
# White Cross Offshore Windfarm Environmental Statement Chapter 4: Site Selection and Assessment of Alternatives

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## Table of Contents



## Table of Figures



## Table of Tables

## Glossary of Acronyms

| Acronym | Definition |
|---|---|
| AfL | Agreement for Lease |
| AoS | Area of Search |
| EIA | Environmental Impact Assessment |
| ES | Environmental Statement |
| HDD | Horizontal Directional Drilling |
| HRA | Habitats Regulation Assessment |
| IBA | Important Bird Area |
| IPC | Infrastructure Planning Commission |
| km | Kilometre |
| $km^2$ | Square kilometre |
| LPA | Local Planning Authority |
| m | Metre |
| MCA | Maritime and Coastguard Agency |
| MCZ | Marine Conservation Zone |
| MMO | Marine Management Organisation |
| MoD | Ministry of Defence |
| MPS | Marine Policy Statement |
| MW | Megawatts |
| NATS | National Air Traffic Services |
| NE | Natural England |
| NPS | National Policy Statement |
| OWL | Offshore Wind Limited |
| PRoW | Public Right of Way |
| RYA | Royal Yachting Association |
| S.36 | Section 36 Consent |
| SAC | Special Area of Conservation |
| SPA | Special Protection Area |
| SSSI | Site of Special Scientific Interest |
| TCE | The Crown Estate |
| TJB | Transition Joint Bay |
| UK | United Kingdom |
| UKHO | UK Hydrographic Office |
| WPD | Western Power Distribution |
| WTG | Wind Turbine Generator |

## Glossary of Terminology

| Defined Term | Description |
|---|---|
| Agreement for Lease | An Agreement for Lease (AfL) is a non-binding agreement between a landlord and prospective tenant to grant and/or to accept a lease in the future. The AfL only gives the option to investigate a site for potential development. There is no obligation on the developer to execute a lease if they do not wish to. |
| Applicant | Offshore Wind Limited. |
| Dynamic cables | The floating wind turbines will require cables to run through the water column from their platform base at the water surface to the touchdown point on the seabed. |
| Environmental Impact Assessment (EIA) | Assessment of the potential impact of the proposed Project on the physical, biological and human environment during construction, operation and decommissioning. |
| Export Cable Corridor | The area in which the export cables will be laid, either from the Offshore Substation or the inter-array cable junction box (if no offshore substation), to the NG Onshore Substation comprising both the Offshore Export Cable Corridor and Onshore Export Cable Corridor. |
| Floating substructure | The floating substructure acts as a stable and buoyant foundation for the WTG. The WTG is connected to the substructure via the transition piece and the substructure is kept in position by the mooring system. |
| Front end engineering and design | Front-end engineering and design (FEED) studies address areas of windfarm system design and develop the concept of the windfarm in advance of procurement, contracting and construction. |
| Generation Assets | The infrastructure of the Project related to the generation of electricity within the windfarm site, including wind turbine generators, substructures, mooring lines, seabed anchors and inter-array cables. |
| Inter-array cables | Cables which link the wind turbines to each other and the Offshore Substation Platform, or at the inter-array cables junction box (if no offshore substation). Array cables will connect the wind turbines to one and other and to the Offshore Substation (if utilised). The initial section for the inter-array cables will be freely suspended in the water column below the substructure (dynamic sections) while the on seabed sections of the cables will be buried where possible. |
| Jointing bay | Underground structures constructed at regular intervals along the Onshore Export Cable Corridor to join sections of cable and facilitate installation of the cables into the buried ducts. |
| Landfall | Where the offshore export cables come ashore. |
| Mean high water springs | The average tidal height throughout the year of two successive high waters during those periods of 24 hours when the range of the tide is at its greatest. |
| Mean low water springs | The average tidal height throughout a year of two successive low waters during those periods of 24 hours when the range of the tide is at its greatest. |

| Defined Term | Description |
|---|---|
| Mitigation | Mitigation measures have been proposed where the assessment identifies that an aspect of the development is likely to give rise to significant environmental impacts, and discussed with the relevant authorities and stakeholders in order to avoid, prevent or reduce impacts to acceptable levels.<br><br>For the purposes of the EIA, two types of mitigation are defined:<br>• Embedded mitigation: consisting of mitigation measures that are identified and adopted as part of the evolution of the project design, and form part of the project design that is assessed in the EIA<br>• Additional mitigation: consisting of mitigation measures that are identified during the EIA process specifically to reduce or eliminate any predicted significant impacts. Additional mitigation is therefore subsequently adopted by OWL as the EIA process progresses. |
| Mooring system | The equipment (mooring lines and seabed anchors) that keeps the floating substructure in position during operation through a fixed connection to the seabed. |
| NG Onshore Substation | Part of an electrical transmission and distribution system. Substations transform voltage from high to low, or the reverse by means of the electrical transformers. |
| NG Grid Connection Point | The point at which the White Cross Offshore Windfarm connects into the distribution network at East Yelland substation and the distributed electricity network. From East Yelland substation electricity is transmitted to Alverdiscott where it enters the national transmission network. |
| Offshore Export Cables | The cables which bring electricity from the Offshore Substation Platform or the inter-array cables junction box to the Landfall. |
| Offshore Export Cable Corridor | The proposed offshore area in which the export cables will be laid, from Offshore Substation Platform or the inter-array cable junction box to the Landfall. |
| Offshore Infrastructure | All of the offshore infrastructure including wind turbine generators, substructures, mooring lines, seabed anchors, Offshore Substation Platform and all cable types (export and inter-array). This encompasses the infrastructure that is the focus of this application and Environmental Statement and the parts of the project consented under Section 36 of the Electricity Act and the Marine and Coastal Access Act 2009. |
| Offshore Junction Box | If an offshore substation is not required, the inter-array cables will combine at a point where a junction box will merge them into the one export cable. The need for a substation is yet to be decided. |
| The Offshore Project | The Offshore Project for the offshore Section 36 and Marine Licence application includes all elements offshore of MHWS. This includes the infrastructure within the windfarm site (e.g. wind turbine generators, substructures, mooring lines, seabed anchors, inter-array cables and Offshore Substation Platform (as applicable)) and all infrastructure associated with the export cable route and landfall (up to MHWS) including the cables and associated cable protection (if required). |

| Defined Term | Description |
|---|---|
| Offshore Substation Platform | A fixed structure located within the Windfarm Site, containing electrical equipment to aggregate the power from the wind turbines and convert it into a more suitable form for export to shore. |
| Onshore Development Area | The onshore area above MLWS including the underground onshore export cables connecting to the White Cross Onshore Substation and onward to the NG grid connection point at East Yelland. The onshore development area will form part of a separate Planning application to the Local Planning Authority (LPA) under the Town and Country Planning Act 1990. |
| Onshore Export Cables | The cables which bring electricity from MLWS at the Landfall to the White Cross Onshore Substation and onward to the NG grid connection point at East Yelland. |
| Onshore Export Cable Corridor | The proposed onshore area in which the export cables will be laid, from MLWS at the Landfall to the White Cross Onshore Substation and onward to the NG grid connection point at East Yelland. |
| Onshore Infrastructure | The combined name for all infrastructure associated with the Project from MLWS at the Landfall to the NG grid connection point at East Yelland. The onshore infrastructure will form part of a separate Planning application to the Local Planning Authority (LPA) under the Town and Country Planning Act 1990. |
| The Onshore Project | The Onshore Project for the onshore TCPA application includes all elements onshore of MLWS. This includes the infrastructure associated with the offshore export cable (from MLWS), landfall, onshore export cable and associated infrastructure and new onshore substation (if required). |
| Offshore Wind Limited | Offshore Wind Ltd (OWL) is a joint venture between Cobra Instalaciones Servicios, S.A., and Flotation Energy Ltd. |
| The Project | the Project is a proposed floating offshore windfarm called White Cross located in the Celtic Sea with a capacity of up to 100MW. It encompasses the project as a whole, i.e. all onshore and offshore infrastructure and activities associated with the Project. |
| Project Design Envelope | A description of the range of possible elements that make up the Project design options under consideration. The Project Design Envelope, or 'Rochdale Envelope' is used to define the Project for Environmental Impact Assessment (EIA) purposes when the exact parameters are not yet known but a bounded range of parameters are known for each key project aspect. |
| Scour protection | Protective materials to avoid sediment being eroded away from the base of the foundations as a result of the flow of water. |
| Substructure | The floating substructure acts as a stable and buoyant foundation for the WTG. The WTG is connected to the substructure via the transition piece and the substructure is kept in position by the mooring system. |
| Transition joint bay (TJB) | Underground structures at the Landfall that house the joints between the offshore export cables and the onshore export cables. |

| Defined Term | Description |
|---|---|
| Transition piece | The transition piece includes various functionalities such as access for maintenance, cable connection for the energy of the turbine and the corrosion protection of the entire foundation. |
| White Cross Offshore Windfarm | 100MW capacity offshore windfarm including associated onshore and offshore infrastructure. |
| White Cross Onshore Substation | A new substation built specifically for the White Cross project. It is required to ensure electrical power produced by the offshore windfarm is compliant with NG electrical requirements at the grid connection point at East Yelland. |
| Wind Turbine Generators (WTG) | The wind turbine generators convert wind energy into electrical power. Key components include the rotor blades, nacelle (housing for electrical generator and other electrical and control equipment) and tower. The final selection of project wind turbine model will be made post-consent application. |
| Windfarm Site | The area within which the wind turbines, Offshore Substation Platform and inter-array cables will be present. |

# 4. Site Selection and Assessment of Alternatives

## 4.1 Introduction

1. This chapter of the Environmental Statement (ES) provides a description of the site selection process and the approach undertaken by Offshore Wind Limited (OWL) to identify the infrastructure seaward of Mean High Water Springs (MHWS) hereafter referred to as 'the Offshore Project'. The process includes consideration of both the offshore and onshore development and associated infrastructure, and the assessment of reasonable alternatives as the project has developed throughout the pre-application process. An important part of the Environmental Impact Assessment (EIA) process is to describe the reasonable alternatives considered during the evolution of the project, such as development design, technology, location, size and scale, and to set out the main reasons for selecting the chosen option.

2. The Windfarm Site was established in 2021 through site selection associated with the Crown Estate Test and Demonstration leasing opportunity. OWL have a connection agreement with National Grid as the Distribution Network Operator (DNO) to connect to the existing substation at East Yelland which will utilise the remaining capacity at this grid connection point. It should be noted that National Grid recently acquired Western Power Distribution (WPD) to be become the DNO.

3. OWL is seeking consent under Section 36 of the Electricity Act 1989 and two separate Marine Licences under the Marine and Coastal Act 2009 (MCAA 2009) for all infrastructure seaward of MHWS. This includes the infrastructure within the Windfarm Site, the Offshore Export Cable, Landfall (up to MWHS) and the Taw Estuary Crossing. This chapter and associated appendices consider the alternative locations and routes of the following infrastructure components:

    - Offshore Export Cable Corridor (and a section of onshore cable corridor which runs under the Taw Estuary)
    - Offshore Substation
    - Landfall (up to MHWS).

4. A project design envelope (PDE) approach has been utilised in order to undertake the EIA. The final detailed design of the Offshore Project will fall within this 'envelope', allowing for detailed design work to be undertaken post-consent without rendering the assessment inadequate. The site selection process presented in this chapter outlines the refinement of the project design within a range of potential design, geographical extent and activity parameters. The following components of the Offshore Project will be selected post-consent:

    - type of Wind Turbine Generator (WTG) and floating substructure
    - layout of the WTGs within the Windfarm Site

- need for and locations of Offshore Substation Platform (OSP) or Offshore Junction Box.

5. Key aspects for which flexibility is required are outlined in Chapter 5: Project Description. Further details of the use of a PDE or "Rochdale envelope" are provided in Chapter 6: EIA Methodology.

6. It is noted that the onshore cable corridor and possible onshore substation are being applied for under a separate planning application under the Town and Country Planning Act 1990 (TCPA 1990) for all infrastructure landward of Mean Low Water Springs (MLWS) (hereafter referred to as 'the Onshore Project').

### 4.1.1 Project Design Envelope

7. The design envelope approach is taken as many of the engineering design aspects relating to construction methods, cable design, substructure design, wind turbine types, mooring designs, and offshore substation design (and requirement) are works in progress. Some of these elements can only be determined when greater certainty over project consent is received. Consequently, in order to enable these elements to be considered and assessed wide areas, corridors, routes, or zones for the various infrastructure are used. Furthermore, this enables the opportunity or requirement for micro-siting to be determined as more information is gathered and assessed and relevant conclusions reached.

## 4.2 Key Components of the Project

8. This section provides an overview of the Offshore Project by setting out its main components. The Offshore Project application is for a 'design envelope' for the relevant offshore components of the project, within which the infrastructure will be built.

9. An illustration of the main components of the Offshore Project is provided in Plate 4.1 alongside the main components of the Onshore Project and identifies the National Grid Electricity Transmission (NGET) from the grid connection point. The components of the Offshore Project are further detailed in Table 4.1. Specifically, the Offshore Project application relates to:

- the offshore generating infrastructure (WTGs), floating substructures, mooring lines, seabed anchors, and inter-array cables)
- the offshore transmission elements, which may include an OSP, and offshore export cable (to enable transmission of the electricity generated) to Mean High Water Spring (MHWS) tide level at the Landfall
- The trenchless crossing below the Taw Estuary (below MHWS on the north of the estuary to MHWS on the south of the estuary).

*Plate 4.1 Project Infrastructure*

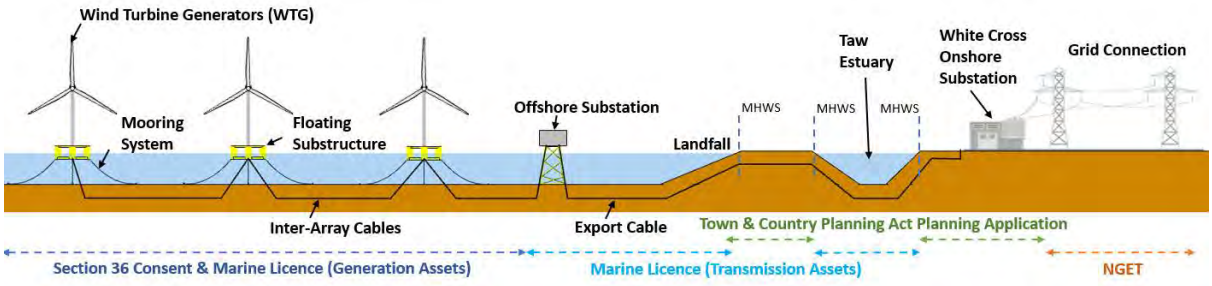



*Table 4.1 Project infrastructure*

| Component | Overview |
|---|---|
| Wind Turbine Generators (WTG) | The wind turbine generators convert wind energy into electrical power. Key components include the rotor blades, nacelle (housing for electrical generator and other electrical and control equipment) and tower. The final selection of project wind turbine model will be made post-consent application. |
| Floating Substructure | The floating substructure acts as a stable and buoyant foundation for the WTG. The WTG is connected to the substructure via the transition piece and the substructure is kept in position by the mooring system. |
| Mooring system | The equipment (mooring lines and seabed anchors) that keeps the floating substructure in position during operation through a fixed connection to the seabed. |
| Inter-Array cables | Inter-Array Cables will connect the wind turbines to one and other and to the Offshore Substation (if utilised). The initial section for the inter-array cables will be freely suspended in the water column below the floating substructure (dynamic sections) while the on-seabed sections of the cables will be buried where possible. |
| Offshore Substation Platform (OSP) or Offshore Junction Box | If required, an offshore substation will convert the power to higher voltages to transmit the power more efficiently (reduced electrical losses) to shore.<br>If an offshore substation is not required, the inter-array cables will combine at a point where a junction box will merge them into the one export cable. The need for a substation is yet to be decided. |

| Component | Overview |
|---|---|
| Offshore Export Cable | Cable connecting the Offshore Substation to the landfall. The cable can be delivered in sections and jointed in-situ (factory joined). The maximum number of offshore export cables is 2.<br>If seabed conditions make burial unfeasible, as well as in the immediate proximity of turbine foundations, cable may be protected by a hard-protective layer such as rock or concrete mattresses. |
| Landfall | The location at which the offshore export cable will come ashore, either by trenchless (such as Horizontal Directional Drill (HDD)) or open cut techniques. |

10. Further details on the key components of infrastructure can be found in Chapter 5: Project Description.

### 4.2.1 Legislation and Guidance

11. The site selection process for offshore windfarms in the United Kingdom (UK) is governed by the existing legislative, policy and guidance framework for the development of electrical infrastructure and for environmental assessment within the UK. The key pieces of legislation, policy and best practice guidance which set the framework for site selection and the assessment of alternatives for offshore windfarms in the UK, and upon which this methodology has been based, are summarised below. Further details on legislation and guidance are provided in Chapter 3: Policy and Legislation.

#### 4.2.1.1 Environmental Impact Assessment Legislation

12. The consideration of alternatives and major choices made during the development of a project design has been part of Environmental Impact Assessment (EIA) legislation since the adoption of the original EIA directive in UK law under the Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 2017 and the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended).

13. It is worth noting that there is no requirement to assess all potential options, only to provide a review of those that have been considered.

14. The National Policy Statement (NPS) form the primary national guidance documents for Nationally Significant Infrastructure Projects (NSIPs) the Planning Act (2008). This project is not an NSIP, although the NPS can still be of use as guidance.

#### 4.2.1.2 The National Policy Statement EN- 1

15. The NPS, for nationally significant infrastructure projects, is clear that 'from a policy perspective this NPS EN-1 does not contain any general requirement to consider alternatives or to establish whether the proposed project represents the best option'. It does however note that in the execution of a competent EIA "*applicants are obliged to include in their ES, as a matter of fact, information about the main alternatives they have studied*."

#### 4.2.1.3 The National Policy Statement EN-3

16. The National Policy Statement for Renewable Energy Infrastructure (NPS EN-3), for nationally significant infrastructure projects, states at paragraph 2.6.81 that the applicant should include an assessment of the effects of installing cables across the intertidal zone which should include information, where relevant, about "*any alternative landfall sites that have been considered by the applicant during the design phase and an explanation for the final choice*" and "*any alternative cable installation methods that have been considered by the applicant during the design phase and an explanation for the final choice*."

#### 4.2.1.4 Habitats Regulations

17. In undertaking a Habitat Regulations Assessment (HRA) under The Conservation of Habitats and Species Regulations 2017, where the project is anticipated to result in a likely significant effect upon a Natural site or interest feature, there is a requirement to present a consideration of alternatives as part of the assessment.

18. NPS EN-1, for nationally significant infrastructure projects, links the HRA and EIA processes by stating "in some circumstances there are specific legislative requirements, notably under the Habitats Directive, for the Infrastructure Planning Commission (IPC) to consider alternatives. These should also be identified in the ES by the applicant."

#### 4.2.1.5 Guidance

19. The process for identifying and refining the Offshore Export Cable Corridor was undertaken with due regard to the following guidance:

- The Crown Estate (2012, updated in 2021) Guidance on the Principles of Cable Routeing and Spacing
- The Crown Estate (2019) Plan-level Habitats Regulations Assessment For The 2017 Offshore Wind Farm Extensions
- The Crown Estate (2021) Cable Route Identification and Leasing Guidelines.

20. The site selection process also has regard to the Marine Policy Statement (MPS) (UK Government, 2011).

### 4.2.2 Site Selection Process

#### 4.2.2.1 Overview

21. The siting, design and refinement of the Offshore Project follows a site selection process, taking account of environmental, physical, technical, commercial and social considerations and opportunities. Engineering feasibility is also a key consideration for suitable options and site selection. Finally, the aim of identifying sites is to ensure that they will, in the long term, provide the lowest cost of energy.

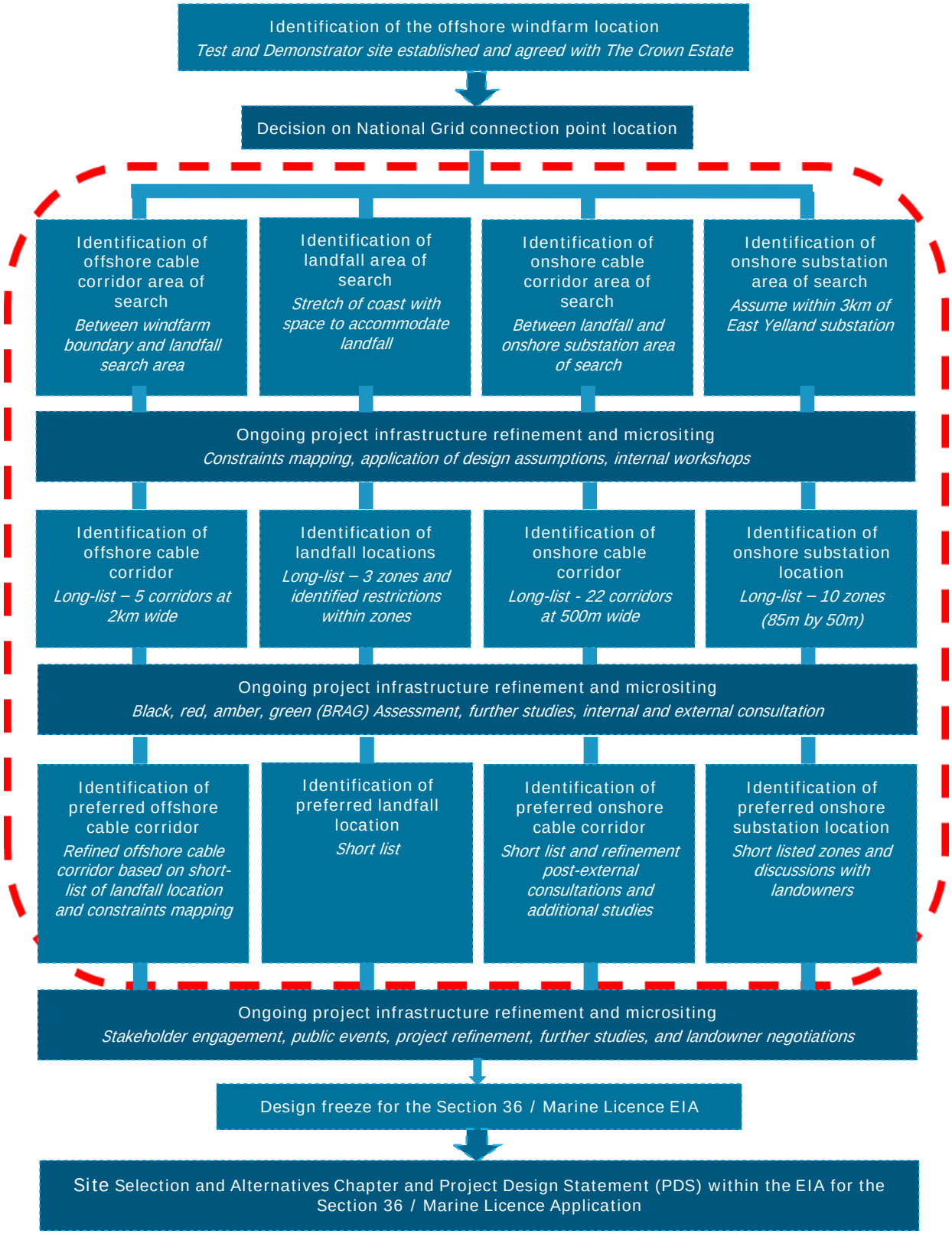
22. The site selection process is shown in Plate 4.2. Each stage of the site selection process forms part of an iterative design process undertaken to identify the most suitable locations, based on criteria outlined in the following sub-section, and configuration for project infrastructure. The red dashed line indicates the stages of the process covered within this EIA and chapter. However, it is noted that the Onshore Cable Corridor and Onshore Substation are covered under the separate TCPA application.

