or indirectly.

4.4 Refined offshore cable routeing

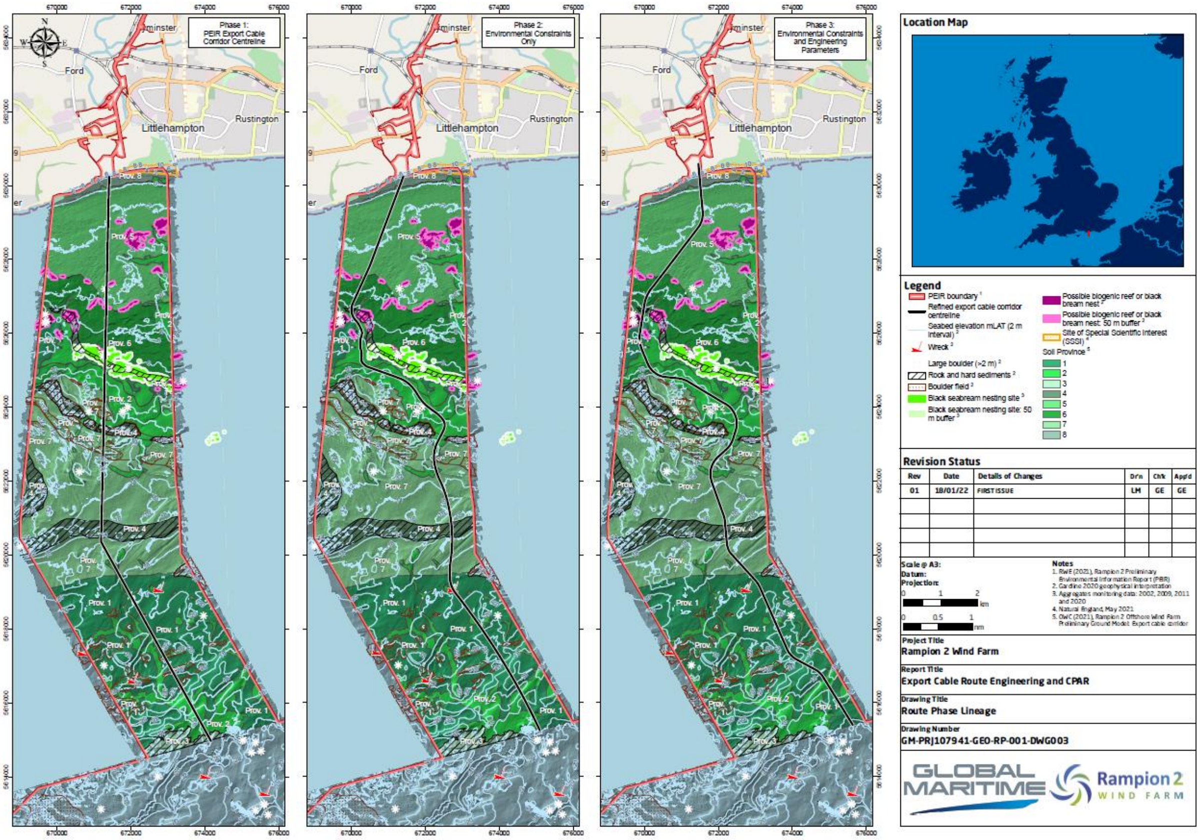
4.4.1 The objective of the macro-route engineering exercise was to mitigate as far as possible the impact on environmental constraints, whilst also maintaining the requirement to progress the shortest installable routes, within seabed conditions which maximise the potential for burial. The resulting routes were then used to produce refined export cable corridors within the wider offshore export cable corridor area, which place emphasis on constraint avoidance/mitigation and feasible constructability.