23. Notwithstanding the separate onshore and offshore applications, the site selection process for offshore elements influences and is influenced by the onshore elements. Where a landfall may be suitable or preferred for offshore cable routing, there may be onshore cable routing (or substation) constraints that make that landfall unsuitable or less suitable. Consequently, within this document we refer to various appendices which present the stages of site and route selection for the Project in its entirety so the various influences and factors between onshore and offshore components can be evidenced. Further in the document, where we discuss landfall or route preference we also provide an indication of what influence the onshore elements and route selection have on the offshore.

#### 4.2.2.2 The Site Selection Process

24. Site selection is an iterative process, which begins with the identification of the Windfarm Site itself and the location of the National Grid connection point. The outcome of the site selection process, through constraints mapping, assessment and continued consultation is the identification of the Offshore Export Cable Corridor, the landfall, the Onshore Cable Corridor, and the Onshore Substation which then culminate in the identification of the preferred option or options to be taken forward into the EIA process. To demonstrate that the site selection process is iterative and has been informed by investigative work and stakeholder consultation, flexibility is required in the initial stages. Consequently, aspects such as landfall zones and Offshore Export Cable Corridors can be refined during the subsequent stages of the EIA process as more detailed site-specific data becomes available.

*Plate 4.2 Site Selection Process for White Cross Offshore Windfarm*



25. At each stage of the site and route selection process, the identification of a series of site and route selection principles and engineering assumptions are developed (based on additional incoming data, studies, and consultation) in order to ensure objective decisions are made. These principles cover environmental, physical, technical, commercial and social considerations and opportunities. The principles at the completion of the site and route selection stage are presented in Table 4.2. Engineering assumptions identify the quantifiable extents used in the determination of the principles and route selection. The engineering assumptions used at each stage, as they developed, are presented in Table 4.3. Each step of the process then involves gathering data from a number of different sources including environmental, engineering, land and stakeholder data and using this information to define and assess the options for each element of project infrastructure. Internal project workshops were held at key stages of the site selection process to collate and review the data gathered to date, and to reach cross-discipline decisions to further refine the options. These comprised a multi-disciplinary team of engineers, and EIA / topic consultants whose expertise was drawn upon throughout the site selection process.

*Table 4.2 Siting and Routing Principles at Completion of Site and Route Selection*

| Principle | Measure at Short List Stage |
|---|---|
| Siting Principles - Landfall | |
| Avoid likely direct effects with sites designated for nature conservation at International, European, national and local level where possible | Avoid |
| Avoid likely direct significant effects with landscape and cultural heritage designations where possible | Avoid |
| Avoid areas with substantial infrastructure or urban land use e.g. areas of housing, other energy infrastructure | Avoid |
| Avoid nearshore cable crossings that would result in prominent intertidal structures | Avoid |
| Minimise the number of crossings of existing offshore cables and pipelines | Minimise |
| Maintain sufficient space for Offshore Export Cable installation (including anchor spread of installation vessels) whilst maintaining an appropriate safety buffer with existing sub-sea cables and pipelines | 50m space for installation |
| Ensure potential landfall trenchless (e.g. HDD or other) length is achievable | Anticipated maximum is 1,500m |
| Avoid areas where coastal cliffs experience high geomorphological activity (for cliff locations the rate of erosion is 10m per 100 years, therefore 5m over 50 years should be considered) or where there is slumping landward greater than 100m | Avoid |
| Ensure sufficient space inland to accommodate set back from the coast to reduce risk associated with coastal erosion | Sufficient space based on Shoreline Management Plan data |

| Principle | Measure at Short List Stage |
|---|---|
| Routing Principles - Offshore | |
| Routing options need to be able to connect to viable landfall locations | Connectivity |
| Routing options should be as short as possible | Minimise length |
| Avoid likely direct long-term significant effects to sites designated for nature conservation (Special Area of Conservation (SAC), Special Protection Area (SPA), and Ramsar) as far as possible | Avoid |
| Avoid likely direct significant effects to ecologically important Annex I sandbanks and Annex I reefs as far as possible | Avoid |
| Minimise number of crossings of existing offshore cables and pipelines. Where crossing is required, cables and pipelines to be crossed at 90° or as near as possible to that, though tolerance angles can be agreed with infrastructure owners as design progresses | Minimise |
| Maintain required separation distances with other offshore cables and pipelines | 50m |
| Maintain sufficient space for Offshore Export Cable installation (including anchor spread of installation vessels) whilst maintaining an appropriate safety buffer with existing sub-sea cables and pipelines | Sufficient space |
| Avoid wrecks as far as possible and completely avoid Protected Wrecks and a buffer zone of 250m at Long List stage and this was reduced to 100m at Short List stage | Minimise number present within corridor, with 100m buffer for Protected Wrecks |
| Avoid anchorage areas | Avoid |
| Avoid actively dredged maintenance dredge areas | Avoid |
| Avoid disposal areas (closed or current) | Avoid |
| Seabed take' in aggregate dredging areas to be minimised and avoided where possible | Avoid or minimise |

*Table 4.3 Engineering Assumptions used at each stage*

| Engineering Assumptions | Area of Search | Long List | Short List |
|---|---|---|---|
| Offshore Export Cable number | 2 | | |
| Offshore Export Cable Corridor width | Not included | 2,000m | 1,000m |
| Offshore Export Cable working width (cable laying) | Not included | 22m to 50m | |
| Onshore Export Cable number | Not included | 1 | 2 (twin) |
| Transition joint bay dimensions length | Not included | 20m | |
| Transition joint bay dimensions width | Not included | 10m | |
| Landfall HDD compound length | Not included | 200m | |
| Landfall HDD compound width | Not included | 200m | |
| Maximum HDD length | Not included | 1,500m | |

26. The site and route selection process follows a staged approach (see Plate 4.2) that considers additional information at each stage to further narrow down the options to those where the least consenting risk occurs (i.e. where fewer sensitive or valued receptors could be affected). Each stage identifies the physical, ecological and human receptors within the relevant areas and uses the principles set out at each stage to discount sites / areas where receptors of particular importance and/or sensitivity occur. At the Short List stage, the black, red, amber, green (BRAG) assessment is used to quantitatively, where possible, indicate the potential impacts of each site and route option. This assessment therefore drives the selection (and subsequent design and mitigation refinements) of the preferred option. Full details are provided in the Short List Report appended to this chapter and referred to later. It is noted that this process is in part influenced by cost, but only at the final option stage.

27. In summary, the initial drivers influencing the offshore and onshore route selection from the outset are:

- The Agreement for Lease which identifies the array location
- The National Grid connection point which identifies the likely area of the new substation (and hence the area within which the proposed project substation will be situated)
- The location and refinement of the project landfall.

28. Once these steps are completed the Onshore and Offshore Export Cable Corridors can be developed using the process described above.

## 4.3 Consultation

29. To inform the route selection process, focussed individual consultation has taken place with stakeholders with a clear statutory role or non-statutory interest in the topics to be considered. A series of meetings with stakeholders included the following steps:

- Outline the route selection principles
- Discuss the potential Offshore Export Cable Corridors
- Gain early feedback on unidentified constraints or opportunities.

30. Feedback on potential Offshore Export Cable Corridors has been received during meetings with a range of stakeholders. Specific route selections meetings were held with the following stakeholders to discuss potential Offshore Export Cable Corridors:

- Maritime and Coastguard Agency (MCA)
- Cornish Fish Producers Organisation
- North Devon Fisherman's Association
- Bideford Harbour Board

- Natural England (in addition a draft Short List report was submitted to Natural England which was commented on and subsequent amendments and additions made).

31. A review of consultation feedback and additional data was undertaken including:

- Statutory consultee feedback
- Landowner and community feedback
- Results from the onshore archaeological geophysical survey
- Ecological survey data.

32. This information has helped to refine the project design which is outlined in Chapter 5: Project Description.

## 4.4 Identification of the Grid Connection Point

33. The project examined several different potential grid connection options which were narrowed down to East Yelland and Alverdiscott based on proximity to the Windfarm Site. Following an examination of the two options, an application for a grid connection was submitted to the WPD, now National Grid, with a connection agreement secured in November 2021. The outcome of this application was a connection to the East Yelland as opposed to a connection to Alverdiscott further to the south. The reasons for selecting East Yelland over Alverdiscott are summarised below:

- Due to the size of the White Cross project (up to 100MW) it is on the boundary between the Distribution and Transmission networks. A Distribution connection offers the project the opportunity to undertake the connection works directly (via an Independent Connection Provider (ICP)) which can accelerate connection times as it is more in control of the programme
- The most obvious connection point to the Distribution network was at East Yelland which had high level advantages in terms of location adjacent to the shore and space at the connection site for expansion
- A connection to Alverdiscott, on the other hand, presented several issues including:
    - The length of the onshore cable route against the shorter length of connection to East Yelland (~14 km vs. ~8 km)
    - The Atlantic Array project encountered considerable objections when routing cables to Alverdiscott, therefore a similar route for White Cross was seen as undesirable
    - The potential for delays and disruption to the connection due to the having to deal with numerous landowners (as compared to a much smaller number for East Yelland)

- Significant environmental constraints (as identified by the Atlantic Array Environmental Statement, 2012) and a lack of available transformer capacity at the grid connection point (there are two existing transformers at Alverdiscott which are for the sole use of National Grid)
- The White Cross project would need to construct a new bay which had the potential to add substantial costs, cause delays to the project and to The Crown Estate (TCE) ambitions for the Celtic Sea. In comparison East Yelland had spare capacity readily available that would not need additional bays to be constructed

- East Yelland represented the quickest, most economical way to secure the grid capacity needed for the project. Securing the remaining spare capacity at East Yelland also ensured future requirements at Alverdiscott from projects of significantly larger capacity in future Celtic Sea leasing rounds would not be jeopardised by taking capacity at Alverdiscott and sterilising land required for cable routes.

## 4.5 Identification of the Windfarm Site

34. The Windfarm Site boundary was established through site selection associated with TCE Test and Demonstration opportunity. Environmental, technical and commercial constraints and factors were analysed including:

- Physical parameters (including water depths, wave height, ground conditions and wind resource)
- NG grid connection point
- Landscape designations
- Environmental designations
- Sensitive ecological habitats (ecological receptors)
- Other users (e.g. Ministry of Defence (MoD) activity, shipping and navigation, National Air Traffic (NATs) services, fishing activity, oil and gas infrastructure and key resource areas (marine aggregates and tidal energy))
- Cumulative impacts with other licensed activities.

35. Within the Windfarm Site the turbine structures (and moorings) and Offshore Substation will be located. Their siting will be influenced by recommendations presented in the detailed technical assessments within all of the topics in this EIA, as well as by geophysical and geotechnical studies.

#### 4.5.1.1 Identification of Wind Turbine Generators and Floating Substructures

36. The size and capacity of the WTGs that will be utilised on the project has yet to be selected and as such the Offshore Project Design Envelope is necessarily broad to accommodate the range of WTGs under consideration and innovations in currently available WTG technologies. Each WTG will follow conventional offshore design architecture with three blades and a horizontal rotor axis.

37. The WTGs will be supported by floating substructures, the specific concept for which has not yet been selected. With many substructure concepts currently available on the market, each at varying stages of development, the project has completed a selection process and feasibility studies to understand which substructure types and concepts will be most suitable for the project. Through this selection process the number of substructure types has been reduced to one, semi-submersibles.

38. Each type of semi-submersible substructure has varying shapes and dimensions as a result of their particular approach to meeting the unique engineering challenges associated with floating WTGs, WTG sizes, and project-specific requirements. The floating substructure design envelope has been formulated to cover the range of technologies under consideration and largest WTG scenario.

39. Conventional fixed substructures were deemed not suitable for the project due to the prohibilitively deep water depth (>60m). Floating substructure enable WTGs to be installed in deeper waters further from shore where wind resource is larger. Floating substructures offer additional benefits in that their construction is largely onshore yard based, with significantly less offshore construction activity required. This reducses the environmental impacts of the offshore construction campaign and the cost and scheduling uncertainties traditionally associated fixed offshore windfarm construction.

## 4.6 Identification of the Landfall Location

### 4.6.1 Area of Search

40. The key drivers for the identification of the landfall Area of Search (AoS) were the location of the grid connection point (as described in Section 4.4), the location of the project AfL area (as described in Section 4.3), the presence of significant ecological designations along the coast, and the presence of coastal settlements and other coastal development as shown in Figure 4.1 (and detailed in *Section 1.3.1* of Appendix 4A). The AoS extended from Hartland Point to Woolacombe, which is an area approximately 21km in width, to provide a wide 'field' of opportunity for a landfall to be identified from the Windfarm Site. The wind farm site lies approximately 53km west of Hartland Point and 76km west of Woolacombe. Lundy Island lies partway between Woolacombe and the offshore wind farm site, with the wind farm site approximately 44km west of Lundy Island.

240000

250000

140000

130000

N

North Zone

Mid Zone

South Zone

0 2 4 km


Legend:

- Landfall Zones
- Area of Search
- Potential Grid Connection Locations
- Closed Disposal Sites
- Marine Conservation Zones (MCZ)
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- Local Nature Reserves (LNR)
- Country Parks
- RSPB Reserve Boundary
- Important Bird Areas (IBA)
- Annex 1 Sandbanks
- Annex 1 Reef
- Anchorage area
- Pilot boarding place
- Anchorage area
- Military practice area
- Restricted area
- Submarine Cable
- Harbour facility
- Pipeline
- Harbour facility
- Navigation line
- Route, Ferry
- Route, Recommended
- Obstruction
- Wreck
- Obstruction
- Scheduled Monuments
- Conservation Areas
- Parks And Gardens

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: Landfall Area of Search

| Figure: | Drawing No: | | | | |
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| **Revision:** | **Date:** | **Drawn:** | **Checked:** | **Size:** | **Scale:** |
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Co-ordinate system: British National Grid



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### 4.6.2 Long List

41. Three potential landfall zones along the coastline were identified (shown on Figure 4.1) with the potential to accommodate the required infrastructure on the basis of the site and route selection principles and engineering assumptions presented in Table 4.2 and Table 4.3, and these zones were taken forward to the Long List stage include:

- North Zone Landfall- Putsborough to Woolacombe (length of frontage is 2.5km)
- Mid Zone Landfall– Instow to Saunton Down (length of frontage is 7.6km)
- South Zone Landfall - Peppercombe to Rock Nose (length of frontage is 6.3km).

42. On the basis of the data sets obtained (see *Section 2.1.4* in Appendix 4B) and the site and route selection principles and engineering assumptions listed in Table 4.2 and Table 4.3) all three landfall zones were taken forward for short listing and BRAG assessment. However, some reductions in the landfall zone extents were made to take account of additional data and considerations, and these were:

- South Zone Landfall - Peppercombe to Rock Nose - the zone was contracted to only consider the area north of Cockington Cliffs. The area south of Cockington Cliffs was unstable and subject to slips and thus technically unfeasible. The northernmost extent was also contracted to avoid the National Trust owned land at Kipling Tor.

43. Assessment of the three landfall zones was undertaken (using datasets listed in *Section 1.3* in Appendix 4C as well as information gained during stakeholder engagement) and concluded that the North Zone landfall was unsuitable (see *Section 8.2.1* in Appendix 4C) due to:

- There are significant transport and access issues resulting from long travel distances along width constrained B-road and minor roads and numerous sharp bends. There would potentially be significant impact on traffic and subsequent noise and air quality impacts as well
- Alternatively, a significant length of haul road would be required across areas with potential for sensitive archaeological receptors
- The northern portion of the landfall zone is steeply sloping and the compound (for HDD or other trenchless techniques) would require significant set-back and engineering complexity
- The southern area was constrained by a ribbon of residential properties running northward to the National Trust owned land
- The presence of the Exmouth Coast and Heaths Important Bird Area (IBA).

### 4.6.3 Short List

44. The BRAG assessment of the two remaining landfall zones indicated the following revision to the Mid Zone landfall to remove technical or environmental concerns raised at the conclusion of the Long List stage:

    - Mid Zone landfall – due to the realignment at Horsey Island the zone should be reduced to avoid the corridor running through this area (for engineering and construction feasibility reasons). Due to the Site of Special Scientific Interest (SSSI) designation within the Taw-Torridge Estuary and the potential restrictions to navigation a route through the estuary from coastal waters was discounted and removed from the landfall zone. [It is noted that this does not preclude a corridor crossing the Taw Estuary if trenchless techniques are used as this would prevent alteration to the bed of the estuary and related receptors]. There are viability constraints for trenchless techniques at the northern end of the landfall zone around Shelley Cove and along Saunton Down due to rock outcrops, therefore this area was removed from the landfall.

45. Given there are no significant aspects that discount either of the landfall zones, where it has been considered that potential impacts and risks can be prevented or minimised with appropriate refinement of design, standard construction methods, and embedded mitigation measures. These considerations are based on assumptions and experience of the project team and the various specialists involved. Table 4.4 presents the key receptors within the landfalls and how potential design, construction methods or embedded mitigation measures have been considered to prevent or minimise potential impacts at these landfalls.

46. Consequently, within the whole Project site and route selection process the onshore and offshore cable corridors have therefore been considered to determine whether one landfall zone was preferable. Considering onshore elements, the Mid Zone landfall is preferred due to engineering, environmental and social considerations. The one key issue at the Mid Zone landfall is the presence of the Braunton Burrows SAC and potential sensitivity to disturbance. However, development of the onshore route location, design, and potential construction techniques (such as the use of trenchless techniques) are believed to realistically prevent any direct long-term impacts to the SAC and its features. Such mitigation would be harder for the much longer South Zone landfall routes.

*Table 4.4 Summary of Landfall Considerations*

| Constraints | Mid Zone Landfall | South Zone Landfall |
|---|---|---|
| Special Areas of Conservation (SAC) | Effects to the Braunton Burrows SAC at the Taw Estuary crossing would be avoided using trenchless techniques. Most impacts to the Braunton Burrows SAC could be avoided (particularly to habitats which are sensitive to disturbance) using route design and trenchless techniques. However, some areas of habitat within the SAC (such as intertidal sandflats) would likely be disturbed though only temporarily during construction (e.g. transition connection) with reinstatement expected (and thus no effects during operation). These habitats are subject to constant disturbance (tidal and storm current influenced) therefore no significant effects on the SAC or its features would be expected to arise due to embedded or established mitigation measures. | The Tintagel-Marsland-Clovelly Coast SAC is present across the intertidal zone. It is expected that the SAC habitats should be avoided through trenchless techniques though some potential for disturbance could arise. However it is currently anticipated that no significant effects on the SAC or its features would be expected to arise due to route design and embedded or established mitigation measures. There is some degree of uncertainty due to the level of design at present. |
| Marine Conservation Zones (MCZ) | Bideford to Foreland Point MCZ within the non-estuarine intertidal component of the zone would likely be disturbed though only temporarily during construction (e.g. transition connection and offshore cable route) with reinstatement expected (and thus no effects during operation). These habitats are subject to constant disturbance (tidal and storm current influenced) therefore no significant effects would be expected to arise on the MCZ due to embedded or established mitigation measures. | Bideford to Foreland Point MCZ across the far northern extent of the zone but is avoided, though potential indirect effects could arise these are predicted to be short-term and temporary and potentially avoidable or could be minimised, therefore no significant effects would be expected to arise on the MCZ. |
| Sites of Special Scientific Interest (SSSI) | Effects to the Taw-Torridge Estuary SSSI would be avoided through development of the works area and use of trenchless techniques. Most impacts to the Braunton Burrows SSSI could be avoided (particularly to habitats which are sensitive to disturbance) using micro-siting and trenchless techniques. However, some areas of habitat within the SSSI (such as intertidal sandflats) would likely be disturbed though only temporarily during construction with reinstatement expected (and thus no effects during operation). These habitats are subject to constant disturbance (tidal and storm current influenced) therefore residual effects would not be expected to arise due to embedded or established mitigation measures. | The Pool to Rowden Gut SSSI is present across the intertidal zone. It is expected that the SSSI habitats should be avoided through trenchless techniques though some potential for disturbance could arise. However it is currently anticipated that these could be avoided through route design and embedded or established mitigation measures. There is some degree of uncertainty due to the level of design at present. |

| Constraints | Mid Zone Landfall | South Zone Landfall |
|---|---|---|
| Ancient Woodland | None within zone. | An area of ancient woodland is located within the zone, though this can likely be avoided through either micro-siting or trenchless techniques |
| County Wildlife Sites | Horsey Island County Wildlife Site would be avoided for various routing preference reasons, notably as it is a managed realignment site and would be unfeasible in engineering terms. | There are several County Wildlife Sites along the coastline within this zone, though these would likely be avoided through trenchless techniques and micro-siting. However some potential risk may occur which would only be identified at further design stage. |
| Important Bird Areas | Exmoor Coast and Heaths IBA along the intertidal at the north end of the zone would be avoided due to expected routing which would avoid coastal cliff areas as well as through use of trenchless techniques.<br>Taw-Torridge IBA within estuary would be avoided through use of trenchless techniques, and avoidance of works during wintering period near the high use areas. | None nearby. |
| UK Habitats of Principal Importance e.g. woodland / rivers / hedgerows / unimproved grassland / coastal habitats / etc. | Most habitats would be avoided (such as maritime cliff and slope, coastal sand dunes, deciduous woodland, saltmarsh, intertidal mudflats, and rocky reefs) through development of the works area and use of trenchless techniques. Some areas of habitat (such as intertidal sandflats, and coastal and floodplain grazing marsh) would likely be disturbed though only temporarily during construction with reinstatement expected (and thus no effects during operation), therefore residual effects would not be expected to arise due to embedded or established mitigation measures. | Maritime cliff and slope and deciduous woodland are present across large areas of the zone. Rocky reefs parallel to much of the zone though not in certain stretches. It is expected that habitats may be avoided through micro-siting and trenchless techniques though some potential for disturbance could arise. |
| Flood zones crossed | A very small width of Flood Zone 2 and 3 would be crossed in the intertidal zone at Saunton Sands, but extensive areas are present on land within the zone in the estuary. However, the use of trenchless techniques would avoid the estuary flood zone, whilst works within the flood zone at Saunton Sands would be short-term and temporary and construction methods would be | Very small width of Flood Zone 2 and 3 crossed in the intertidal zone, however this would be avoided using trenchless techniques. |

| Constraints | Mid Zone Landfall | South Zone Landfall |
|---|---|---|
| | developed for work in the area both being resilient to and avoid effects on the flood zone capacity. | |
| Proximity to EA designated main rivers | Within the landfall zone (Taw Estuary) – however trenchless techniques would avoid any disturbance in or within the main river | None within or adjacent to zone. |
| Historic Landfill | An area of historic landfill is present to the north-east of the substation within the zone, however this lies some distance from developed corridors and would not fall within any area of disturbance. | None within zone. |
| Distance from nearest scheduled monument (m) | One Scheduled Monument within zone is expected to be avoided by some distance due to its location outside any realistic cable routing. | No SM in zone. |
| Known designated heritage assets | One listed building within zone, however this is expected to be avoided by route design and/or micro-siting to avoid it. | No listed building within zone (though adjacent to boundary. |
| Known and unknown non-designated heritage assets | Concentration of archaeological sites and findspots at Croyde and Baggy Point, would be avoided due to expected routing which would avoid coastal cliff areas as well as through use of trenchless techniques. Modern HER records (mostly WW2) along Braunton Burrows associated with the US Army Assault training centre, could be disturbed though further survey and route design and micro-siting (along with trenchless techniques) would have a high likelihood of avoiding significant disturbance to known and unknown features. Trenchless techniques would be expected to avoid potentially significant paleoenvironmental remains and post-medieval records structures and fishing apparatus, whilst further survey and route design and micro-siting would have a high likelihood of avoiding significant disturbance to known and unknown features. | Concentration of archaeological sites (both prehistoric and medieval) occur along the cliffs and would generally be expected to be avoided through trenchless techniques. Immediately inland has high archaeological potential, and whilst further survey and route design and micro-siting (along with trenchless techniques) would have a moderate likelihood of avoiding significant disturbance to known and unknown features there is a degree of uncertainty. |
| UK Hydrographic Office (UKHO) records | 12 UKHO wreck and obstruction records are expected to be avoidable through route design and micro-siting along with appropriate buffer distances. | 1 UKHO wreck and obstruction records are expected to be avoidable through route design and micro-siting along with appropriate buffer distances |

| Constraints | Mid Zone Landfall | South Zone Landfall |
|---|---|---|
| HER wreck records | 1 HER wreck record is expected to be avoidable through route design and micro-siting along with appropriate buffer distances | None present |
| Distance to properties | There are several properties along Croyde Road within the north end of the zone, and at the south, the nearest residential are Appledore (130m), Instow (120m), and West Yelland (310m). However, all properties would be avoided through route design and/or micro-siting. | A small number of residential properties at the northern end within the boundary and a scattering of residential along the zone on the border or immediately outside. However, all properties would be avoided through route design and/or micro-siting. |
| Access Appraisal | Some routes will be tight and not wide enough for HGVs and passing traffic so would require traffic management and possibly widening, better access south of the Taw Estuary, though north of the Taw Estuary the intention could be to open a haul road close off the B3231 and access the northern bank of the Estuary Taw by the haul road and minimise use of locally narrow roads. However any effects would be short-term and temporary. | Actual routes to landfall area are variable within limited road / access provision which could require significant haul road. However any effects would be short-term and temporary. |
| County Geological Sites | None present | A County Geological Site lies across the southern frontage of the Zone though this would be avoided through use of trenchless techniques. However, uncertainty remains regarding the depth of the feature and whether this will be impacted |
| National Trust Land | None within | A small area within which could be avoided through route design and micro-siting |
| National Coastal Path | The Coastal Path runs through the Saunton Sands Car Park access road, though this is expected to be managed through construction design and methods and embedded and/or additional mitigation measures | Coastal path runs parallel within the zone; however, trenchless techniques would be used and thus avoid any obstruction |
| Number of Public Right of Way (ProW) crossings | There are 7 PRoWS within the zone including the Tarka Trail though these are expected to be managed through micro-siting, construction design and methods and embedded and/or additional mitigation measures. | Three footpaths are present within the zone though these are expected to be managed through micro-siting, construction design and methods and embedded and/or additional mitigation measures. |
| National Cycle Network Routes | Route runs parallel within the zone along the south of the Taw Estuarythough this is expected to be managed through micro- | Not within or adjacent to the zone. |

| Constraints | Mid Zone Landfall | South Zone Landfall |
|---|---|---|
| | siting, construction design and methods and embedded and/or additional mitigation measures. | |
| Royal Yachting Association (RYA) General Boating Area | Boating within the Taw and Torridge Estuaries is expected to be avoided using trenchless techniques. | None nearby. |
| Planning Applications | Area of the zone at Yelland Quay is identified as inert waste recycling policy area. The Yelland Quay mixed development application is now approved, and this covers the area to the east of existing Yelland substation. However, route design would be expected to avoid these locations. | None identified within the zone. |
| Pipelines, Cables, Outfalls | At least 2 cables landfall at the northern end of the zone would be avoided through route design and micro-siting. | An outfall linked to the Cornborough Sewage Treatment Works is located within the zone would be avoided through route design and micro-siting. |
| Wrecks and obstructions | Five wrecks or obstructions within zone are expected to be avoidable through route design and micro-siting along with appropriate buffer distances. | One wreck or obstruction within zone is expected to be avoidable through route design and micro-siting along with appropriate buffer distances. |
| Industrial areas | A small area designated harbour facility is located on the south side of the Taw Estuarybut this would be avoided due to the use of trenchless techniques. | None within zone |
| Military practice areas | Large areas of the estuary and southern half of Saunton Sands are covered by Military Practice areas. However, refinement of the route design, construction methods, and embedded or additional mitigation measures would be expected to prevent significant obstruction. | None within zone. |

47. The South Zone landfall routes that were considered (see Section 8.4 in Appendix 4C) within the whole Project site and route selection process are significantly longer than the Mid Zone routes, which not only results in additional engineering risks, but also increasing numbers of constraints regarding steep topography, a larger number of complex obstacle crossings (A roads, rivers, and landfall), and other width constraints to these corridors (at the northern end specifically an area of residential buildings significantly reducing available width). The South Zone corridors also have a larger number of simple obstacle crossings (such as minor roads, tracks, ditches / watercourses, tree lines / hedgerows) compared to the Mid Zone landfall routes, which again multiply the engineering risks. It is also noted that there will be significant access difficulties for some of the South Zone onshore corridors. Furthermore, the landfall would also likely require haul roads and highway widening of a scale significantly greater than the Mid Zone corridors which may only need short sections of haul road. In addition, the South Zone landfall corridors are significantly longer and therefore have a greater scale of potential to result in impacts to archaeological receptors both known and unidentified. There are also far more listed buildings, in particular, one width constrained location.

## 4.7 Identification of the Corridor for the Offshore Export Cable

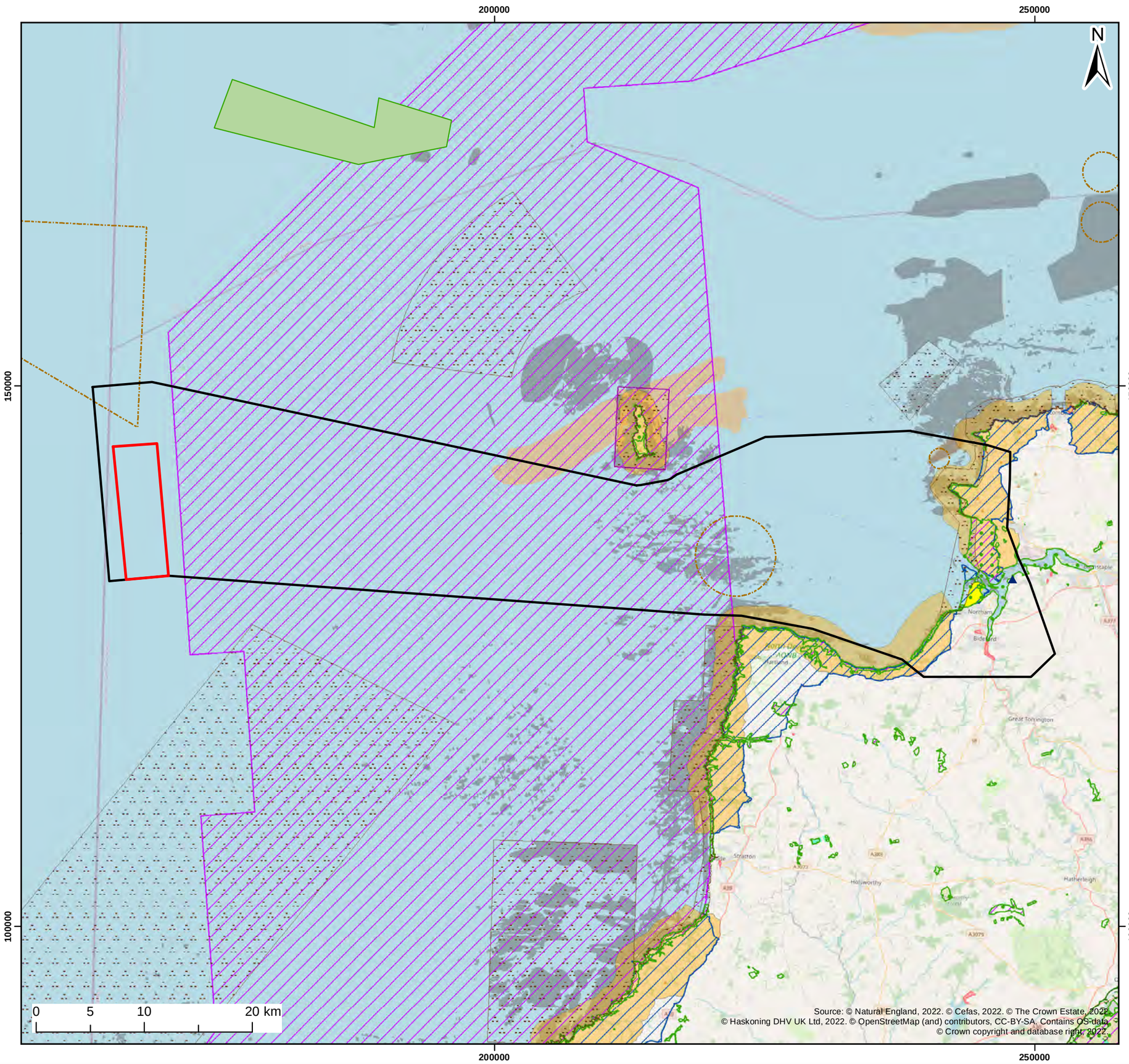
### 4.7.1 Area of Search

48. In parallel with the identification of the landfall, the Offshore Export Cable Corridor was therefore widened to incorporate the coastal zone considered in the landfall AoS, see Figure 4.2 (see *Section 1.4.1* of Appendix 4A). Constraints were also identified, and constraints mapping undertaken as shown in Figure 4.2 (see detail in *Section 1.4.1* of Appendix 4A). As discussed in Section 4.3, specific route selection meetings were held. Key outcomes of the meetings included the suggestion of additional onshore cable corridors:

- MZ-21 (North Bank of the Taw Estuary) is shown in *Figure 4.21* in Appendix 4C
- SZ-22 (Northam Burrows) is shown in *Figure 4.22* in Appendix 4C.

49. Outcomes of the meetings included the suggestion of additional Offshore Export Cable Corridors:

- Corridor 7 – from the North Zone landfall connecting to the central core route to the OWF site
- Corridor 8 – from the Mid Zone landfall connecting to the central core route to the OWF site.




Legend:

- Project Boundaries
- Area of Search
- Potential Grid Connection Locations
- Offshore Wave Site Pre-planning Application
- Closed Disposal Sites
- Marine Conservation Zones (MCZ)
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- National Parks
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- National Nature Reserves (NNR)
- Local Nature Reserves (LNR)
- Country Parks
- Annex 1 Sandbanks
- Annex 1 Reef

| Client: | Project: |
|---|---|
| Offshore Wind Ltd. | White Cross Offshore Windfarm |

Title: Export Cable Corridor Area of Search

Figure: 4.2 | Drawing No: PC2978-RHD-ZZ-XX-DR-Z-0455

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Co-ordinate system: British National Grid

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### 4.7.2 Long List

50. Following the identification of the AoS, the long list of Offshore Export Cable Corridors was developed linking the array to the short list of landfall locations (see Section 4.5.2), considering a range of routing principles (and receptors / constraints) shown in Table 4.2, and detailed in *Section 3.1.3* of Appendix 4B, including:

- Viable landfalls
- Minimising length
- Avoiding direct long-term significant impacts to sites designated for nature conservation
- Avoiding potential Annex 1 habitats
- Avoiding infrastructure (and maintaining appropriate separation distances of a minimum of 50m) such as cables, and oil and gas platforms and pipelines, or minimising crossings where necessary
- Maintain sufficient space for Offshore Export Cable installation (including anchor spread of installation vessels) whilst maintaining an appropriate safety buffer with existing sub-sea cables and pipelines
- Avoiding known wrecks
- Avoiding anchorage areas
- Avoiding actively dredged maintenance dredge areas
- Avoiding disposal areas (closed or current)
- Minimising 'seabed take' in aggregate dredging areas or avoid where possible.

51. The Offshore Export Cable Corridors are split into 2 core offshore routes and 3 nearshore routes (for each landfall) resulting in 5 potential corridors, see Figure 4.3 (detail shown in *Figure 3.1* to *Figure 3.5* in Appendix 4B). All the routes cross the Bristol Channel Approaches SAC, the North Devon Biosphere Reserve, and areas of potential Annex I reef and Annex I sandbank habitat due to the extent of these crossing the entire offshore frontage. The corridors comprise a number of infrastructure and receptors in addition and are described below:

- Corridor 1 – from the South Zone landfall connecting to the northern core route to the OWF site - contains 5 wrecks and 9 obstructions, and overlaps with four telecommunications cables
- Corridor 2 - from the Mid Zone landfall connecting to the northern core route to the OWF site - crosses the Bideford to Foreland Point MCZ. The corridor also contains 6 wrecks and 12 obstructions, and overlaps with a recommended navigation route into and out of Appledore, the Braunton Burrows Military Training Area, and 4 telecommunications cables
- Corridor 3 - from the Mid Zone landfall connecting to the northern core route to the OWF site - crosses the Bideford to Foreland Point MCZ. The corridor

also contains 3 wrecks and 5 obstructions, and overlaps with a recommended navigation route into and out of Appledore, the Braunton Burrows Military Training Area, the RYA identified boating area, four telecommunications cables, and part of a disused disposal ground

- Corridor 4 - from the South Zone landfall connecting to the southern core route to the OWF site - contains two wrecks and two obstructions, and overlaps with four telecommunications cable and part of a disused disposal ground
- Corridor 5 - from the North Zone landfall connecting to the northern core route to the OWF site - contains eight wrecks and nine obstructions, and overlaps with one telecommunications cable
- Corridor 6 – there was no proposed corridor from the North Zone landfall connecting to the southern core route to the OWF site due to the significant diversion and additional distance this would require.

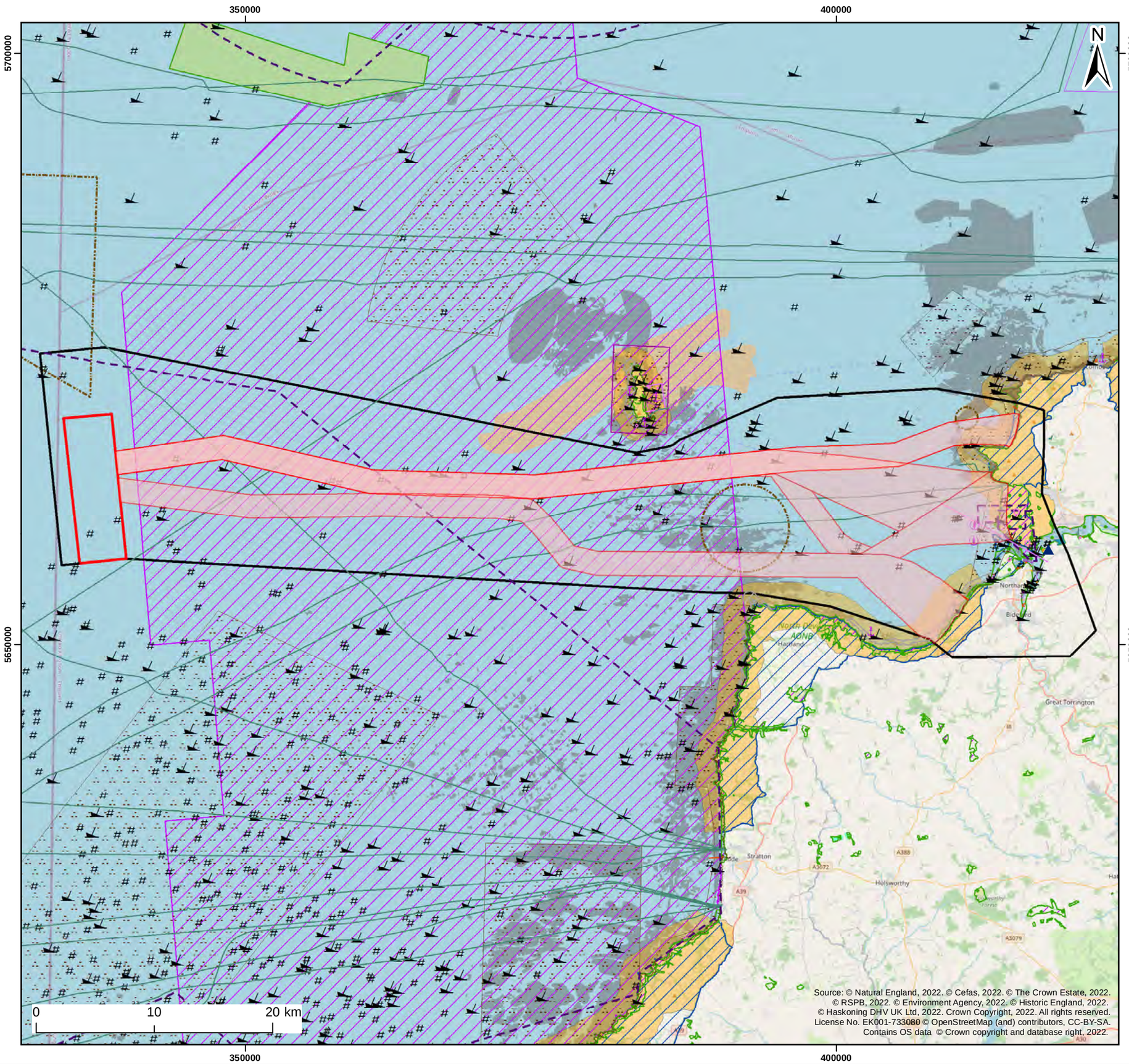
### 4.7.3 Short List

52. Subsequent to the long list of routes to be considered, additional datasets were obtained, and the route corridors were reduced to 1km (from 2km at Long List stage), shown in Figure 4.4. This process was also influenced by consultation with fishing organisations, the Maritime and Coastguard Agency (MCA), and Natural England. An outcome of the consultation meetings included the need to consider additional Offshore Export Cable Corridors notably:

- Corridor 7 – from the North Zone landfall connecting to the central core route to the OWF site
- Corridor 8 – from the Mid Zone landfall connecting to the central core route to the OWF site.

53. As the North Zone landfall was discounted and a Central Offshore Export Cable Corridor included that left the following corridors to be assessed:

- Mid Zone 2 (MZ-2) (Northern) shown in Figure 4.4 and *Figure 3.2* in Appendix 4C
- Mid Zone 3 (MZ-3) (Southern) shown in Figure 4.4 and *Figure 3.3* in Appendix 4C
- Mid Zone 6 (MZ-6) (Central) shown in Figure 4.4 and *Figure 3.7* in Appendix 4C
- South Zone 1 (SZ-1) (Northern) shown in Figure 4.4 and *Figure 3.1* in Appendix 4C
- South Zone 4 (SZ-4) (Southern) shown in Figure 4.4 and *Figure 3.4* in Appendix 4C.