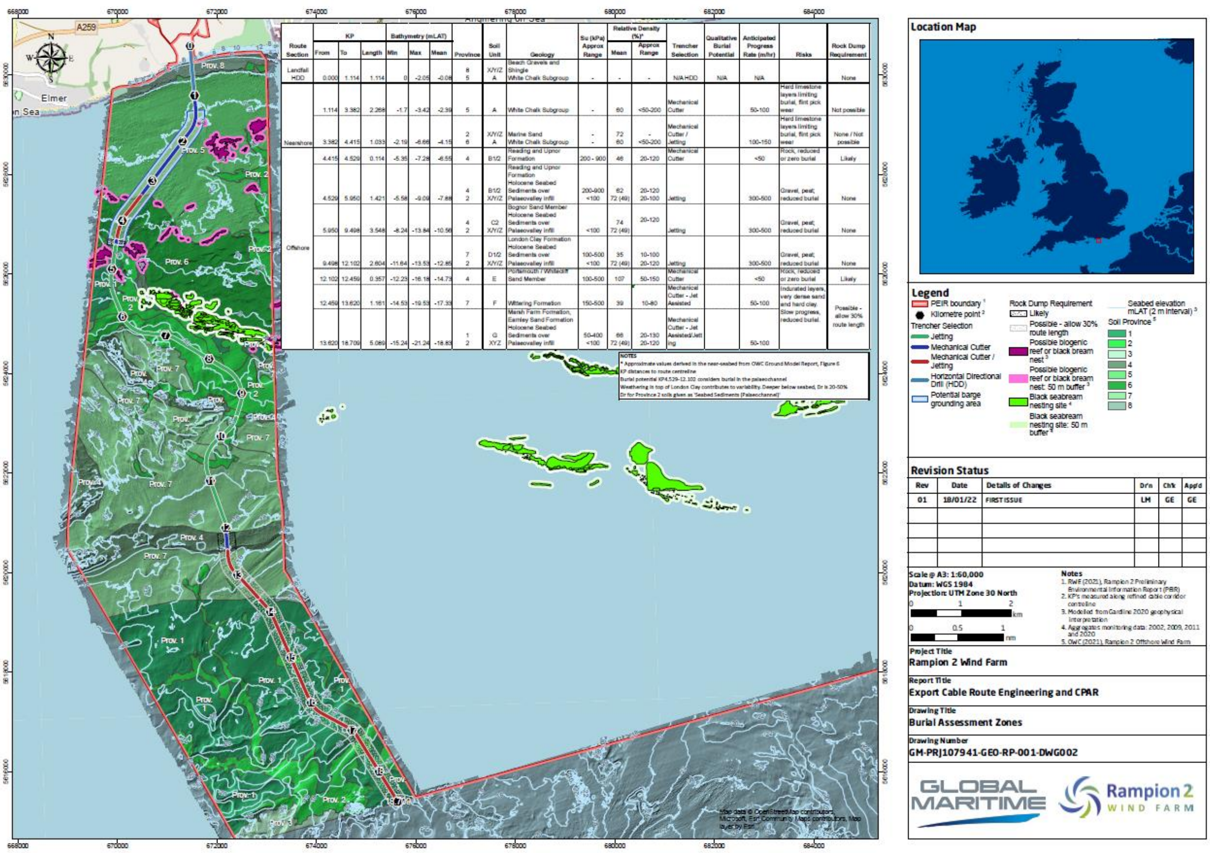
4.4.2 Indicative cable route and refined offshore export cable corridor design were therefore split into three distinct phases:

- As a baseline, define the PEIR offshore export cable corridor centreline. This acts as the shortest route between wind farm and landfall whilst maintaining maximum separation from the corridor perimeter, excluding all physical and technical constraints, and engineering design parameters (**Figure 5;** Phase 1);
- Design a refined offshore export cable corridor centreline based on environmental constraints only (**Figure 5**, Phase 2), but not considering technical constraints or engineering design parameters; and
- Produce a further refined offshore export cable corridor centreline, which takes into account environmental constraints, but also introduces technical constraints and design parameters (**Figure 5**, Phase 3). The resulting centreline is then used to generate refined offshore export cable corridors which are both environmentally considerate and feasible from an engineering and installation perspective.

4.4.3 The lineage described by the three route design phases above is represented in **Figure 5** below.

Figure 4 Route Phase Lineage (extract from Global Maritime routeing study)