Legend:

- Project Boundary
- Offshore Cable Corridors
- Area of Search
- Potential Grid Connection Locations
- Offshore Wave Site Pre-planning Application
- Closed Disposal Sites
- Marine Conservation Zones (MCZ)
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- National Nature Reserves (NNR)
- Important Bird Areas (IBA)
- RSPB Reserve Boundary
- Annex 1 Sandbanks
- Annex 1 Reef
- Anchorage area
- Pilot boarding place
- Anchorage area
- Military practice area
- Restricted area
- Harbour area (administrative)
- Submarine Cable
- Harbour facility
- Pipeline
- Harbour facility
- Navigation line
- Route, Ferry
- Route, Recommended
- Obstruction
- Wreck
- Obstruction

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: Export Cable Corridor Long List

| Figure: | Drawing No: |
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Co-ordinate system: WGS 1984 UTM Zone 30N

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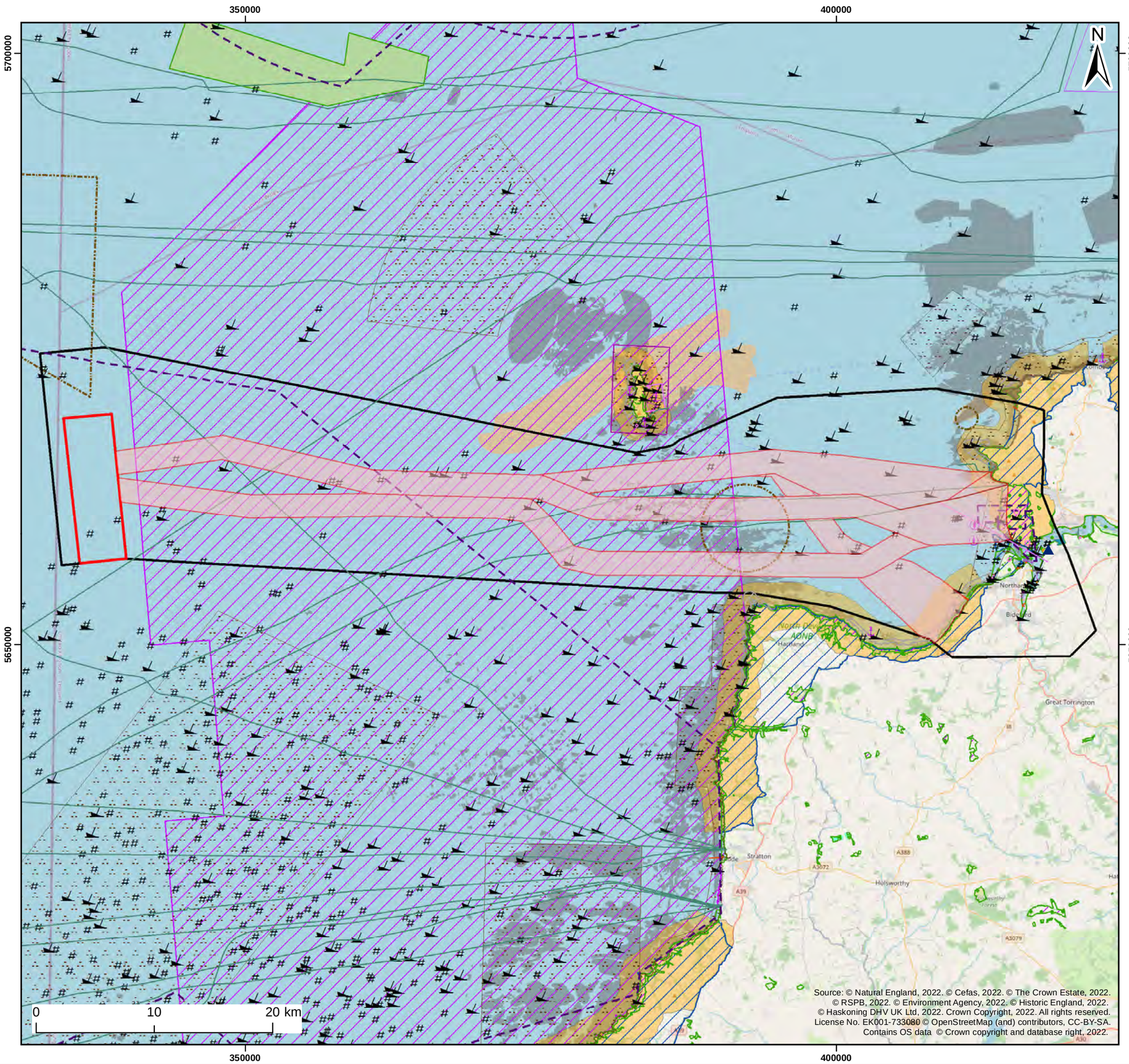


Legend:

- Project Boundary
- Offshore Cable Corridors
- Area of Search
- Potential Grid Connection Locations
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- Closed Disposal Sites
- Marine Conservation Zones (MCZ)
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- National Nature Reserves (NNR)
- Important Bird Areas (IBA)
- RSPB Reserve Boundary
- Annex 1 Sandbanks
- Annex 1 Reef
- Anchorage area
- Pilot boarding place
- Anchorage area
- Military practice area
- Restricted area
- Harbour area (administrative)
- Submarine Cable
- Harbour facility
- Pipeline
- Harbour facility
- Navigation line
- Route, Ferry
- Route, Recommended
- Obstruction
- Wreck
- Obstruction

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: Export Cable Corridor Short List

Figure: 4.4 | Drawing No: PC2978-RHD-ZZ-XX-DR-Z-0457

| Revision: | Date: | Drawn: | Checked: | Size: | Scale: |
|---|---|---|---|---|---|
| P01 | 15/12/2022 | AB | CB | A3 | 1:320,000 |
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Co-ordinate system: WGS 1984 UTM Zone 30N

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54. On the balance and basis of the BRAG assessment carried out, and summarised key elements for the Mid Zone and South Zone landfalls in *Table 6.2* in Appendix 4C, the preferred corridor is the northern route for the Mid Zone landfall and the northern route for the South Zone landfall.

55. Of the many potential receptor-impacts identified in the assessment, many were small in scale and avoidable through micro-siting or buffering which can be determined following more detailed surveys, or through changing the alignment of the cable route within the corridor to optimise outcomes (such as on cable crossings). However, the following are considered to be potentially high-risk elements which thus rule out the Central and Southern Offshore Export Cable Corridors:

- The Central Corridor added in following consultation contains extensive areas of potential Annex 1 reef habitat, which significantly raises the potential for constraints related to impacts on protected habitats and cable burial (which is preferred). The extent of Annex I reef habitat along the corridor is concentrated and extensive compared to the other corridors
- The Central Corridor runs an extensive distance through a disused former licensed disposal area, and the South Corridor runs partway through a disused former licensed disposal area. Information on both sites is unknown but there are likely to be elevated risks for any route running through these sites
- The Southern Corridor (close to Hartland Point) runs across an area where there is extensive reef and where there is high physical (tidal and current) activity with anecdotal information indicating that sediment coverage is likely to be limited and highly mobile.

56. On the basis of the above, the Northern Offshore Corridor is identified as the preferred offshore route from the final selected / preferred landfall. Table 4.5 presents the key differences between the offshore corridors for the Mid Zone and South Zone landfalls. None of these differences give any weighting to the decision making for the preferred landfall zone. Furthermore, it is explicitly noted that these are some of the quantitative 'criteria', not other qualitative or semi-quantitative criteria, as are discussed in paragraph 50 above. However, various receptors within the Northern Corridors have been considered throughout the design and EIA process (supported by survey work) to avoid potential significant impacts (either through clear mitigation measures or identified suitability for micro-siting for example). These include:

- Ensuring no long-term impact on the Bristol Channel Approaches SAC
- Ensuring no long-term impact on the Braunton Burrows SAC
- Ensuring no long-term impact on the Bideford to Foreland Point MCZ
- Avoiding potential Annex 1 reef habitat

- Avoiding wrecks and obstructions
- Avoiding features of archaeological potential
- Avoiding the Braunton Burrows Military Training Area (unless agreement reached with the MoD)
- Maximises distance and depth over which crossing of the Appledore Recommended Route occurs
- Maximise distance from the Pilot Boarding Station
- Avoid cable crossings where depth is <20m.

*Table 4.5 Summary of Offshore Northern Cable Route Differences from Mid Zone and South Zone Landfalls*

| Criteria | Mid Zone Landfall MZ-2 (Northern) | Southern Zone Landfall SZ-1 (Northern) |
|---|---|---|
| Approximate Length of Cable Route (km) | 76.3km | 77km |
| Proximity to marine MCZ (m) | Overlaps with, but predicted to be temporary impact | 840m |
| Total length of corridor overlap with Annex 1 Reef (km) | 6.7km - though scattered which could enable avoidance through micro-siting | 6.7km - though scattered which could enable avoidance through micro-siting |
| Total length of corridor overlap with Annex 1 Sandbanks (km) | 69.6km | 70.3km |
| Distance to Protected Wrecks | 6.1km | 6.1km |
| Number of wrecks and obstructions within cable corridor | 6 wrecks<br>12 obstructions<br>Though avoidable through micro-siting | 5 wrecks<br>9 obstructions<br>Though avoidable through micro-siting |
| Devon HER wreck records within cable corridor | 5 wreck records - though avoidable through micro-siting | 3 wreck records - though avoidable through micro-siting |
| West Coast Palaeolandscapes Project | 3 palaeochannels and a floodplain recorded in this zone | 3 palaeochannels and a floodplain recorded in this zone |
| Extent within Braunton Burrows Military Training Area ($km^2$) | 2.69$km^2$ - though avoided through revisions and amendments to final route | None |
| Appledore Recommended Route | Overlaps 4.6km offshore from corridor commencement – though refined corridor is 6km offshore and due to deep water and burial of cable no issues would arise | Does not overlap |
| RYA General Boating Area | Unlikely to overlap | Unlikely to overlap |
| Overlap with disposal sites | None within or nearby | None within or nearby |

## 4.8 The Windfarm Design and Technical Alternatives

57. The design envelope for the offshore development is described in Chapter 5: Project Description. Given the stage of the project design the envelope is necessarily broad to allow for all eventualities regarding offshore technology selection. Engineering work and discussions with technology providers have been progressing concurrently to the EIA and the design envelope has been refined where possible since the Scoping Opinion (MMO Case Reference: EIA/2022/00002). This section describes where refinement has been possible and the technical alternatives that are still under consideration.

### 4.8.1 WTGs

58. Offshore WTGs are now considered a mature technology that has been developed over several decades, however they are continuing to develop in their size and power generation capacity. The number of WTGs utilised by the project will be determined by their individual capacities. There are currently a range of WTGs with differing sizes and generation capacities under consideration for the project, the parameters for which are all captured in the design envelope and the worst-case impacts on the relevant receptor(s). The selection of WTG will be made based upon technical and economical assessments at the time of procurement.

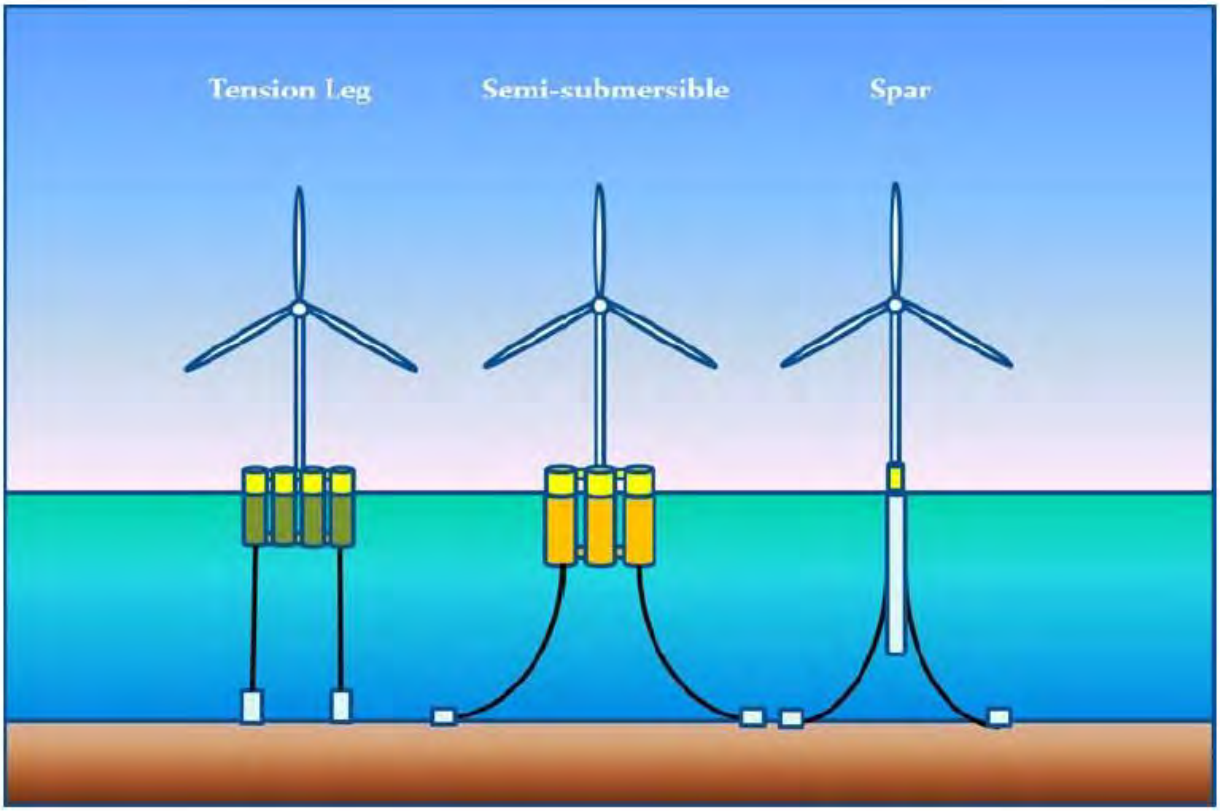
### 4.8.2 Floating Substructure

59. The floating substructure acts as a stable and buoyant foundation for the WTG. Plate 4.3 presents the three types of substructure that were considered in the scoping report; tension-leg platform, semi-submersible, and spar. Each of these substructure types can be constructed from steel, concrete or a hybrid of the two. Throughout the concept design stage of the project each of the substructure types' suitability for the Windfarm Site has been evaluated and a refinement to the types considered in the design envelope has been made. Fixed foundations have not been considered during the design as the water depth at site is seen as prohibitive for such foundation types.

60. Tension-leg platforms have been removed from consideration due to not having reached the appropriate level of readiness for implementation (technical readiness level) at project scale. This is based on a standardised technology metric for determining how 'ready' a technology is for being deployed.

61. Spar substructures have been removed from consideration due to the relatively shallow depths of the Windfarm Site (for floating wind projects) making these types of substructure incompatible with the Windfarm Site.

*Plate 4.3 Substructure types*




62. The semi-submersible is now the only substructure type considered within the design envelope. Discussions with semi-submersible technology provides are continuing and the final selection of concept will be based upon elements such as cost, sustainability and performance at the Windfarm Site. Consequently, the worst-case parameters have been detailed in Chapter 5: Project Description.

### 4.8.3 Mooring System

63. The mooring system keeps the floating substructure in position during operation and extreme storm events through a fixed connection to the seabed and is comprised of the mooring lines, seabed anchors, ancillary items and connectors. There are several options available for each of these components as discussed below. No refinement to the types under consideration has been made yet. Consequently, the worst-case parameters have been detailed in Chapter 5: Project Description.

64. The mooring line configuration will be selected in conjunction with the semi-submersible concept and seabed anchor type. There will be a maximum of 6 mooring lines per floating substructure with chain, nylon, polyester, and other synthetic materials under consideration.

65. The seabed anchor selection will be based upon the geophysical and geotechnical conditions at the Windfarm Site. The options which are currently under consideration are drag embedment anchors or suction, drilled or driven piles.

66. Drag-embedment anchors derive their function from being buried, or embedded, deep within the seabed. Their anchoring capacity is directly related to embedment depth and mass (which increases friction). They can be manufactured from steel.

67. Driven piles are small diameter steel pipes that are driven to an appropriate depth within the seabed to provide the anchoring function necessary. They may require scour protection.

68. Drilled piles are small in diameter and are inserted into the seabed following a hole being drilled by a drill rig. They are then grouted in place.

69. Suction anchors are an open steel tube which is pulled into the seabed using suction. They may require scour protection.

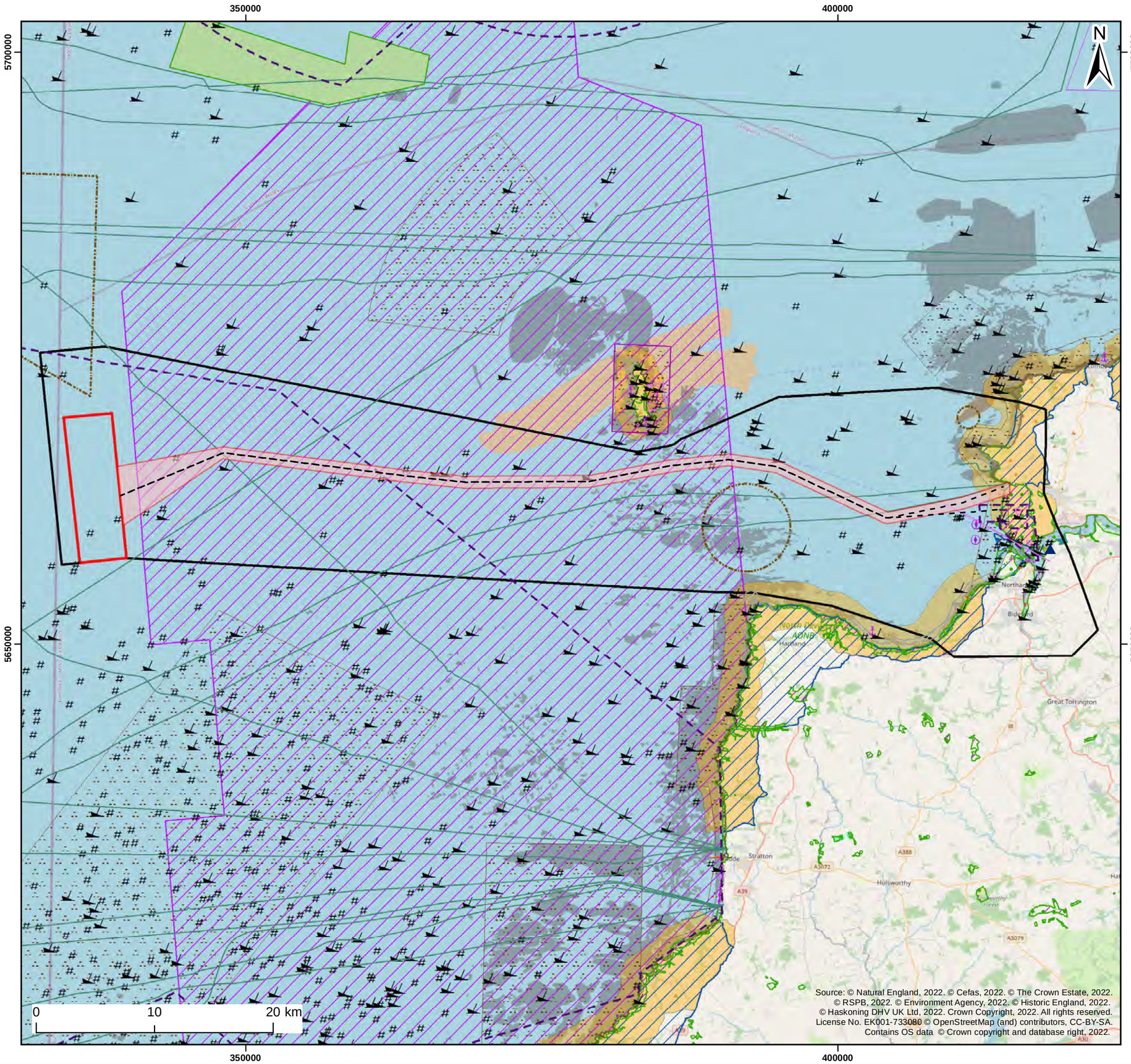
## 4.9 Summary

70. In summary, OWL have considered options and alternatives in an objective way which has led to the refinement of the project description provided in Chapter 5: Project Description. The options and the process of refining the original project design from the broad search areas for the Offshore Export Cable Corridor and Landfall have been informed by consultations alongside environmental considerations and engineering requirements. Table 4.6 gives an overview of the site selection decisions that have been discussed within this chapter.

71. This site selection and assessment of alternatives chapter explains this process and presents the proposed routing assessed within the ES and presented in the Section 36 consent application and Marine Licence applications. The parameters for the proposed route are included in Chapter 5: Project Description, with the proposed landfall and Export Cable Corridor shown in Figure 4.5.

*Table 4.6 Summary of site selection decisions*

| Component | Options considered | Decision | Reasoning |
|---|---|---|---|
| Offshore Export Cable Corridor | North Zone routes | Discounted | Discounted due to discount of North Zone landfall |
| | MZ-2 (Northern) | Preferred | Avoids significant use of cable protection, minimises long-term habitat disturbance, and minimises potential constraints to navigation and fishing |
| | MZ-3 (Southern) | Discounted | Routes across an area where there is extensive reef and where there is high physical (tidal and current) activity requiring extensive cable protection |
| | MZ-6 (Central) | Discounted | Presence of very large swathes of rocky habitat (requiring extensive cable protection) and also potential Annex 1 reef habitat. Also runs through offshore disposal area |
| | SZ-1 (Northern) | Preferred | Avoids significant use of cable protection, minimises long-term habitat disturbance, and minimises potential constraints to navigation and fishing |
| | SZ-4 (Southern) | Discounted | Routes across an area where there is extensive reef and where there is high physical (tidal and current) activity requiring extensive cable protection |
| | SZ-7 (Central) | Discounted | Presence of very large swathes of rocky habitat (requiring extensive cable protection) and also potential Annex 1 reef habitat. Also runs through offshore disposal area |
| Landfall | North Zone | Discounted | None – significant access and other technical feasibility issues |
| | Mid Zone | Preferred | Whilst routing through the Braunton Burrows SAC it is considered that this can be undertaken with no direct long-term impacts. In addition, significant less potential engineering risks, disruption to residences, access works, non-designated nature conservation, and potential archaeological impacts compared to South Zone |
| | South Zone | Not preferred | Does entail crossing SAC but no direct disturbance |





Legend:

- Project Boundary
- Area of Search
- Offshore Cable Corridor
- Indicative Centre Line
- Potential Grid Connection Locations
- Offshore Wave Site Pre-planning Application
- Closed Disposal Sites
- Marine Conservation Zones (MCZ)
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- National Nature Reserves (NNR)
- Important Bird Areas (IBA)
- RSPB Reserve Boundary
- Annex 1 Sandbanks
- Annex 1 Reef
- Anchorage area
- Pilot boarding place
- Anchorage area
- Military practice area
- Restricted area
- Harbour area (administrative)
- Submarine Cable
- Pipeline
- Harbour facility
- Harbour facility
- Navigation line
- Route, Ferry
- Route, Recommended
- Obstruction
- Wreck
- Obstruction

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: Proposed Export Cable Corridor and Landfall

| Figure: | Drawing No: |
|---|---|
| 4.5 | PC2978-RHD-ZZ-XX-DR-Z-0458 |

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Co-ordinate system: WGS 1984 UTM Zone 30N

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# White Cross Offshore Wind Farm Area of Search Report

| | | |
|---|---|---|
| Document Code: | *PC2978-RHD-ZZ-XX-RP-Z-0013* | |
| Version Number: | 5.0 | |
| Date: | 08/03/2023 | |
| Prepared by: | *CB* | |
| Checked by: | *PT* | |
| Approved by: | *EF* | |

## Document History

| Version Number | Reason for Issue / Major Changes |
|---|---|
| v1.0 | Draft for review |
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| v3.0 | Revised Final |
| v4.0 | Final |
| v5.0 | Final for Submission |

# Table of Contents



# Table of Figures

## Glossary of Acronyms

| Term | Definition |
|---|---|
| AfL | Agreement for Lease |
| AONB | Area of Outstanding Natural Beauty |
| AoS | Area of Search |
| cSAC | Candidate Special Area of Conservation |
| ha | Hectare |
| km | Kilometre |
| LNR | Local Nature Reserve |
| m | Metre |
| MCZ | Marine Conservation Zone |
| NNR | National Nature Reserve |
| pSAC | Possible Special Area of Conservation |
| pSPA | Potential Special Protection Area |
| SAC | Special Area of Conservation |
| SPA | Special Protection Area |
| SSSI | Site of Special Scientific Interest |
| TJB | Transition Joint Bay |
| WPD | Western Power Distribution |

# 1. Introduction

## 1.1 Project Background

1. This report sets out the initial development of the Area of Search (AoS) to support site selection activities for the following elements of the White Cross Offshore Windfarm (the Project):

   - Landfall
   - Offshore export cable route
   - Offshore substation location
   - Onshore cable route
   - Onshore substation location.

2. The development of the AoS has been informed by relevant guidance, an understanding of the maximum design parameters for the various proposed infrastructure elements, and an understanding of the existing constraints. The AoS covers both offshore and onshore infrastructure as both influence or are influenced by the connections between them.

3. The site selection process, and the methodology that drives it, will adhere to the following key pieces of legislation, policy, and best practice guidance:

   - The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017
   - Overarching National Policy Statement for Energy (EN-1)
   - National Policy Statement for Renewable Infrastructure (EN-3)
   - National Policy Statement for Electricity Networks Infrastructure (EN-5)
   - Marine Policy Statement
   - Crown Estate's Cable Route Protocol
   - Electricity Act 1989
   - National Grid's Guidelines on Substation Siting and Design ('The Horlock Rules')
   - Offshore Transmission Network Review led by the Department for Business, Energy & Industrial Strategy.

4. To inform the site selection work, a range of design assumptions have been developed, which include:

   - Offshore export cable route width – Minimum 22m, maximum 50m
   - Landfall transition joint bay (TJB) permanent land take – 20 x 10m (indicative dimensions)
   - Onshore export cable route width – up to 50m, 60m width at trenchless crossings
   - Onshore operational substation footprint – 1ha.

5. An overall AoS has been identified with a description of the data sets considered. The AoS is discussed in terms of onshore and offshore elements is discussed and a summary of the constraints is included.

6. The project elements considered within the AoS are the location of the Landfall, Offshore Cable Corridor, Offshore Substation, Onshore Cable Corridor and Onshore Substation.

## 1.2 Project Area of Search

### 1.2.1 Datasets Used

7. The following data sets were used for the identification of the Project Area of Search:

- Closed Disposal Sites
- Marine Conservation Zones (MCZ)
- National Parks
- Ramsar
- Special Protection Area (SPA)
- Potential Special Protection Area (pSPA)
- Sites of Special Scientific Interest (SSSI)
- Special Areas of Conservation (SAC)
- Possible Special Area of Conservation (pSAC)
- Candidate Special Area of Conservation (cSAC)
- Areas of Outstanding Natural Beauty (AONB)
- National Nature Reserves (NNR)
- Local Nature Reserves (LNR)
- Country Parks
- Heritage Coast.

### 1.2.2 Identification of the Project Area of Search

8. An overview of the AoS is shown in Figure 1.1.

## 1.3 Onshore Area of Search

### 1.3.1 Identification of the Onshore Area of Search

9. The Onshore AoS relates to the location of the Landfall, Onshore Cable Corridor and Onshore Substation.

10. The key drivers for the identification of the Onshore AoS are the location of the Onshore Substation, the location of the Project Agreement for Lease (AfL) area, the positioning of the key ecological designations along the coast and the presence of coastal settlements and developments.

11. Constraints that have been identified within the Landfall AoS include:

- Bideford to Foreland Point MCZ
- Braunton Burrows SAC
- Tintagel-Marsland-Clovelly Coast SAC
- Braunton Burrows SSSI
- Braunton Swanpool SSSI
- Northam Burrows SSSI
- Mermaid's Pool to Rowden Gut SSSI
- Westward Ho! Cliffs SSSI
- Hobby to Peppercombe SSSI
- Greenaways and Freshmarsh, Braunton SSSI
- Taw-Torridge Estuary SSSI
- Saunton to Baggy Point Coast SSSI
- Caen Valleys Bats SSSI
- Fremington Quay Cliffs SSSI
- Fremington Claypit SSSI
- Marsland to Clovelly Coast SSSI
- Mill Rock SSSI
- Barricane Beach SSSI
- Morte Point SSSI
- Fremington LNR
- Kenwith Valley LNR
- Kynoch's Foreshore LNR
- North Devon Heritage Coast
- Hartland Heritage Coast
- North Devon AONB
- Northam Burrows Country Park.

12. The Onshore area of the Project AoS is shown in Figure 1.2.

13. The challenges and constraints associated with landfall zones that will be explored further as part of the subsequent stages of the site selection work.

14. The onshore substation (in addition to the East Yelland Western Power Distribution (WPD) substation that may be required if an offshore substation is not constructed) has an Area of Search zone within 3km of the existing WPD substation boundary, as shown in Figure 1.2.

## 1.4 Offshore Area of Search

### 1.4.1 Identification of the Offshore Cable Corridor Area of Search

15. The Offshore AoS relates the location of the Offshore Cable Corridor, Offshore Substation, and Landfall (intertidal).

16. The key drivers for the identification of the Offshore AoS are the location of the Project AfL area and the position of the key ecological designations.

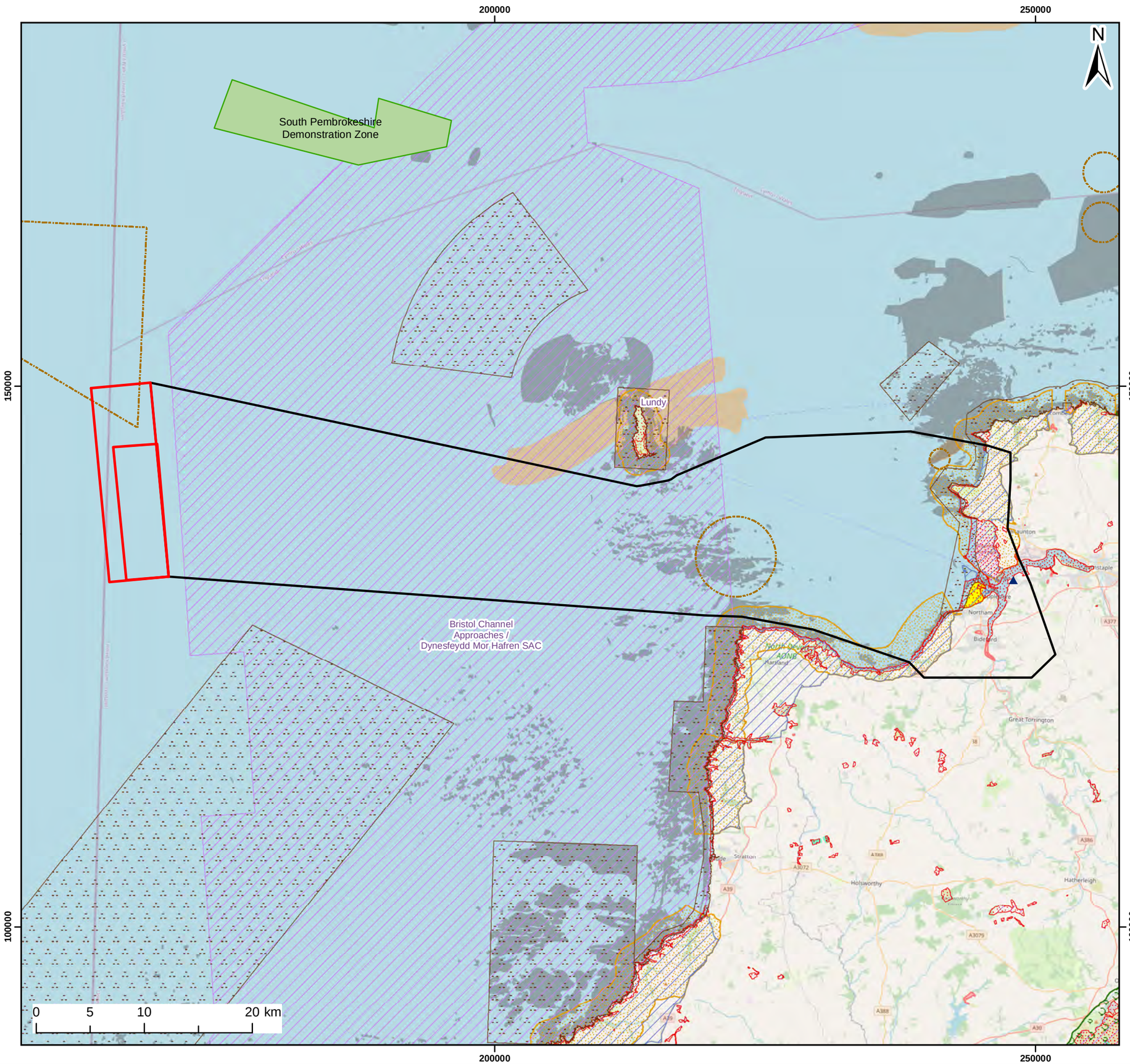
17. The following site constraints (where present in and around the wider area) informed the alignment of the study area boundaries include:

    - Lundy SSSI
    - Lundy SAC
    - Lundy MCZ
    - Hartland Point to Tintagel MCZ
    - North of Lundy MCZ
    - South-West Approaches to Bristol Channel MCZ
    - Morte Platform MCZ
    - Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC
    - North Devon Biosphere Reserve.

18. At this stage, the constraints that have been taken into account during the identification of the Offshore Cable AoS include:

    - Bristol Channel Approaches/Dynesfeydd Mor Hafren SAC
    - Bideford to Foreland Point MCZ
    - South Pembrokeshire Demonstration Zone
    - Closed Disposal Sites.

19. The Offshore AoS is shown on Figure 1.1.





Legend:

- Project Boundaries
- Area of Search
- Potential Grid Connection Locations
- Offshore Wave Site Pre-planning Application
- Closed Disposal Sites
- Marine Conservation Zones (MCZ)
- National Parks
- Sites of Special Scientific Interest (SSSI)
- Special Areas of Conservation (SAC)
- Areas of Outstanding Natural Beauty (AONB)
- National Nature Reserves (NNR)
- Local Nature Reserves (LNR)
- Country Parks
- Heritage Coast
- Annex 1 Sandbanks
- Annex 1 Reef



| Client: | Project: |
|---|---|
| Offshore Wind Ltd. | White Cross Offshore Windfarm |

Title: Area of Search - Offshore

Figure: 1 | Drawing No: PC2978-RHD-XX-ZZ-DR-Z-0018

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Co-ordinate system: British National Grid

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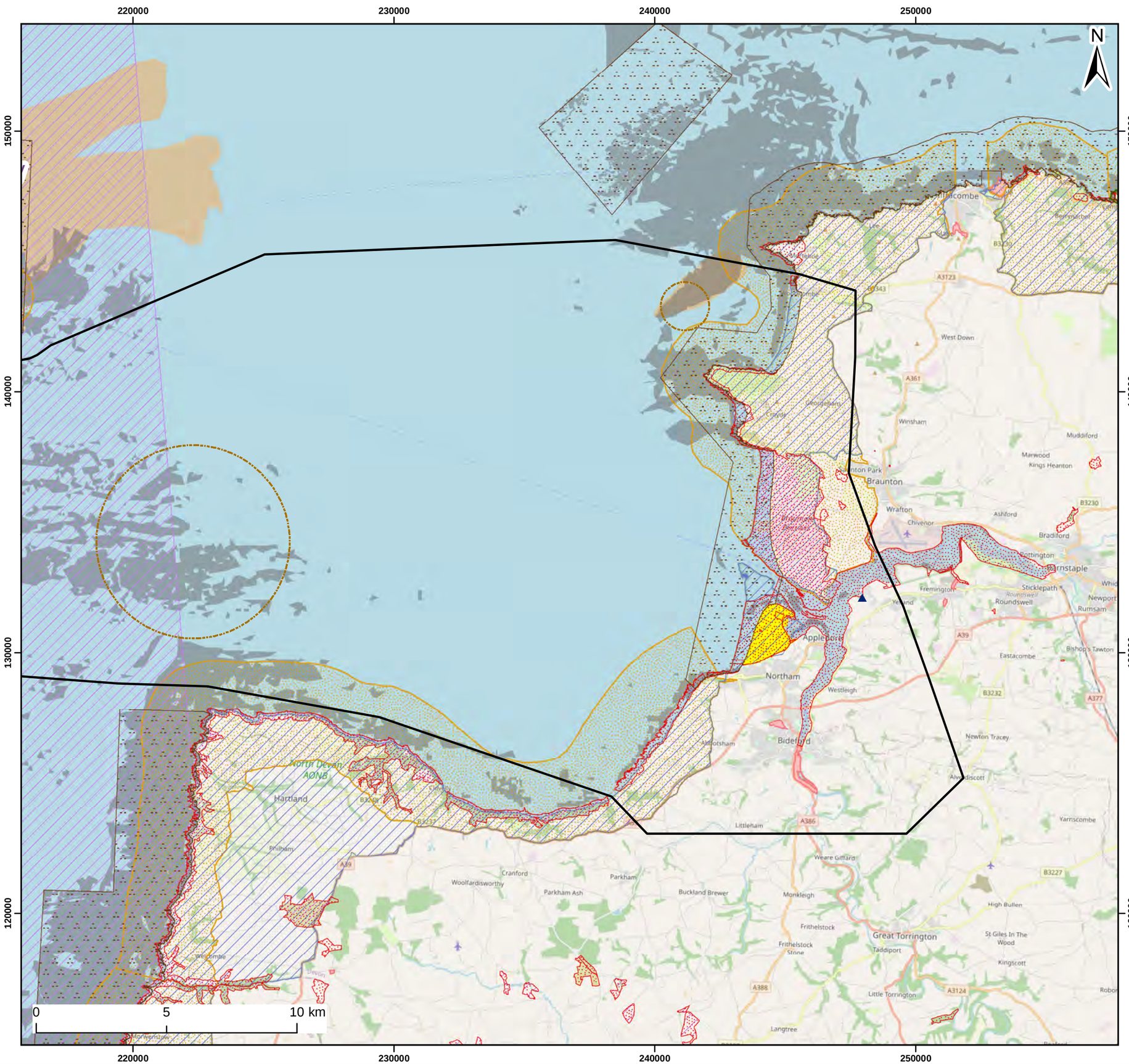



Legend:

- Area of Search
- Potential Grid Connection Locations
- Closed Disposal Sites
- Marine Conservation Zones (MCZ)
- National Parks
- Sites of Special Scientific Interest (SSSI)
- Special Areas of Conservation (SAC)
- Areas of Outstanding Natural Beauty (AONB)
- Local Nature Reserves (LNR)
- Country Parks
- Heritage Coast
- Annex 1 Sandbanks
- Annex 1 Reef



| Client: | Project: |
|---|---|
| Offshore Wind Ltd. | White Cross Offshore Windfarm |

Title: Area of Search - Onshore

Figure: 2 | Drawing No: PC2978-RHD-XX-ZZ-DR-Z-0019

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| P02 | 08/11/2021 | GC | CB | A3 | 1:145,000 |
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Co-ordinate system: British National Grid

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# White Cross Offshore Wind Farm Long List Report

| | | |
|---|---|---|
| Document Code: | *PC2978-RHD-ZZ-XX-RP-Z-0014* | |
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## Document History

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|---|---|
| v1.0 | Draft for review |
| v2.0 | Second draft for review |
| v3.0 | Final |
| v4.0 | Updated Final |
| v5.0 | Final |
| V6.0 | Final for Submission |

# Table of Contents

## Table of Figures



## Table of Tables

## Glossary of Acronyms

| Term | Definition |
|---|---|
| AfL | Agreement for Lease |
| AOD | Above Ordnance Datum |
| AONB | Area of Outstanding Natural Beauty |
| AoS | Area of Search |
| cSAC | Candidate Special Area of Conservation |
| EIA | Environmental Impact Assessment |
| ES | Environmental Statement |
| EU | European Union |
| ha | Hectare |
| HDD | Horizontal Directional Drilling |
| km | Kilometre |
| LNR | Local Nature Reserve |
| m | Metre |
| MCZ | Marine Conservation Zone |
| NNR | National Nature Reserve |
| OS | Ordnance Survey |
| pSAC | Possible Special Area of Conservation |
| pSPA | Potential Special Protection Area |
| RSPB | Royal Society for the Protection of Birds |
| SAC | Special Area of Conservation |
| SPA | Special Protection Area |
| SSSI | Site of Special Scientific Interest |
| TJB | Transition Joint Bay |

# 1. Introduction

## 1.1 Project Background

1. This report outlines the site selection process undertaken by Royal HaskoningDHV since the identification of the onshore and offshore Area of Search (AoS) for the White Cross Offshore Windfarm (the Project). This note covers the process undertaken for the identification of the long list of indicative routes and locations for the following project infrastructure elements:

   - Landfall
   - Offshore export cable route
   - Offshore substation location
   - Onshore cable route.

2. The long list covers both offshore and onshore infrastructure as both influence or are influenced by the connections between them. Each infrastructure element is presented in turn providing a general discussion of the rationale for identifying each option.

3. To inform a robust EIA process, it is important to define the assumptions and principles that underpin the site selection work to ensure that decisions are transparent. It is important to note that these assumptions and principles may be further refined as more information is obtained about the scale of the proposed development and the constraints present

4. In accordance with overarching policy and legislation, the design principles and engineering assumptions which are being considered for this project are in line with best practice to avoid, reduce and minimise adverse impacts resulting from the construction, operation and decommissioning of project infrastructure. The design principles and engineering assumptions have been developed with consideration to industry guidance, including but not limited to, The Crown Estate Cable Route Protocol 2017[1] and the Horlock Rules[2]:

[1] The Cable Route Protocol comprises a set of requirements for offshore wind developers in the planning of off-shore export cable routes. Compliance with these requirements is secured within the offshore array AfL. Compliance with these requirements must be demonstrated as part of any application to The Crown Estate for a transmission assets AfL.

[2] In order to identify the most appropriate location to site the onshore substation, National Grid's Guidelines on Substation Siting and Design ('The Horlock Rules') will be taken into consideration. These guidelines document National Grid's best practice for the consideration of relevant constraints associated with the siting of substations

- Overarching National Policy Statement for Energy (EN-1)
- National Policy Statement for Renewable Infrastructure (EN-3)
- National Policy Statement for Electricity Networks Infrastructure (EN-5)
- Marine Policy Statement
- Crown Estate's Cable Route Protocol
- Electricity Act 1989
- National Grid's Guidelines on Substation Siting and Design ('The Horlock Rules')
- Offshore Transmission Network Review led by the Department for Business, Energy & Industrial Strategy.

5. The desk-based constraints mapping of environmental and other consenting parameters was carried out on the basis of a project design envelope. However, a detailed civil engineering review of these locations has not yet been undertaken to identify any significant engineering constraints that would preclude development at this stage due to the wide range of potential locations. However, some engineering constraints have been considered.

## 1.2 Engineering Design Constraints

6. To inform the long list route selection work a range of design assumptions have been developed, which include:

- Offshore export cable route width – Minimum 22m, maximum 50m
- Landfall transition joint bay (TJB) permanent land take – 20 x 10m (indicative dimensions)
- Onshore export cable route width – up to 50m, 60m width at trenchless crossings.

# 2. Landfall Identification of Long List

## 2.1.1 Introduction

7. The landfall AoS identified three key stretches of coast with potential space where the offshore export cables could be brought onshore (see Figure 2.1). These are:

   - Landfall North Zones - Putsborough to Woolacombe (2.5km)
   - Landfall Mid Zone – Instow to Saunton Down (7.6km)
   - Landfall South Zone - Peppercombe to Rock Nose (6.3km).

8. These stretches of coastline have not been further broken down for the purpose of the long-listing exercise. The potential for specific landfall options within these stretches of coastline are effectively informed by the onshore and offshore cable routing constraints. However, further discussion and refinement is provided here for completeness.

## 2.1.2 Design Assumptions

9. The maximum design parameters taken into consideration (to ensure room is available for the required maximum footprint) were as follows:

   - One export cable within the cable corridor
   - Transition bay dimensions length (m) (permanent land take) – 20m
   - Transition bay dimensions width (m) (permanent land take) – 10m
   - Landfall HDD compound length (m) – 200m
   - Landfall HDD compound width (m) – 200m
   - Maximum HDD length – 1,500m.

10. It is noted that dimensions for compound and transition bay are conservative (larger in size that that likely to be required) and that full reinstatement would be undertaken. The only remaining structure on the survey could be inspection manholes for example.