Route Section	KP From	KP To	KP Length	Bathymetry (mLAT) Min	Bathymetry (mLAT) Max	Bathymetry (mLAT) Mean	Province	Soil Unit	Geology	Su (kPa) Approx Range	Relative Density (%)* Mean	Relative Density (%)* Approx Range	Trencher Selection	Qualitative Burial Potential	Anticipated Progress Rate (m/hr)	Risks	Rock Dump Requirement
Landfall HDD	0.000	1.114	1.114	0	-2.05	-0.08	8 5	X/Y/Z A	Beach Gravels and Shingle White Chalk Subgroup	-	-	-	N/A HDD	N/A	N/A		None
Nearshore	1.114	3.382	2.268	-1.7	-3.42	-2.39	5	A	White Chalk Subgroup	-	60	<50-200	Mechanical Cutter		50-100	Hard limestone layers limiting burial, flint pick wear	Not possible
	3.382	4.415	1.033	-2.19	-6.66	-4.15	2 6	X/Y/Z A	Marine Sand White Chalk Subgroup	- -	72 60	- <50-200	Mechanical Cutter / Jetting		100-150	Hard limestone layers limiting burial, flint pick wear	None / Not possible
Offshore	4.415	4.529	0.114	-5.35	-7.28	-6.55	4	B1/2	Reading and Upnor Formation	200 - 900	46	20-120	Mechanical Cutter		<50	Rock, reduced or zero burial	Likely
	4.529	5.950	1.421	-5.58	-9.09	-7.88	4 2	B1/2 X/Y/Z	Reading and Upnor Formation Holocene Seabed Sediments over Palaeovalley infill	200-900 <100	62 72 (49)	20-120 20-100	Jetting		300-500	Gravel, peat; reduced burial	None
	5.950	9.498	3.548	-8.24	-13.84	-10.56	4 2	C2 X/Y/Z	Bognor Sand Member Holocene Seabed Sediments over Palaeovalley infill	<100	74 72 (49)	20-120	Jetting		300-500	Gravel, peat; reduced burial	None
	9.498	12.102	2.604	-11.64	-13.53	-12.85	7 2	D1/2 X/Y/Z	London Clay Formation Holocene Seabed Sediments over Palaeovalley infill	100-500 <100	35 72 (49)	10-100 20-120	Jetting		300-500	Gravel, peat; reduced burial	None
	12.102	12.459	0.357	-12.23	-16.18	-14.73	4	E	Portsmouth / Whitecliff Sand Member	100-500	107	50-150	Mechanical Cutter		<50	Rock, reduced or zero burial	Likely
	12.459	13.620	1.161	-14.53	-19.53	-17.33	7	F	Wittering Formation	150-500	39	10-80	Mechanical Cutter - Jet Assisted		50-100	Indurated layers, very dense sand and hard clay. Slow progress, reduced burial.	Possible - allow 30% route length
	13.620	18.709	5.089	-15.24	-21.24	-18.83	1 2	G XYZ	Marsh Farm Formation, Earnley Sand Formation Holocene Seabed Sediments over Palaeovalley infill	50-400 <100	66 72 (49)	20-130 20-120	Mechanical Cutter - Jet Assisted/Jetting		50-100		

NOTES
* Approximate values derived in the near-seabed from OWC Ground Model Report, Figure 6
KP distances to route centreline
Burial potential KP4.529-12.102 considers burial in the palaeochannel
Weathering in top of London Clay contributes to variability. Deeper below seabed, Dr is 20-50%
Dr for Province 2 soils given as 'Seabed Sediments (Palaeochannel)'

4.4.4 The initial refined offshore export cable corridor centre line (**Figure 5**, Phase 1) crosses directly through several sensitive features including mapped (known) black seabream nesting areas and NERC (UK BAP) reefs. The routeing study therefore applied constraint rules in order to avoid these features where this was possible (**Figure 5**, Phase 2), before applying technical engineering constraints to further refine the best environmental routeing solution to ensure the feasibility of offshore cable installation (**Figure 5**, Phase 3). The way in which the constraint rules for the development of the Phase 2 route were developed and applied is described below.

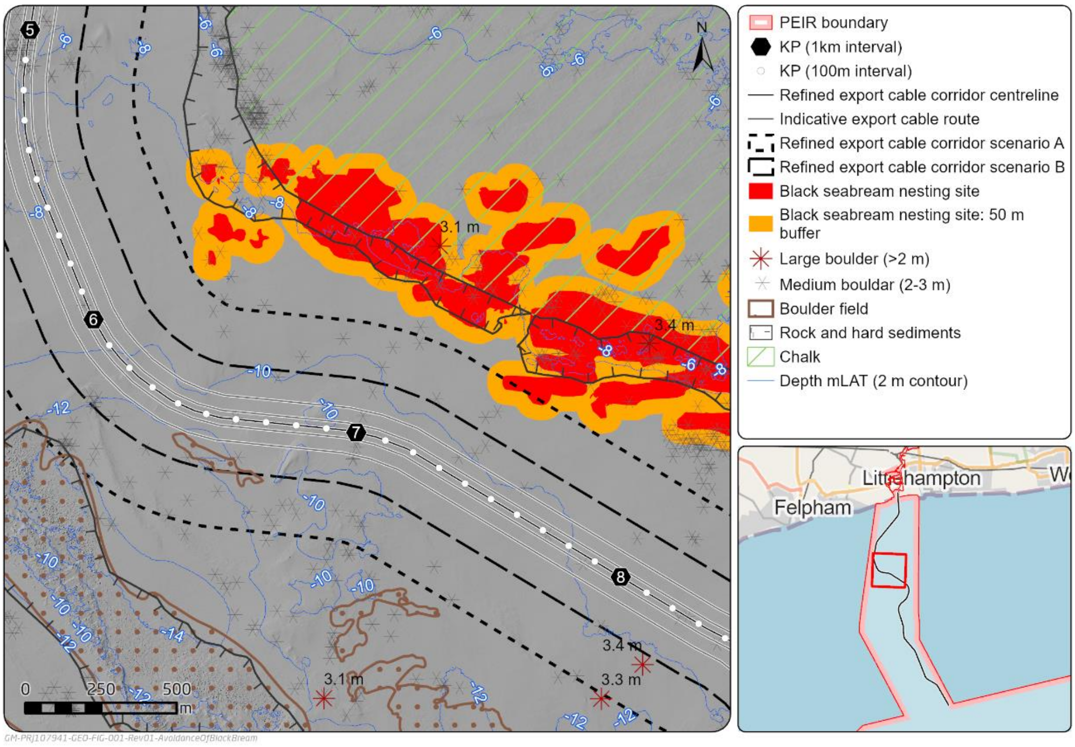
Black seabream nesting sites

4.4.5 Black seabream nesting sites are known to exist within the PEIR offshore export cable corridor area, as shown in **Figure 5**. Principal densities and aggregations of these nesting sites were mapped utilising both historic desk studies and the most recent survey data, drawn from the aggregates industry surveys and from the geophysical survey of the Rampion 2 PEIR boundary carried out in 2020. These nest sites were considered as a hard constraint and therefore routeing design sought to avoid direct overlap with these areas as far as practicable.

4.4.6 In order to ensure sufficient separation distance from sensitive features was afforded in the routeing, a target distance for laying cables within the refined offshore export cable corridor (within the wider offshore export cable corridor area) for the outermost cable was set at 250m inside the refined offshore export cable corridor. For the purposes of the routeing, an additional 50m buffer was also added outside of the refined offshore export cable corridor (effected by adding this to the boundaries of each sensitive feature), therefore meaning actual cable installation activity will generally be 300m away from the edge of any black bream nesting area.

4.4.7 An example graphic for the routeing design, avoiding a black seabream nesting area is presented in **Figure 5** below.

Figure 5 Example output from routeing study showing bream nest area and separation distance (extract from Global Maritime routeing study)



4.4.8 The buffering distance was set on the basis of the potential indirect effects of the cable installation, drawing on the findings of the physical processes assessment work. As noted above, this is predicted to comprise a maximum average local thickness of deposition in the case of predominantly gravelly sediments of 30 to 60cm, over an area up to 5 to 10m downstream of the trenching as the work proceeds along the length of the trench. For sands, the depositional area is greater, however this is predicted to be limited in terms of both deposition and extent, comprising a depositional depth range of 3-6cm over an area up to 100 to 200m downstream of the active trenching location as installation proceeds along the length of the trench. Fine sediment material is expected to become widely dispersed and although elevated SSC will result for a short period, elevated SSC levels will reduce gradually over time through dispersion, to less than measurable levels (<10mg/l) within two to three days. Furthermore, fines are not predicted to resettle on the seabed with measurable thickness locally.

4.4.9 The exact nature of the disturbance will vary along the offshore export cable route, depending on the sediment conditions, and the final length of installed cable, burial depth and burial method, however the buffer distance from the trenching works provides protection at the bream nesting sites from any significant localised and temporary re-suspension and settling of sediments as a result of cable installation activities.