## 2.1.3 Site Selection Principles

11. The three landfall zones were identified and developed using the following high level site selection principles:

   - Avoid likely direct significant impacts with sites designated for nature conservation at International, European, national and local level
   - Avoid likely direct significant impacts on landscape and cultural heritage designations
   - Avoid areas with substantial infrastructure or urban land use e.g. areas of housing and other energy infrastructure

- Avoid nearshore cable crossings that would result in prominent intertidal structures
- Minimise the number of crossings of existing offshore cables and pipelines
- Maintain sufficient space (minimum of 50m) for offshore cable installation (including anchor spread of installation vessels) whilst maintaining an appropriate safety buffer with existing sub-sea cables and pipelines
- Ensure potential landfall Horizontal Directional Drill (HDD) length is achievable
- Avoid areas where coastal cliffs experience high geomorphological activity (for cliff locations the rate of erosion is 10m per 100 years, therefore 5m over 50 years should be considered) or where there is slumping landward greater than 100m
- Ensure sufficient space inland to accommodate set back from the coast to reduce risk associated with coastal erosion.

### 2.1.4 Datasets Used

12. The following data sets were used for the identification of the Long List:

- Areas of Outstanding Natural Beauty (AONB)
- Closed Disposal Sites
- Country Parks
- Heritage Coast
- Local Nature Reserves (LNR)
- Marine Conservation Zones (MCZ)
- National Nature Reserves (NNR)
- National Parks
- Ramsar
- Special Areas of Conservation (SAC)
- Possible Special Area of Conservation (pSAC)
- Candidate Special Area of Conservation (cSAC)
- Sites of Special Scientific Interest (SSSI)
- Special Protection Area (SPA)
- Potential Special Protection Area (pSPA).

## 2.2 General Description of Identified Landfall Zones

### 2.2.1 Landfall South Zone - Peppercombe to Rock Nose

13. This landfall zone is situated along the coastal frontage from Peppercombe extending to Kipling Tor (National Trust) to the west of Westward Ho!.

14. This landfall zone comprises coastal cliffs behind which is predominantly grassland and woodland interspersed with a small number of residences / farms. The cliffs are around 10mAOD in height to the north of Peppercombe, and 15mAOD near

Cornborough, but are generally higher and range up to 100mAOD away from these 'valleys'.

15. Boreholes indicate approximately 10m of clay underlying the soil, below which is soft blue shale. The southern half of this landfall zone (and all the way to Hartland Point) is generally unstable due to the geology of the cliffs and there is extensive slumping and slipping of the cliffs.

16. Access to potential HDD drilling compounds would be off the A39 and along minor roads for up to 2km, and possible haul road after that for up to 500m. There are extensive areas of agricultural land available for HDD compounds with few constraints.

17. The coastal cliff would represent a constraint. Given its height there would be no suitability for trenching, thus resulting in HDD as the only option along this landfall zone. There are two sections where the cliff is less than 20m in height which would reduce potential losses due to overburden. There are few constraining land uses or historic land uses. The Cornborough Sewage Treatment Works is located inland but there is an outfall running perpendicular to the coast. Due to the cliffs there are no areas within Flood Zone 2 and 3.

18. The entire coastal cliff and intertidal zone are designated as a Site of Special Scientific Interest (SSSI), notably Mermaid's Pool to Rowden Gut SSSI designated for its geological exposures. Trial trenching would impact on the site, but HDD would avoid potential impacts. There are areas of priority habitat along this landfall zone, with maritime cliff and slope extending across the majority of the frontage, albeit very narrow fronting Cornborough and Peppercombe. Areas of deciduous woodland are scattered around the zone and one area of ancient woodland (the majority being in the Peppercombe area).

19. The nearest Bathing Water (Northam) is over 1km to the north-east.

20. This landfall zone is located within the North Devon Area of Outstanding Natural Beauty (AONB) and the Hartland (Devon) Heritage Coast. There are several listed buildings inland from this landfall zone. The South West Coast Path extends across this whole landfall zone. The key constraints relate to the short-term and temporary effects on visual amenity from walkers along the coast path.

#### 2.2.1.1 Summary

21. This landfall zone is considered a potentially suitable option north of Cockington Cliff, as south of that area the cliff is still unstable and subject to slips. Also, the northernmost extent should be retracted to avoid the National Trust owned land at Kipling Tor. The most opportune area for a cable would appear be the shallow valley to the south of Cornborough where the cliff height is 15m or less, so it is

recommended that this is the centreline location for the refined corridor. However, it is noted that this is subject to determination of location of the Cornborough Sewage Treatment Works outfall and geotechnical review.

### 2.2.2 Landfall Mid Zone – Instow to Saunton Down

22. This landfall zone covers the area from the Taw Estuary, including Instow Beach, then extending out along the north side of the estuary and north up the coast along Saunton Sands to the headland at Saunton Down.

23. This landfall zone comprises river estuary, behind which is grassland and woodland and an increasing density of settlements and transport infrastructure. Further north of the estuary, the zone comprises intertidal sandflats backed by coastal sand dunes until the rocky cliffs are reached near Saunton Down. The land is low lying for most of the landfall zone, except the sand dunes reach in excess of 20m in height, and cliffs at the northern end are approximately 20AOD in height.

24. Boreholes indicate approximately 32m of clay, rock and clay, and sand in varying depths before hitting grey slate. Bedrock is much shallower at the southern end of the zone, with slate exposures in the channel of the estuary.

25. Access to potential HDD drilling compounds to the north of the estuary would be off the A39 at Braunton and either along the B3231 to the north end, or off along minor roads for some distance to reach just north of the estuary. The local roads in this area are very narrow. There are extensive areas of agricultural land available for HDD compounds with few constraints. To the south of the Taw Estuary, access would be either of the A39 onto the A3125 then B3233 along through Fremington and then toward the estuary via the old Yelland power station access road, or alternatively along the A39 and onto the B3233 at Torridge Bridge to come to the access road from the Instow direction. There are some areas of agricultural fields which could be HDD compounds, but around the East Yelland substation there are ongoing works and a development proposal that could inhibit a compound and even launch for the HDD immediately north of the substation.

26. The length of the estuary is the key engineering constraint for making landfall either directly along the estuary from the sea or alternatively crossing the estuary to head north and achieve landfall elsewhere within the zone. Whilst from an construction perspective the shallow coastal section fronting Saunton Sands is ideal for trenching, the site is heavily designated (see below) so alternative (HDD) methods may be required here. The coastal cliffs to the north-west are stable enough for a HDD landfall, though further information regarding the immediate offshore conditions would help to understand the potential for navigation risks associated with this proximity to the cliff alongside a shallow beach. Due to presence of the cliffs and the large sand dunes backing the shallow intertidal area, there are no areas within

Flood Zone 2 and 3 to the north of the zone. However, south of the Taw Estuary, large areas (including the substation) are indicated as being in Flood Zone 2 and 3.

27. The Taw-Torridge Estuary is designated as a Site of Special Scientific Interest (SSSI) for its habitats and bird numbers (predominantly wintering). Further north the entire sand dune system of Braunton Burrows and the intertidal area are designated as a Special Area of Conservation (SAC) for its sand dune and intertidal sandflat habitats amongst other related species. Trial trenching would impact on both sites, therefore HDD options would be required to avoid potential impacts. There are areas of priority habitat along the landfall, including sand dunes, but to the north of the estuary there is a large area of coastal and floodplain grazing marsh. Areas of deciduous woodland are also scattered around the zone. The entire area lies within the North Devon Biosphere Reserve. To the east of the substation at the southern end of the zone is the RSPB Isley Reserve, but this is sufficiently distant and screened that no influences would occur on this site.

28. The nearest Bathing Water (Saunton Sands) is at the north end of this landfall zone.

29. This landfall zone is located within the North Devon Area of Outstanding Natural Beauty (AONB) and the North Devon Heritage Coast. There is one listed building and one Scheduled Monument within the landfall zone. The key constraints relate to the short-term and temporary effects on visual amenity from walkers along the coast path.

30. This landfall zone is situated within the North Devon Surfing Reserve.

31. The southern half of Braunton Burrows is a Ministry of Defence training area.

#### 2.2.2.1 Summary

32. The landfall is considered a potentially suitable option albeit with areas that would have constraints ranging from military training, navigation risks, and national and international nature conservation designations. Crossing the estuary will be an engineering challenge due to the width of the estuary and the need to avoid impacting on the estuary designated habitats and species.

### 2.2.3 Landfall North Zones - Putsborough to Woolacombe

33. This landfall zone is situated along the coastal frontage north of Napps Cliff (Putsborough Sand) to Woolacombe.

34. This landfall zone comprises coastal cliffs, behind which is residences at the southern end and National Trust land for the remainder which is maintained as grassland. The cliffs are around 20mAOD in along the entire length of the landfall until right at the north end where it drops to beach level.

35. Access to potential HDD drilling compounds would be off the A361 or A3123 onto the B3343 which runs to and through Wollacombe the beach. Gaining access to the top of the cliffs and to the south is limited and would require using minor roads and the creation of fairly substantial haul roads. There are extensive areas of agricultural land available for HDD compounds with few constraints.

36. The coastal cliff would represent a constraint, given its height there would be no suitability for trenching, thus resulting in HDD as the only option along this landfall. The cliff is shallower at the southern end, becoming significantly steeper past Black Rock when it becomes National Trust land. Due to the cliffs there are no areas within Flood Zone 2 and 3.

37. The only designation at the Mill Rock SSSI (a Geological SSSI designated for Upper Devonian fish remains present in a layer of volcanic rock) is located within the north of the zone. The Saunton to Baggy Point Coast SSSI, which is designated for its coastal cliffs, is immediately adjacent to the south of the zone. Trenching would impact on the SSSIs, but HDD or routeing to avoid these small designated areas would avoid potential impacts. There are areas of priority habitat along the landfall, with maritime cliff and slope, coastal sand dune, lowland heathland, lowland dry grassland, and intertidal mud and sandflats extending across the whole landfall zone.

38. There are two Bathing Water sites in this zone, Putsborough and Woolacombe at the southern and northern end respectively.

39. This landfall zone is located within the North Devon Area of Outstanding Natural Beauty (AONB) and the North Devon Heritage Coast. There are no Scheduled Monuments or listed buildings within this landfall zone. The South West Coast Path extends across the whole landfall zone. The key constraints relate to the short-term and temporary effects on visual amenity from walkers along the coast path.

#### 2.2.3.1 Summary

40. The landfall is considered a potentially suitable option north of the SSSI though it is steep behind the cliff to the north. Access could however be a potential issue, as could other elements such as the priority habitats.

240000

250000

140000

130000

N

North Zone

Mid Zone

South Zone

0 2 4 km


Legend:

- Landfall Zones
- Area of Search
- Potential Grid Connection Locations
- Closed Disposal Sites
- Marine Conservation Zones (MCZ)
- Sites of Special Scientific Interest (SSSI)
- Special Areas of Conservation (SAC)
- Areas of Outstanding Natural Beauty (AONB)
- Local Nature Reserves (LNR)
- Country Parks
- Heritage Coast
- Important Bird Areas (IBA)
- RSPB Reserve Boundary
- Annex 1 Sandbanks
- Annex 1 Reef
- Anchorage area
- Pilot boarding place
- Anchorage area
- Military practice area
- Restricted area
- Submarine Cable
- Harbour facility
- Pipeline
- Harbour facility
- Navigation line
- Route, Ferry
- Route, Recommended
- # Obstruction
- Wreck
- Obstruction
- Scheduled Monuments
- Conservation Areas
- Parks And Gardens



Client: Offshore Wind Ltd.

Project: White Cross Offshore Windfarm

Title: White Cross Land Fall Zones

Figure: 2.1

Drawing No: PC2978-RHD-XX-ZZ-DR-Z-0026

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Co-ordinate system: British National Grid

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# 3. Offshore Export Cable Corridor – Identification of Long List

## 3.1.1 Introduction

41. Following the identification of the Offshore AoS, several broad cable corridors were identified as areas whereby the offshore export cables could be brought from the AfL to each landfall zone (see Figure 3.1 to Figure 3.5). The offshore cable corridors are split into 3 Core Offshore Routes (north, central and south) and 3 Nearshore Routes (for each landfall) and result in 8 potential routes:

- Route 1 (Figure 3.1) – from the South Zone landfall connecting to the northern core route to the OWF site
- Route 2 (Figure 3.2) – from the Mid Zone landfall connecting to the northern core route to the OWF site
- Route 3 (Figure 3.3) – from the Mid Zone landfall connecting to the southern core route to the OWF site
- Route 4 (Figure 3.4) – from the South Zone landfall connecting to the southern core route to the OWF site
- Route 5 (Figure 3.5) – from the North Zone landfall connecting to the northern core route to the OWF site
- Route 6 (Figure 3.6) – from the North Zone landfall connecting to the central core route to the OWF site
- Route 7 (Figure 3.7) – from the Mid Zone landfall connecting to the central core route to the OWF site
- Route 8 (Figure 3.8) – from the South Zone landfall connecting to the central core route to the OWF site.

## 3.1.2 Design Assumptions

42. The maximum design parameters taken into consideration for the export cable corridor routes were:

- One export cable within the cable corridor
- Working width required for offshore export cable lay – 2km. It is noted that this will be subject to review where there are crossings of third-party cables / pipelines or other infrastructure constraints. It is also noted that this width is solely for the purpose of design. The actual width will be no more than 50m.

## 3.1.3 Routing Principles

43. Offshore export cable corridor routes were developed using high level routing principles, including:

- Routing options need to be able to connect to viable landfall locations
- Routing options should be as short as possible

- Avoid direct long-term significant impacts to sites designated for nature conservation as far as possible
- Avoid direct significant impacts to ecologically important Annex I sandbanks and Annex I reefs as far as possible
- Minimise number of crossings of existing offshore cables and pipelines. Where crossing is required, cables and pipelines to be crossed at 90° or as near as possible to that, though tolerance angles can be agreed with infrastructure owners as design progresses
- Maintain required separation distances (minimum 50m) with other offshore cables and pipelines
- Maintain sufficient space for offshore cable installation (including anchor spread of installation vessels) whilst maintaining an appropriate safety buffer with existing sub-sea cables and pipelines
- Avoid wrecks as far as possible and completely avoid protected wrecks and a buffer zone of 250m
- Avoid anchorage areas
- Avoid actively dredged maintenance dredge areas
- Avoid disposal areas (closed or current)
- 'Seabed take' in aggregate dredging areas to be minimised and avoided where possible.

### 3.1.4 Datasets Used

44. The datasets used are presented in paragraph 12.

## 3.2 Identification and Description of the Offshore Cable Corridors

45. The following sets out the general characteristics of the offshore cable corridor routes. Several elements are true for all cable corridors:

- All routes pass through the Bristol Channel Approaches / Dynesfeydd Mor Hafren SAC
- Routes 2 and 3 pass through the Bideford to Foreland Point MCZ
- All routes overlap with the North Devon Biosphere Reserve
- There is potential Annex 1 reef habitat present along all routes
- There is predominantly sandy habitat in the offshore coupled with some coarser sediments and occasional rocky outcrops
- Routes 2 and 3 overlap the Braunton Burrows Military Training Area
- All routes cross over 4 existing telecommunications cables
- Routes 3 and 4 overlap partially with a disused disposal site.

## 3.3 Offshore Routes

46. The following describe in more detail what constraints are located within each Core Offshore Route and Core Nearshore Route from the White Cross site to the landfall locations set out in Section 2.

### 3.3.1 Route 1

47. This route is 77km long and overlaps with the Bristol Channel Approaches SAC, the North Devon Biosphere Reserve, areas of potential Annex I reef and Annex I sandbank habitat, contains 5 wrecks and 9 obstructions, and overlaps with 4 telecommunications cables.

### 3.3.2 Route 2

48. This route is 76.3km long and overlaps with the Bristol Channel Approaches SAC, the North Devon Biosphere Reserve, and the Bideford to Foreland Point MCZ, along with areas of potential Annex I reef and Annex I sandbank habitat. The corridor also contains 6 wrecks and 12 obstructions and overlaps with a recommended navigation route into and out of Appledore, the Braunton Burrows Military Training Area, and 4 telecommunications cables.

### 3.3.3 Route 3

49. This route is 77.8km long and overlaps with the Bristol Channel Approaches SAC, the North Devon Biosphere Reserve, and the Bideford to Foreland Point MCZ, along with areas of potential Annex I reef and Annex I sandbank habitat. The corridor also contains 3 wrecks and 5 obstructions and overlaps with a recommended navigation route into and out of Appledore, the Braunton Burrows Military Training Area, the RYA identified boating area, 4 telecommunications cables, and part of a disused disposal ground.

### 3.3.4 Route 4

50. This route is 73.5km long and overlaps with the Bristol Channel Approaches SAC, the North Devon Biosphere Reserve, areas of potential Annex I reef and Annex I sandbank habitat, and contains 2 wrecks and 2 obstructions, overlaps with 4 telecommunications cable, and part of a disused disposal ground.

### 3.3.5 Route 5

51. This route is 76.6km long and overlaps with the Bristol Channel Approaches SAC, the North Devon Biosphere Reserve, areas of potential Annex I reef and Annex I sandbank habitat, and contains 8 wrecks and 9 obstructions, and overlaps with 1 telecommunications cable.

### 3.3.6 Route 6

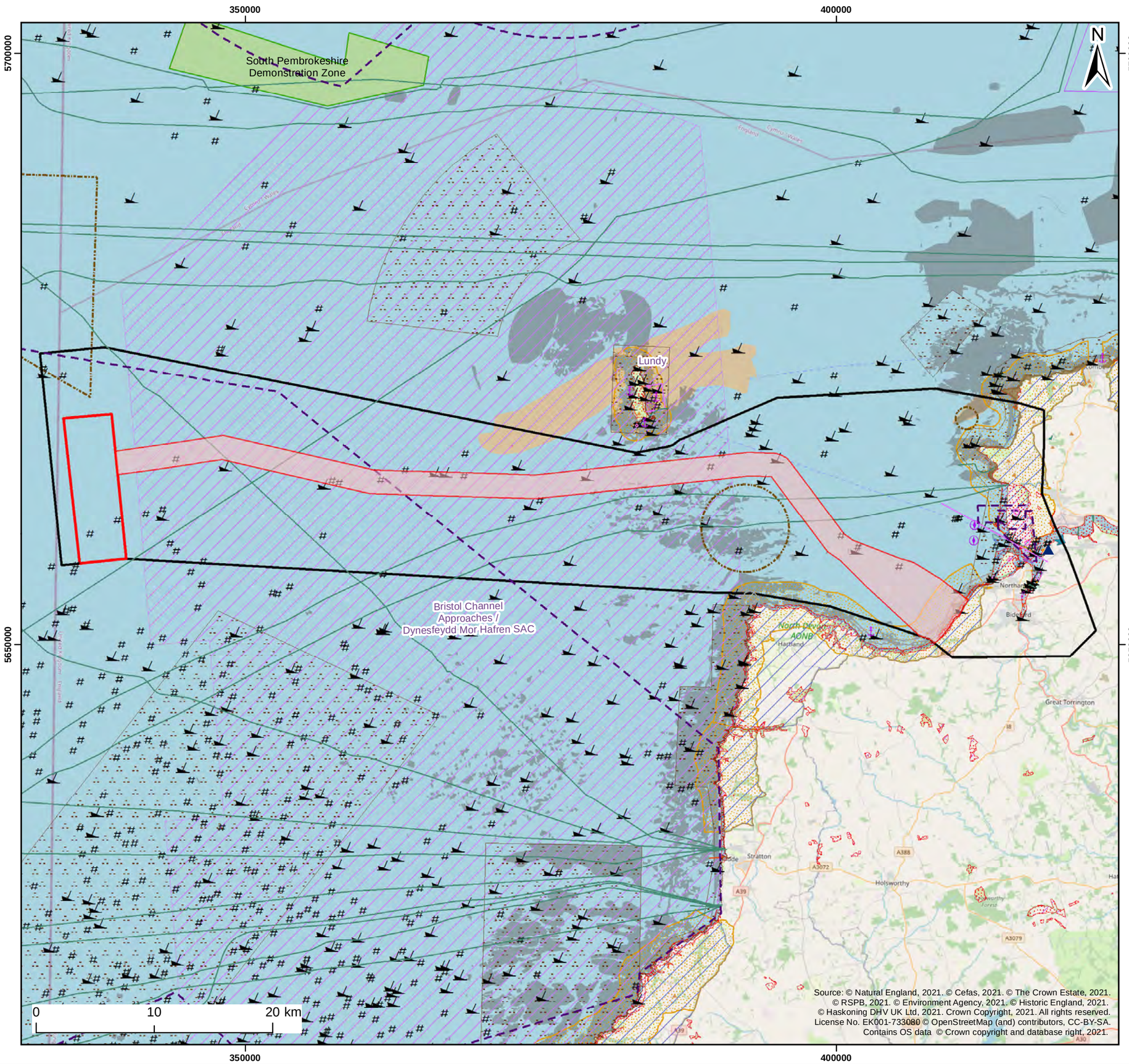
52. This route is 76.7km long and overlaps with the Bristol Channel Approaches SAC, the North Devon Biosphere Reserve, and the Bideford to Foreland Point MCZ, and extensive areas of potential Annex I reef as well as potential Annex I sandbank habitat, and contains 6 wrecks and 8 obstructions, and overlaps with 3 telecommunications cable and a large area of a disused disposal ground.

### 3.3.7 Route 7

53. This route is 75.7km long and overlaps with the Bristol Channel Approaches SAC, the North Devon Biosphere Reserve, and the Bideford to Foreland Point MCZ, and extensive areas of potential Annex I reef as well as potential Annex I sandbank habitat. The corridor also contains 5 wrecks and 10 obstructions, and overlaps with a recommended navigation route into and out of Appledore, the Braunton Burrows Military Training Area, the RYA identified boating area, 4 telecommunications cables, and a large area of a disused disposal ground.

### 3.3.8 Route 8

54. This route is 75km long and overlaps with the Bristol Channel Approaches SAC, the North Devon Biosphere Reserve, areas of potential Annex I reef and Annex I sandbank habitat, contains 5 wrecks and 9 obstructions, and overlaps with 4 telecommunications cables, and a large area of a disused disposal ground.