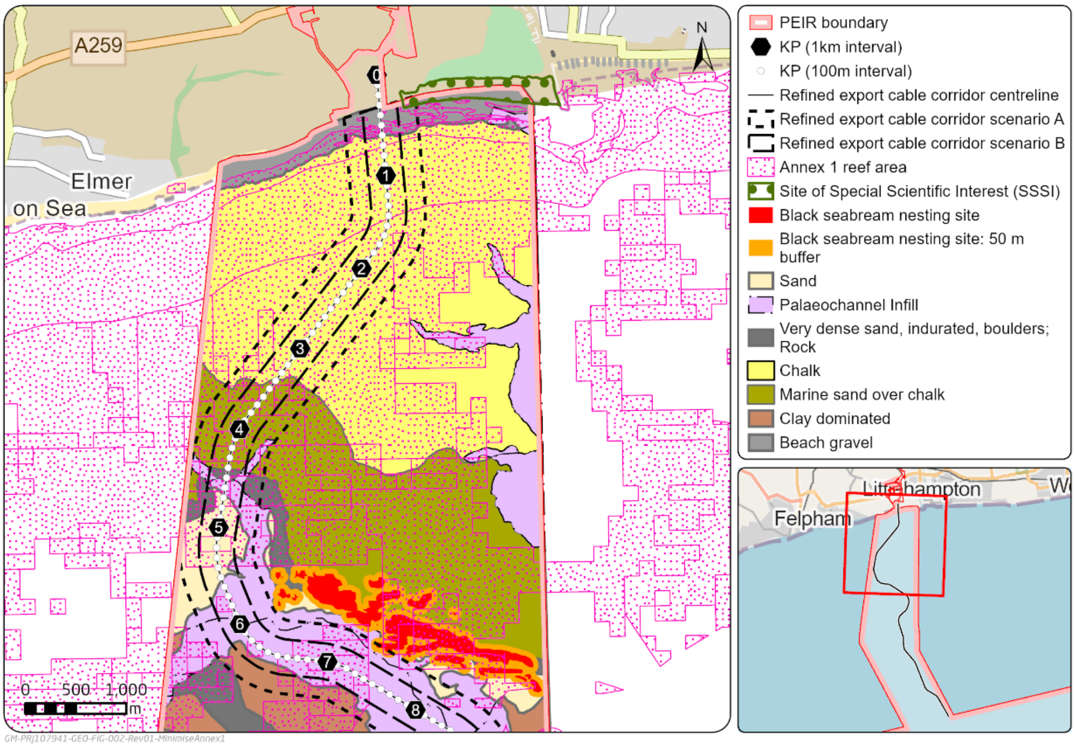
4.4.10 Following the routeing exercise, RED Engineers identified a pinch point over a short route length, where the nearest cable installation operation will be at a reduced spacing of approximately 175m from the edge of a black seabream nesting area. Whilst this is less that the 300m generally provided for, the total distance (125m + 50m buffer) will still provide in excess of 150m separation distance and full avoidance of the nesting site feature.

NERC (UK BAP) reef habitats

4.4.11 NERC (UK BAP) reef habitats within the route corridor take the form of rock reefs at seabed, formed by outcropping chalk and harder/indurated lithologies within the Palaeogene deposits. The same buffering distances were applied to these features for the Phase 2 and Phase 3 routeing design exercise with the objective of avoiding impacts to these features.

With reference to the extents of such features across the wider offshore export cable corridor area, whilst it was possible to avoid interaction with the majority, it was not possible to provide complete avoidance (**Figure 5**) of all reef features. At points along the refined offshore export cable corridor where NERC (UK BAP) Reef habitats cannot be wholly avoided, RED will seek to utilise the most appropriate equipment to minimise the width of disturbance through the feature. In addition, and where relevant, the route will also take the shortest path through underlying chalk substrate, for example to the west of the PEIR offshore export cable corridor area (see **Figure 6** below) to minimise the impact footprint and also to route into paleochannels infilled with soils where possible. An example of routeing around black seabream nesting areas, targeting paleochannels and minimising the distance over which interaction with chalk substrata arises is presented in **Figure 6** below.

Figure 6 Cable routeing through paleochannel, avoidance of bream nest area and minimised chalk interaction (extract from Global Maritime routeing study)



4.4.12 The targeting of paleochannels and areas where cable burial is most likely to be successful has also been included within the routeing design work in order to minimise the potential for secondary cable protection to be required. Further information on this aspect is provided in the section below on cable laying and installation techniques. In addition, where reefs are required to be crossed by the offshore cable works, appropriate equipment options will be selected to ensure the width of any crossing is minimised (also see **Section 4.5** below).

4.4.13 RED engineers have also identified a single pinch point at the most western border of the offshore export cable corridor to the edge of the known black seabream nests features where currently high level micro-siting indicates a potential for the refined offshore export cable corridor to be in closer proximity to an area of potential “biogenic reef” (although this may be a black bream nest feature) identified from the RWE 2020 Geophysical survey data (**Figure 5**). The proximity will will be approximately (and no less than) 150m at the edge of the reef feature however, and although this is less than the 300m separation distance generally provided for in the routeing, this still ensures that the area will not be subject to significant deposition effects, which are largely limited to an area within 50m of the works as set out in the physical processes assessment.

4.5 Use of specialist cable laying and installation techniques

4.5.1 The design work to inform practical mitigation for the cable installation works has also included investigation on the techniques that can be employed to reduce impact footprints where this is required to address the potential for significant effects to arise. Whilst the offshore cable routeing exercise has achieved avoidance of the majority of the sensitive features within the wider offshore export cable corridor area, there remain instances where full avoidance has not been possible as described above, in addition to uncertainties on the locations of all bream nesting activities, where this has not been identified with sufficient confidence from the available survey data to comprehensively represent in mapping.

4.5.2 The aim of the following sections is, therefore, to provide additional information on the techniques, approaches and equipment that are available to ensure both direct (footprint) and indirect (SSC and deposition) effects are reduced for all receptors, both known and unknown. The mitigation is aimed at reducing impact risks to non-significant levels for NERC (UK BAP) reef features and potential (unknown) black seabream nesting locations, where avoidance is not possible.

Cable protection

4.5.3 It is widely recognised in the offshore industry that burial is the most cost-effective means of achieving cable protection. In addition, minimising the use of cable protection at the seabed surface also serves to limit areas over which a longer-term change impact) to seabed habitats will arise, as the presence of such material can limit the potential for such areas to return to baseline condition through the action of natural sediment transport processes following cessation of construction activities. Routeing design has therefore been undertaken to maximise burial potential along the route. It is important to note that in the

Rampion 2 offshore export cable corridor area, in common with the wider area off the Sussex coast, the geological conditions are not entirely conducive to burial. Even so, many of the geological formations along the route are considered trenchable with mechanical cutting, although other formations are strongly cemented and are likely to pose an issue.

4.5.4 Wherever possible, the routeing design has taken advantage of soil infilled paleochannels to maximise burial potential with conventional jetting methods, with trenchable geological formations targeted next; this minimises cable routeing through the harder more strongly cemented formations in the area. When examining feasibility, conservative target trench depths of 1.0m in Palaeogene and Cretaceous deposits have been selected.

Potential unburied cable due to ground conditions

4.5.5 Certain sections of the route cross lithologies at seabed which are likely to be difficult to trench, resulting in reduced or absence of burial. These problematic lithologies are likely to be limited to the cemented sands of the Bognor Rocks. Over these route lengths, rock placement may be required to secure cable on-bottom stability and to protect the cable from primary threats such as ship anchors and fishing trawls.

Alternative cable protection

4.5.6 There are no anticipated infrastructure within the export corridor that require to be crossed, leading to the need for engineered crossing arrangements and alternative protection.

4.5.7 There are some route sections where reduced or absence of burial may be anticipated, although this is reduced as far as possible. In total, 2.35km of route length (per cable) may require a level of alternative protection, such as rock dumping. Overall, the engineering study has identified that a mechanical cutting trencher is necessary for up to 54% of the route length, of which 13% is considered likely to require further protection with rock placement. The remaining 46% is considered possible to achieve with jet trenching. This can be further clarified when route specific geotechnical data is obtained at the pre-construction stage and the burial potential confirmed.

4.6 Cable installation methodology

4.6.1 With regards to trenching and burial, it is clear from the geophysical survey data for the offshore export cable corridor area that a mechanical trencher is required to achieve burial in chalk areas without sufficient soft sediment cover. There are a number of considerations as to which particular trenchers may be suitable, which are not resolvable at this time due to other dependencies, including the ability for a cable lay barge to directly access the horizontal directional drill (HDD) exit pit. Key considerations include:

- The need or requirement for support vessel to house pumps and power systems;

- The ability to operate in lay-back from a cable lay barge, and the distance over which this is possible;
- The degree of disturbance to the seabed, both in terms of the dimensions of the trench excavated, and the disturbance caused by machine tracks;
- The manoeuvrability of the trencher and ability to traverse seabed irregularities; and
- The ability of the nearshore trencher to continue on to successfully complete the offshore scope, thus reducing both repeat impact to the environment and mobilisation costs.