Legend:

- Windfarm Site
- Offshore Cable Corridor
- Area of Search
- Potential Grid Connection Locations
- Offshore Wave Site Pre-planning Application
- Closed Disposal Sites
- Marine Conservation Zones (MCZ)
- Sites of Special Scientific Interest (SSSI)
- Special Areas of Conservation (SAC)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- Important Bird Areas (IBA)
- RSPB Reserve Boundary
- Annex 1 Sandbanks
- Annex 1 Reef
- Anchorage area
- Pilot boarding place
- Anchorage area
- Military practice area
- Restricted area
- Harbour area (administrative)
- Submarine Cable
- Harbour facility
- Pipeline
- Harbour facility
- Navigation line
- Route, Ferry
- Route, Recommended
- Obstruction
- Wreck
- Obstruction

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: White Cross Offshore Cable Corridor 1

Figure: 3.1 | Drawing No: PC2978-RHD-XX-ZZ-DR-Z-0043

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Co-ordinate system: WGS 1984 UTM Zone 30N

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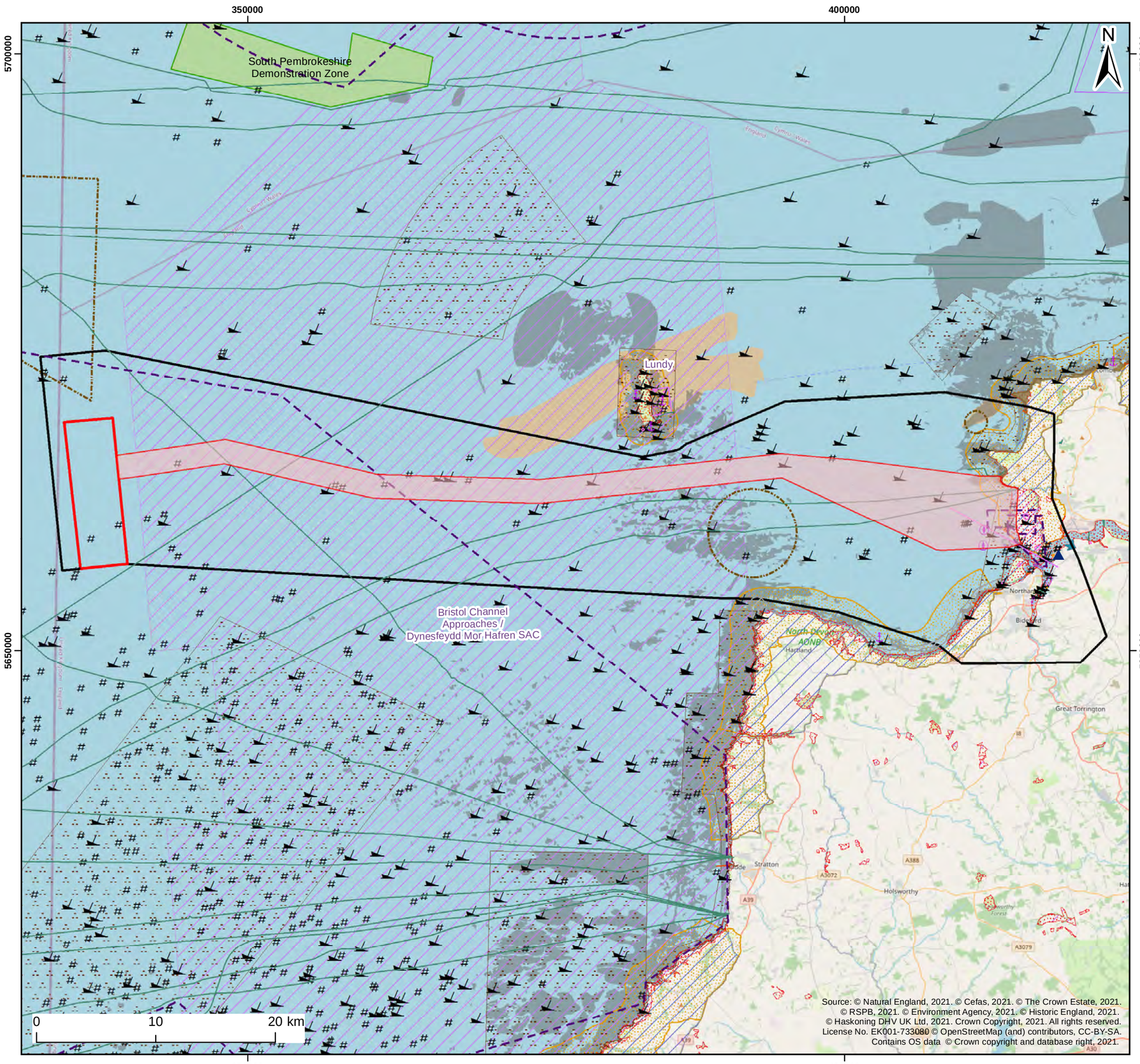



Legend:

- Windfarm Site
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- Harbour facility
- Pipeline
- Harbour facility
- Navigation line
- Route, Ferry
- Route, Recommended
- Obstruction
- Wreck
- Obstruction



Client: Offshore Wind Ltd.

Project: White Cross Offshore Windfarm

Title: White Cross Offshore Cable Corridor 2

Figure: 3.2

Drawing No: PC2978-RHD-XX-ZZ-DR-Z-0044

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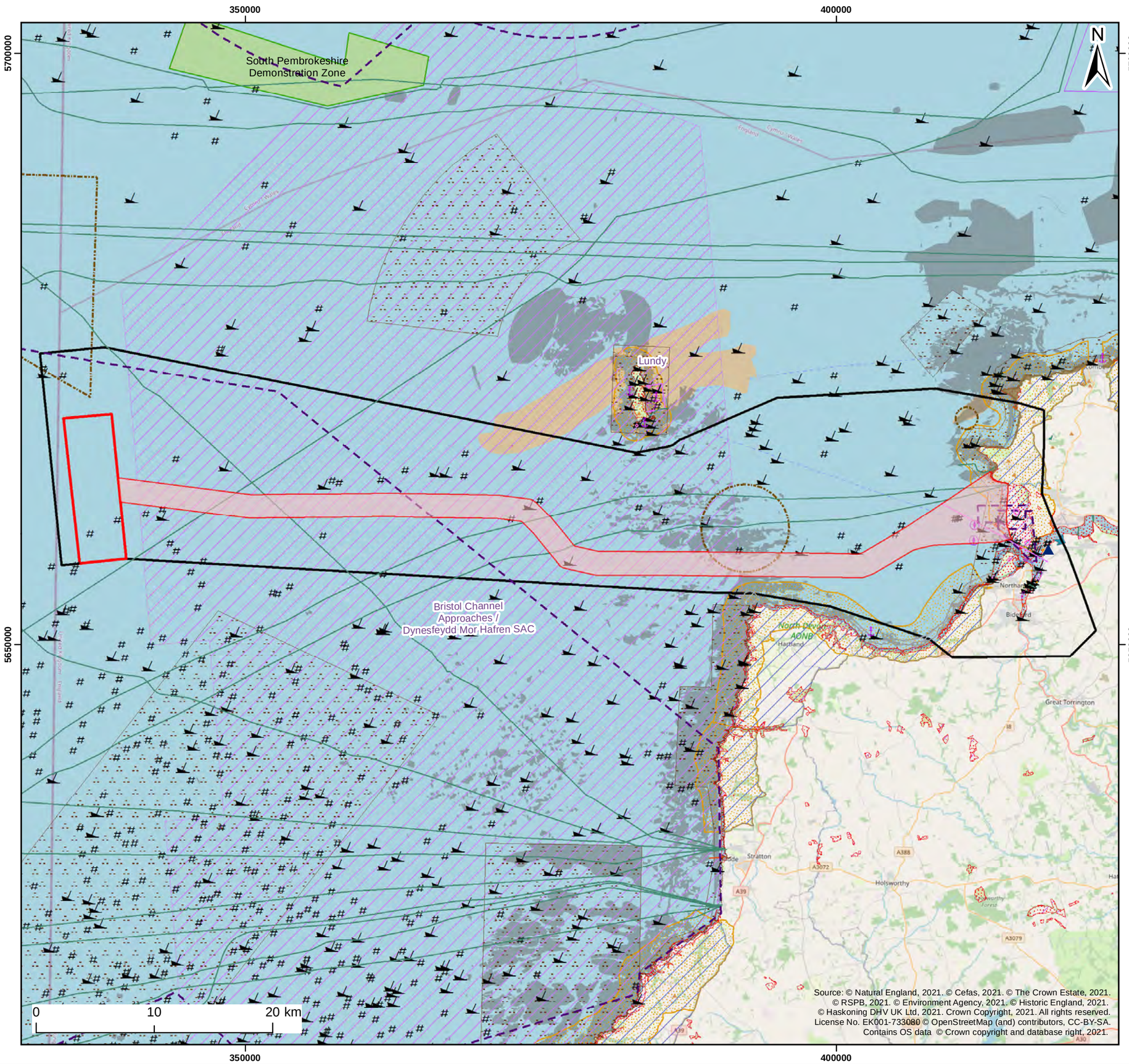



Legend:

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- Harbour facility
- Pipeline
- Harbour facility
- Navigation line
- Route, Ferry
- Route, Recommended
- Obstruction
- Wreck
- Obstruction

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: White Cross Offshore Cable Corridor 3

Figure: 3.3 | Drawing No: PC2978-RHD-XX-ZZ-DR-Z-0045

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Co-ordinate system: WGS 1984 UTM Zone 30N



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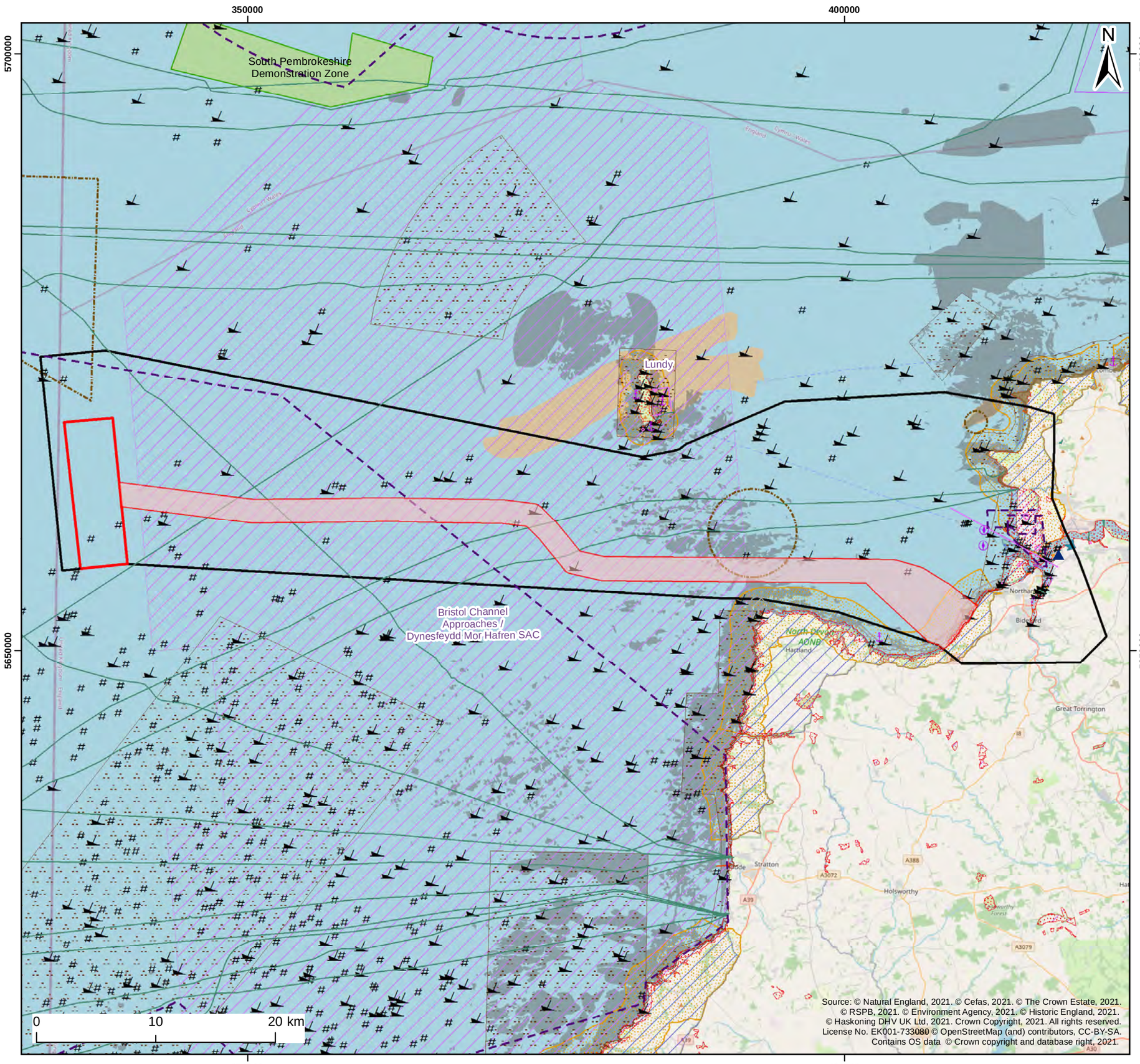



Legend:

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- Harbour facility
- Pipeline
- Harbour facility
- Navigation line
- Route, Ferry
- Route, Recommended
- Obstruction
- Wreck
- Obstruction



Client: Offshore Wind Ltd.

Project: White Cross Offshore Windfarm

Title: White Cross Offshore Cable Corridor 4

Figure: 3.4

Drawing No: PC2978-RHD-XX-ZZ-DR-Z-0046

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Co-ordinate system: WGS 1984 UTM Zone 30N

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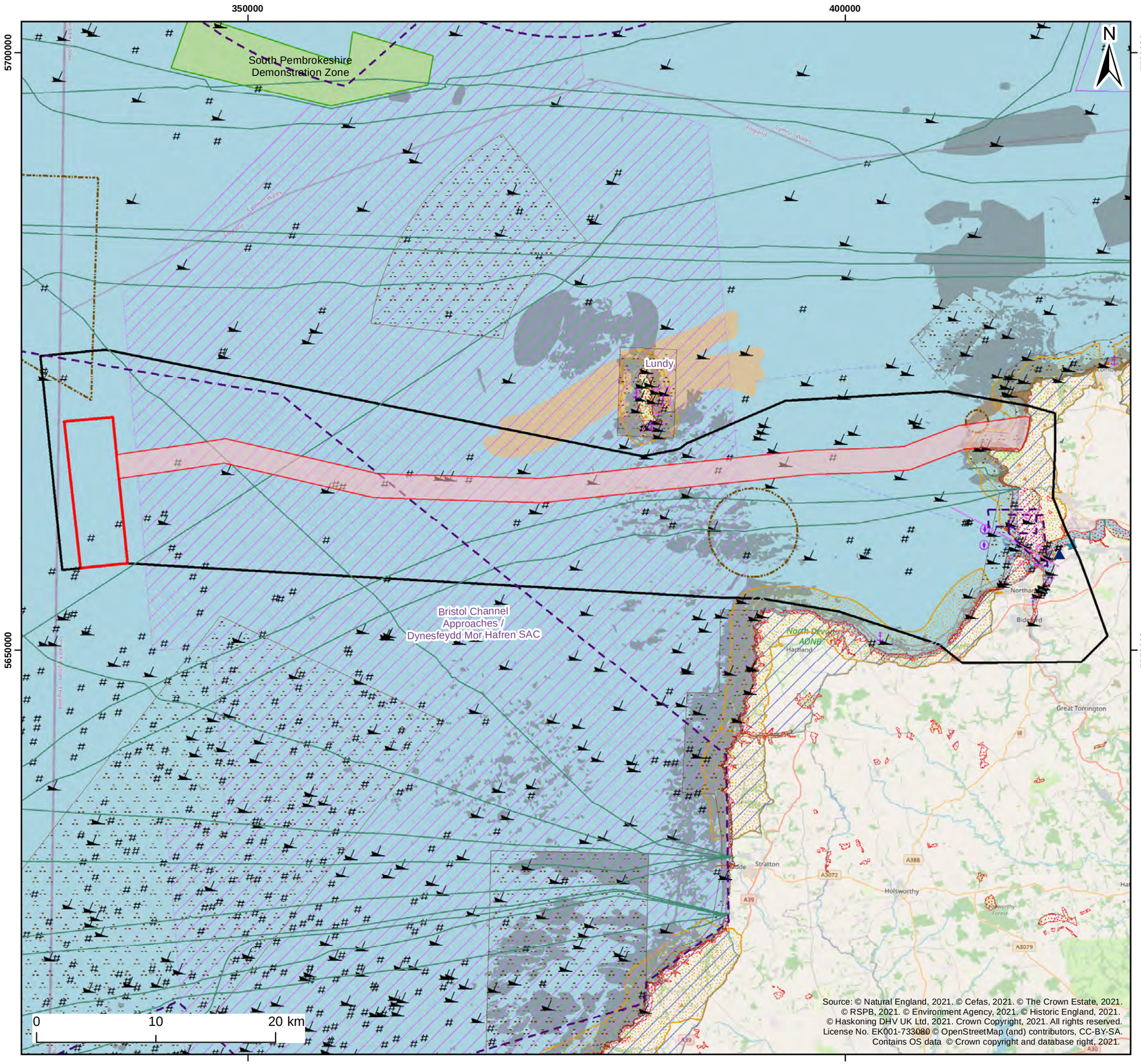



Legend:

- Windfarm Site
- Offshore Cable Corridor
- Area of Search
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- Offshore Wave Site Pre-planning Application
- Closed Disposal Sites
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- Restricted area
- Harbour area (administrative)
- Submarine Cable
- Harbour facility
- Pipeline
- Harbour facility
- Navigation line
- Route, Ferry
- Route, Recommended
- Obstruction
- Wreck
- Obstruction



Client: Offshore Wind Ltd.

Project: White Cross Offshore Windfarm

Title: White Cross Offshore Cable Corridor 5

Figure: 3.5

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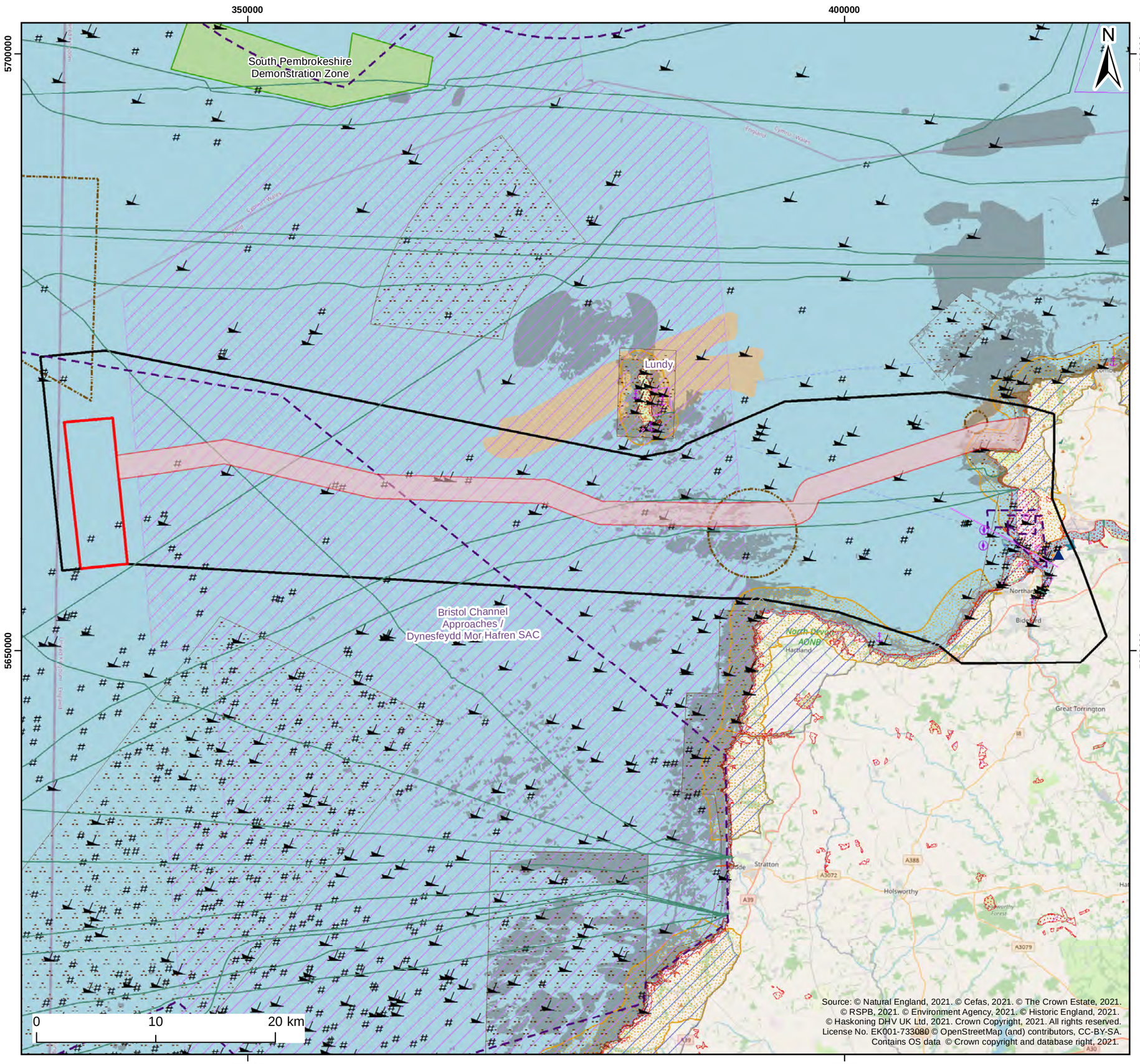



Legend:

- Windfarm Site
- Offshore Cable Corridor
- Area of Search
- Potential Grid Connection Locations
- Offshore Wave Site Pre-planning Application
- Closed Disposal Sites
- Marine Conservation Zones (MCZ)
- Sites of Special Scientific Interest (SSSI)
- Special Areas of Conservation (SAC)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- Important Bird Areas (IBA)
- RSPB Reserve Boundary
- Annex 1 Sandbanks
- Annex 1 Reef
- Anchorage area
- Pilot boarding place
- Anchorage area
- Military practice area
- Restricted area
- Harbour area (administrative)
- Submarine Cable
- Harbour facility
- Pipeline
- Harbour facility
- Navigation line
- Route, Ferry
- Route, Recommended
- Obstruction
- Wreck
- Obstruction



Client: Offshore Wind Ltd.