4.6.2 What is clear is that there are a number of potentially suitable trenching solutions in the market, which will reduce the temporal and spatial impact to both the NERC (UK BAP) reef features, as well as minimise suspended sediment impact to the black seabream nest areas, examples of which are presented below.

Aratellus Leviathan – Onshore, Nearshore and Offshore Mechanical and Jet Trencher

4.6.3 The Aratellus Leviathan – Onshore, Nearshore and Offshore Mechanical and Jet Trencher (**Figure 7**) utilises a combination of a mechanical cutting chain and jetting to deliver burial in a post-lay mode. It is unique in its capability to automatically self-level through a suspension system, and to independently steer it's front and rear tracks, giving enhanced manoeuvrability. It is largely independently operated but will require a separate support vessel for shallow water and beaching operations.

4.6.4 This trencher could continue from the nearshore section to trench the remainder of the route in both jetting and cutting modes. The total footprint of the trencher is small in comparison to other cable laying equipment such as cable ploughs, being approximately 4m, with the direct trench cutting area of 1m, and a trenching speed of approximately 75-100m an hour.

Figure 7 Aratellus Leviathan Mechanical Trencher

Van Oord Deep Dig-It – Nearshore, Offshore Mechanical and Jet Trencher

4.6.5 A similar proposition to the Aratellus Leviathan with deeper burial capability and more power, but less manoeuvrable. The Van Oord Deep Dig-It – Nearshore, Offshore Mechanical and Jet Trencher (shown in **Figure 8**) is remotely operated and therefore does require support vessels in the nearshore environment.

Figure 8 Van Oord Deep Dig-It (image courtesy of Van Oord)

4.6.6 Other trenchers exist on the market for nearshore conditions, in hard seabed soils and soft rocks, such as Enshore's T1 and SWT1 combined jetting and cutting trenchers.

4.7 Seasonal restriction for installation works within offshore export cable corridor area

4.7.1 As described previously, during the breeding season, black seabream are reported to return to the same area every year. As a result of this focused area of nesting activity, Kingmere MCZ was created to protect this important breeding and spawning site and enforced seasonal restrictions on certain activities during the black seabream nesting period. Although the restricted period is specifically relevant to the protected site, the same spawning period obviously also applies to bream nesting outside of the MCZ boundaries. Additionally, whilst Rampion 2 is outside of the MCZ, the proximity of the Proposed Development to the MCZ requires consideration in terms of indirect impacts arising, in this instance from the cable installation works.

4.7.2 The mitigation measures presented in the preceding sections will ensure that direct impacts to known black seabream nesting areas can be avoided and that installation methodologies can be employed to ensure indirect impacts do not pose a risk of significant effect to spawning habitats for the species. The adoption of the installation methodologies also results in mitigation, by impact footprint reduction, for areas where bream may nest but which are not represented in the available data sets. Notwithstanding, it is recognised that even with these mitigation measures in place, there is the potential for a risk of impact through disturbance to nesting black seabream or, for unknown seabream nesting areas at least, an uncertain level of risk of direct or indirect effects arising from the seabed disturbance during offshore cable laying, together with subsequent raised SSC and deposition.

4.7.3 In order to provide a higher level of protection to avoid potential for significant effects to arise, RED will also commit to a seasonal restriction on the offshore export cable installation works. As black seabream vacate nests outside of the breeding season, the impact of disturbance to nesting individuals from the offshore export cable installation is only relevant during the breeding season, therefore RED are committed to ensuring that all cable installation activities within the export cable corridor area are undertaken outside of the identified breeding season of March to July (Natural England, 2021).

5. Overview of mitigation commitments

- Cable routeing and micro-siting within the offshore export cable corridor area will provide for avoidance of known sensitive features as far as practicable.
- As part of the routeing design, a working separation distance will be maintained wherever possible from sensitive features, notably bream nesting areas to limit the potential for impacts to arise (direct or indirect). The current target for this is 300m, being comprised of a 250m working distance and an additional 50m buffer around sensitive features (principally bream nesting areas).
- As part of the routeing design, a working separation distance will be targeted wherever possible from sensitive bream nest features, to limit the potential for impacts to arise (direct or indirect). The current target for this is 300m, being comprised of a 250m working distance and an additional 50m buffer around bream nest features.
- The offshore export cable routeing design has included the targeting of seabed areas to maximise the potential for cables to be buried, thus providing for seabed habitat recovery in sediment areas and reducing the need for secondary protection and consequently minimising any potential for longer-term residual effects.
- Adoption of specialist offshore export cable laying and installation techniques will minimise the direct and indirect (secondary) seabed disturbance footprint to reduce impacts, which will provide mitigation of impacts to all seabed habitats, but particularly chalk and reef areas as well as potential (unknown) black seabream nesting locations, where avoidance is not possible. RED will seek to utilise the most appropriate technology available at the time of construction to reduce the direct footprint impact from cutting machinery.
- A seasonal restriction will be put in place to ensure cable installation activities within the export cable area are undertaken outside the black seabream breeding period (March-July) to avoid any effects from installation works on black seabream nesting within or outside of the Kingmere MCZ.

6. Summary and Conclusions

6.1.1 An offshore export routeing design process has been undertaken, commencing with a baseline centre offshore export corridor route, moving to environmental mitigation and finally into an engineered route.

6.1.2 The engineered route provides for the avoidance of the majority of sensitive features within the offshore export cable corridor area, whilst complying with engineering constraints to secure an installable route. The routeing selections also minimise secondary impacts (SSC and sediment deposition) on the majority of known black seabream nesting habitat and NERC (UK BAP) reef features by implementing appropriate installation works separation distances and additional buffers around features for the routeing design work, although the route of individual cables within the offshore export corridor has not yet been considered in detail. The buffering distances afford substantial additional mitigation against indirect effects for relevant habitats, since both the sediment and reef biotopes identified in the cable corridor area are either not sensitive or have low sensitivity to raised SSC and sediment deposition based on MarESA assessments.

6.1.3 The offshore export routeing mitigation has sought to maximise the potential for burial of cables, either through direct burial where there is sufficient sediment depth (for example within paleochannels) or via trenching to bury cables in areas of underlying chalk, ensuring that no long-term change to the nature of the surface habitat character will arise from the requirement for secondary protection that will be needed for surface lay in such areas. This approach, maximising the length of the offshore export cables that is effectively buried minimises the potential for long-term impacts (change) to seabed habitats along the cable routes through the post-construction operational phase of Rampion 2. Notably this also includes a reduction in the potential for longer term impacts on areas of black seabream nesting not currently known (or possible to map).

6.1.4 Nevertheless, over significant parts of the offshore export cable route, it is not possible to avoid all areas where rock or hard soils outcrop at seabed. For this reason, a mechanical cutting trencher is necessary for up to 54% of the route length, of which 13% is considered likely to require further protection with rock placement. The remaining 46% is considered possible to achieve with jet trenching. The mitigation set out in this document includes the use of specialist cable laying and installation techniques to ensure that where this is the case, a reduction in impact magnitude arising from the cable installation works can be delivered. Adoption of these approaches will minimise both the direct and indirect (secondary) seabed disturbance footprint to reduce impacts. This will provide benefits for all seabed habitats where the techniques are applied, but particularly chalk and reef areas as well as potential (unknown) black seabream nesting locations, where avoidance is not possible to provide with the current baseline data (and in recognition of the uncertainties in coverage raised by stakeholders).

6.1.5 Importantly, the capability of avoidance of all mapped black seabream nests, as identified in the PEIR, with additional buffering from cable installation means that there is no anticipated residual significant effect to known black seabream from direct disturbance or sediment dispersion.

6.1.6 The application of a seasonal restriction to ensure cable installation activities within the export cable area are undertaken outside the black seabream breeding period (March-July) will avoid any effects from installation works on black seabream nesting activities during the breeding season. For areas subject to even low order indirect impacts from SSC and sediment deposition, notably including the Kingmere MCZ, and areas where the offshore export cables have been buried below the seabed surface, the short period for seabed recovery (weeks) ensures there is no potential for significant impacts on favourable habitat to persist for any protracted period following completion of the works.

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