Project: White Cross Offshore Windfarm

Title: White Cross Offshore Cable Corridor 6

Figure: 3.6

Drawing No: PC2978-RHD-ZZ-XX-DR-Z-0123

| Revision: | Date: | Drawn: | Checked: | Size: | Scale: |
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| P01 | 21/02/2022 | AB | PT | A3 | 1:320,000 |
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Co-ordinate system: WGS 1984 UTM Zone 30N

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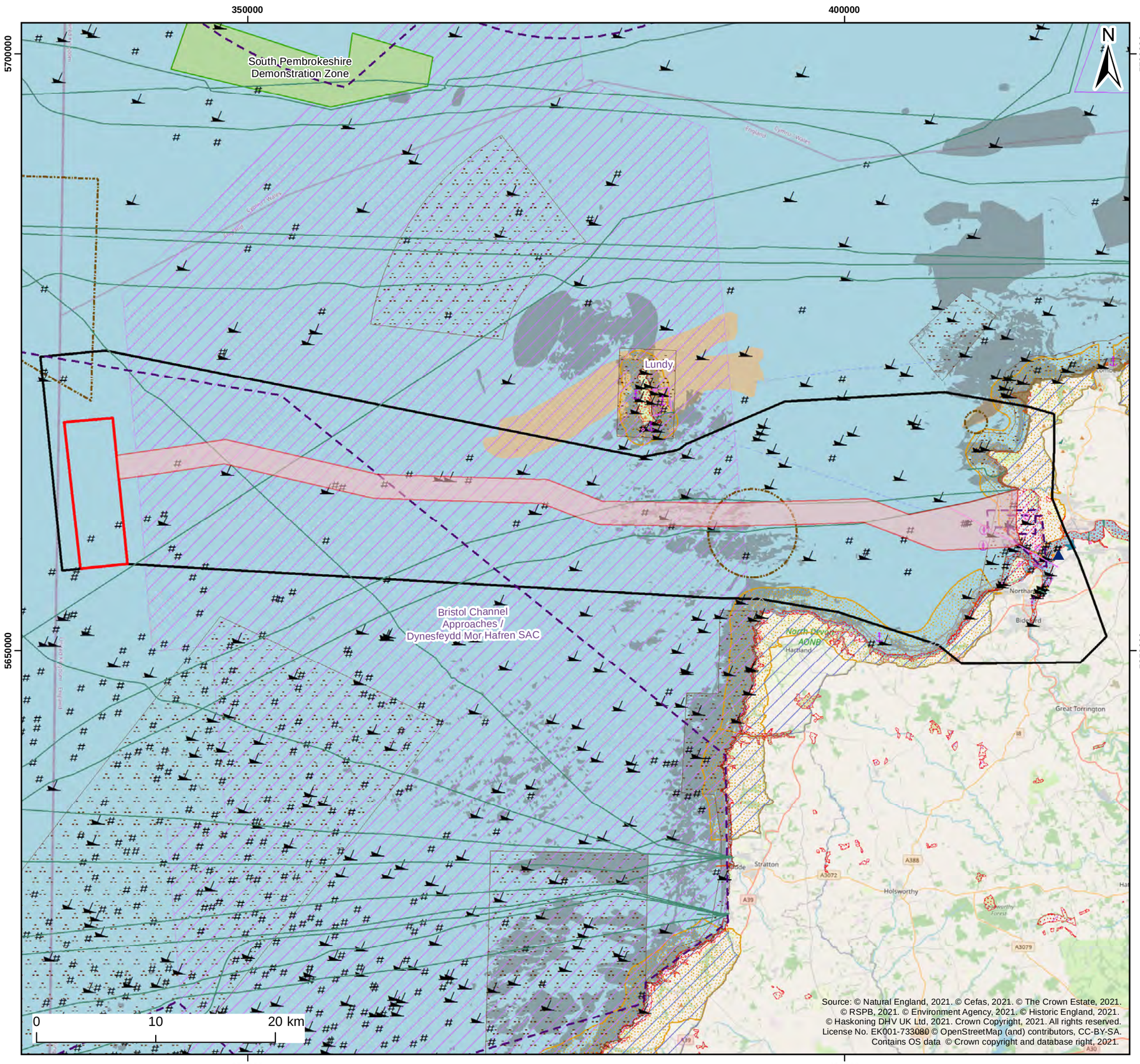



Legend:

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- Harbour facility
- Pipeline
- Harbour facility
- Navigation line
- Route, Ferry
- Route, Recommended
- Obstruction
- Wreck
- Obstruction



Client: Offshore Wind Ltd.

Project: White Cross Offshore Windfarm

Title: White Cross Offshore Cable Corridor 7

Figure: 3.7

Drawing No: PC2978-RHD-ZZ-XX-DR-Z-0124

| Revision: | Date: | Drawn: | Checked: | Size: | Scale: |
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Co-ordinate system: WGS 1984 UTM Zone 30N

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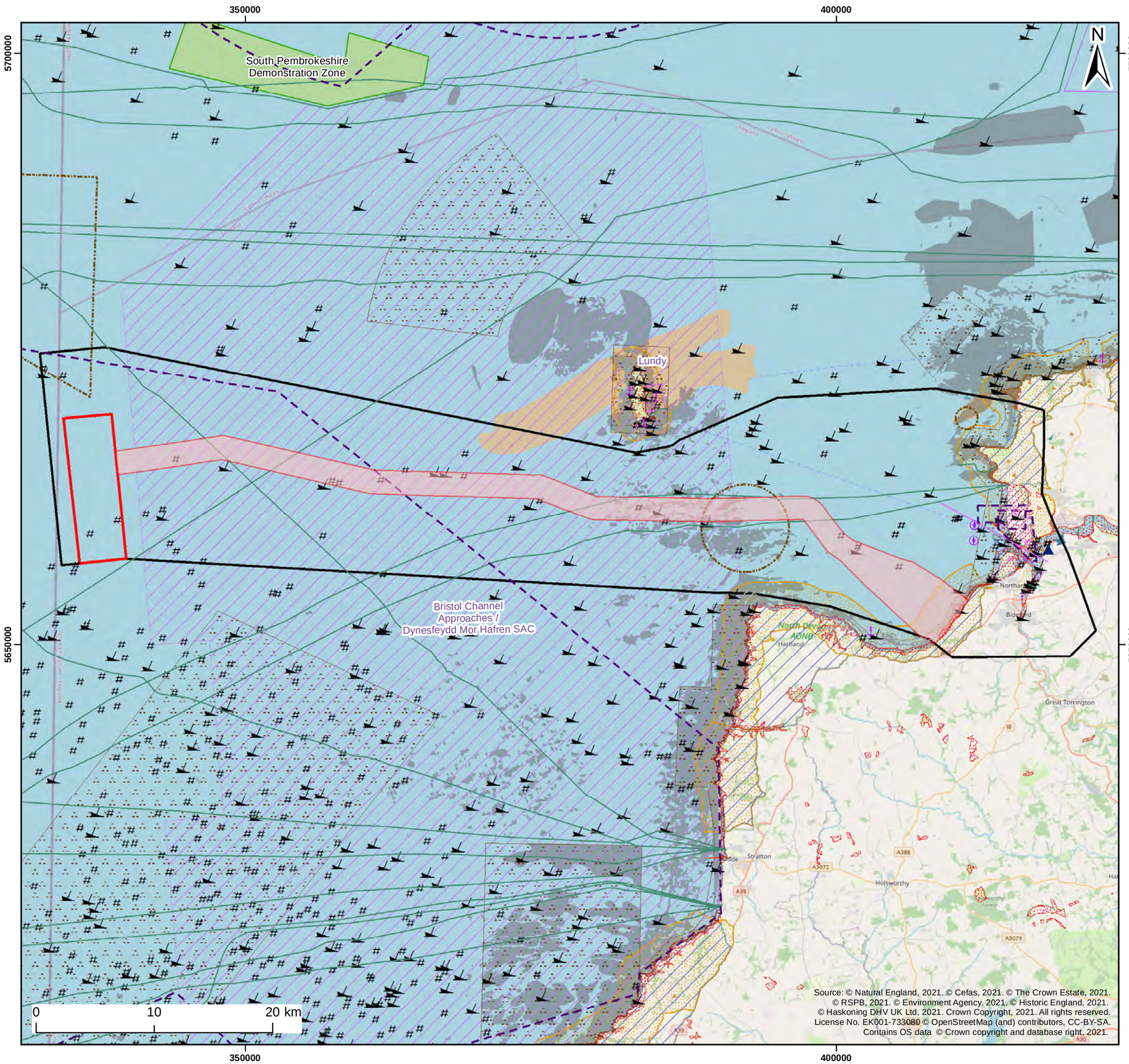



Legend:

- Windfarm Site
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- Harbour facility
- Pipeline
- Harbour facility
- Navigation line
- Route, Ferry
- Route, Recommended
- Obstruction
- Wreck
- Obstruction



Client: Offshore Wind Ltd.

Project: White Cross Offshore Windfarm

Title: White Cross Offshore Cable Corridor 8

Figure: 3.8

Drawing No: PC2978-RHD-ZZ-XX-DR-Z-0125

| Revision: | Date: | Drawn: | Checked: | Size: | Scale: |
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Co-ordinate system: WGS 1984 UTM Zone 30N

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# 4. Onshore Cable Corridor – Identification of Long List

## 4.1 Introduction

55. Following the identification and characterisation of the AoS, several broad cable corridors (500m in width) have been identified as forming a long list of potential routes. Several design assumptions and routing principles were taken into account, along with the consideration of further data sets obtained by the project. Each of these is discussed below.

### 4.1.1 Design Assumptions

56. The maximum design parameters taken into consideration for the onshore export cable corridor routes were:

- Maximum cable corridor construction swathe width up to 50m
- Cable corridor construction swathe width at trenchless crossings – 60m
- Cable corridor construction swathe width at pinch points – 30m
- Trenchless crossing compounds length – 100m
- Trenchless crossing compounds width – 100m
- Maximum HDD length – 1,500m.

57. It is noted that dimensions for compounds and corridor widths are conservative and that full reinstatement would be undertaken.

### 4.1.2 Routing Principles

58. Onshore cable corridor routes were then developed using the following routing principles:

- Consider routes to achieve most economic and efficient connection (shortest viable routes)
- Avoid direct significant (residual) impacts with sites designated for nature conservation at European, national and local level
- Avoid areas of important habitat, e.g. trees, ponds, wetlands, where possible
- Avoid proximity to residential dwellings (minimum 20m standoff distance)
- Minimise number of complex crossing, e.g. road, river and rail crossings
- Avoid proximity to Scheduled Monuments and listed buildings (minimum 40m standoff distance)
- Minimise impacts to residential areas in relation to access to services and road usage, including footpath closures where possible.

### 4.1.3 Datasets Used

59. The datasets used are listed in paragraph 12.

## 4.2 Identification and Description of Onshore Cable Corridors

60. An overview of the cable corridor routes identified during this process is set out in Table 4.1. For the purposes of this long-list exercise broad 500m wide corridors were identified, these will be refined at subsequent phases of the site selection exercise (detailed assessment, micro-siting etc of the preferred broad corridor(s)) down to the eventual application corridor width of 100m. The locations of the identified cable corridor routes are presented on Figure 4.1, Figure 4.2, and Figure 4.3. It is noted that following consultation on the Long List two additional routes were added (MZ-21 and SZ-22).

61. When identifying broad 500m wide corridors inevitably there is occasional overlap with some of the constraints, and an additional exercise was undertaken to identify the key Constraint Areas (CA) along these broad corridors to provide more detail of the available space. Further detail of potential constraints are detailed in Table 4.1, which are likely to require micro-siting or HDD to avoid and then detailed for each segment.

*Table 4.1 Consultation process overview*

| Cable Corridor | Constraints | Length |
|---|---|---|
| MZ-1 | • Braunton Burrows SAC<br>• Taw-Torridge Estuary SSSI<br>• Braunton Burrows SSSI<br>• Bideford to Foreland Point MCZ<br>• Priority Habitats (intertidal mudflat, coastal sand dunes, coastal and floodplain grazing marsh)<br>• RYA Boating Area<br>• Appledore Recommended Navigation Route<br>• Historic landfill | 4.7km |
| MZ-2 | • Braunton Burrows SAC<br>• Taw-Torridge Estuary SSSI<br>• Braunton Burrows SSSI<br>• Greenaways and Freshmarsh, Braunton SSSI<br>• Braunton Swanpool SSSI<br>• Saunton to Baggy Point Coast SSSI<br>• Bideford to Foreland Point MCZ<br>• Exmoor Coast and Heaths IBA<br>• North Devon Biosphere Reserve<br>• Priority Habitats (intertidal mudflat, coastal sand dunes, deciduous woodland, coastal and floodplain grazing marsh, and maritime cliff and slope)<br>• Horsey Island – managed realignment site<br>• North Devon AONB<br>• 1 listed building | 10.1km |

| Cable Corridor | Constraints | Length |
|---|---|---|
| NZ-3 | • Braunton Burrows SAC<br>• Taw-Torridge Estuary SSSI<br>• Braunton Burrows SSSI<br>• Greenaways and Freshmarsh, Braunton SSSI<br>• Braunton Swanpool SSSI<br>• Saunton to Baggy Point Coast SSSI<br>• Exmoor Coast and Heaths IBA<br>• North Devon Biosphere Reserve<br>• Priority Habitats (intertidal mudflat, coastal sand dunes, deciduous woodland, coastal and floodplain grazing marsh, and maritime cliff and slope)<br>• Horsey Island – managed realignment site<br>• North Devon AONB<br>• 1 listed building | 10.38km |
| MZ-4 | • Braunton Burrows SAC<br>• Taw-Torridge Estuary SSSI<br>• Braunton Burrows SSSI<br>• Greenaways and Freshmarsh, Braunton SSSI<br>• Braunton Swanpool SSSI<br>• Bideford to Foreland Point MCZ<br>• North Devon Biosphere Reserve<br>• Priority Habitats (intertidal mudflat, coastal sand dunes, deciduous woodland, and coastal and floodplain grazing marsh)<br>• Horsey Island – managed realignment site<br>• North Devon AONB | 5.7km |
| MZ-5 | • Braunton Burrows SAC<br>• Taw-Torridge Estuary SSSI<br>• Braunton Burrows SSSI<br>• Greenaways and Freshmarsh, Braunton SSSI<br>• Braunton Swanpool SSSI<br>• Saunton to Baggy Point Coast SSSI<br>• Bideford to Foreland Point MCZ<br>• Exmoor Coast and Heaths IBA<br>• North Devon Biosphere Reserve<br>• Priority Habitats (intertidal mudflat, coastal sand dunes, deciduous woodland, coastal and floodplain grazing marsh, and maritime cliff and slope)<br>• North Devon AONB<br>• Historic landfill | 10.4km |

| Cable Corridor | Constraints | Length |
|---|---|---|
| MZ-6 | • Braunton Burrows SAC<br>• Taw-Torridge Estuary SSSI<br>• Braunton Burrows SSSI<br>• Greenaways and Freshmarsh, Braunton SSSI<br>• Braunton Swanpool SSSI<br>• Bideford to Foreland Point MCZ<br>• North Devon Biosphere Reserve<br>• Priority Habitats (intertidal mudflat, coastal sand dunes, deciduous woodland, and coastal and floodplain grazing marsh)<br>• North Devon AONB | 6.14km |
| NZ-7 | • Braunton Burrows SAC<br>• Taw-Torridge Estuary SSSI<br>• Braunton Burrows SSSI<br>• Greenaways and Freshmarsh, Braunton SSSI<br>• Braunton Swanpool SSSI<br>• Saunton to Baggy Point Coast SSSI<br>• Exmoor Coast and Heaths IBA<br>• North Devon Biosphere Reserve<br>• Priority Habitats (intertidal mudflat, coastal sand dunes, deciduous woodland, coastal and floodplain grazing marsh, and maritime cliff and slope)<br>• Horsey Island – managed realignment site<br>• North Devon AONB | 10.69km |
| MZ-8 | • Braunton Burrows SAC<br>• Taw-Torridge Estuary SSSI<br>• Braunton Burrows SSSI<br>• Greenaways and Freshmarsh, Braunton SSSI<br>• Braunton Swanpool SSSI<br>• Saunton to Baggy Point Coast SSSI<br>• Exmoor Coast and Heaths IBA<br>• Bideford to Foreland Point MCZ<br>• North Devon Biosphere Reserve<br>• Priority Habitats (intertidal mudflat, coastal sand dunes, deciduous woodland, coastal and floodplain grazing marsh, and maritime cliff and slope)<br>• Horsey Island – managed realignment site<br>• North Devon AONB<br>• 1 listed building | 7.6km |

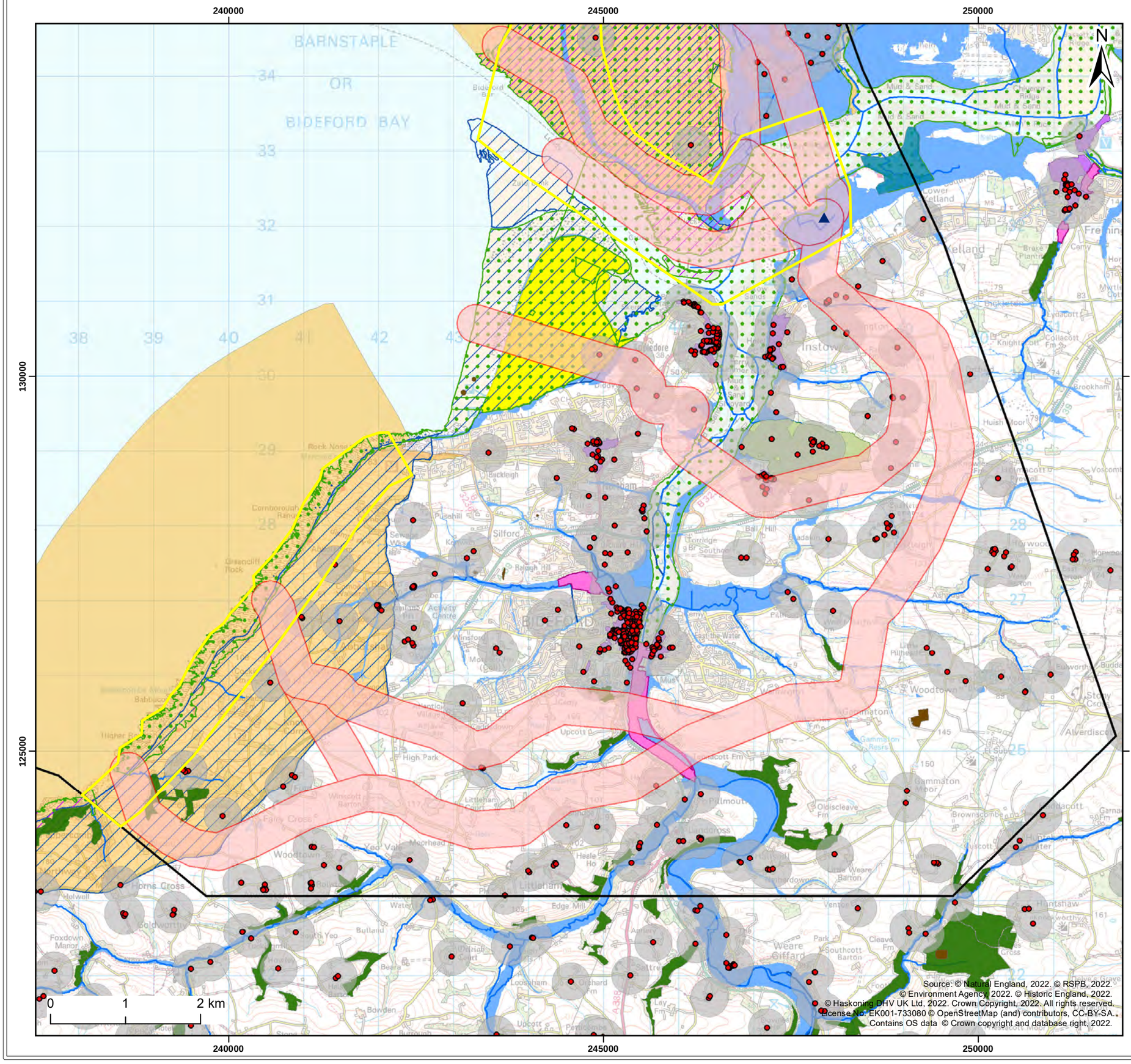
| Cable Corridor | Constraints | Length |
|---|---|---|
| MZ-9 | • Braunton Burrows SAC<br>• Taw-Torridge Estuary SSSI<br>• Braunton Burrows SSSI<br>• Greenaways and Freshmarsh, Braunton SSSI<br>• Braunton Swanpool SSSI<br>• Saunton to Baggy Point Coast SSSI<br>• Bideford to Foreland Point MCZ<br>• Exmoor Coast and Heaths IBA<br>• North Devon Biosphere Reserve<br>• Priority Habitats (intertidal mudflat, coastal sand dunes, deciduous woodland, coastal and floodplain grazing marsh, and maritime cliff and slope)<br>• North Devon AONB<br>• 1 listed building<br>• Historic landfill | 8.1km |
| SZ-10 | • Mermaid's Foot to Rowden Gut SSSI<br>• North Devon Biosphere Reserve<br>• Ancient woodland<br>• Kynoch's Foreshore LNR<br>• Priority Habitats (intertidal mudflat, coastal saltmarsh, deciduous woodland, coastal and floodplain grazing marsh, and maritime cliff and slope)<br>• 17 listed buildings<br>• North Devon AONB<br>• Historic landfill | 17.7km |
| SZ-11 | • Mermaid's Foot to Rowden Gut SSSI<br>• North Devon Biosphere Reserve<br>• Ancient woodland<br>• Kynoch's Foreshore LNR<br>• Priority Habitats (intertidal mudflat, coastal saltmarsh, deciduous woodland, coastal and floodplain grazing marsh, and maritime cliff and slope)<br>• 17 listed buildings<br>• North Devon AONB<br>• Strategic allocation | 16.8km |
| SZ-12 | • Mermaid's Foot to Rowden Gut SSSI<br>• North Devon Biosphere Reserve<br>• Ancient woodland<br>• Kynoch's Foreshore LNR<br>• Priority Habitats (intertidal mudflat, coastal saltmarsh, deciduous woodland, coastal and floodplain grazing marsh, and maritime cliff and slope)<br>• 17 listed buildings<br>• North Devon AONB<br>• Historic landfill | 18.7km |

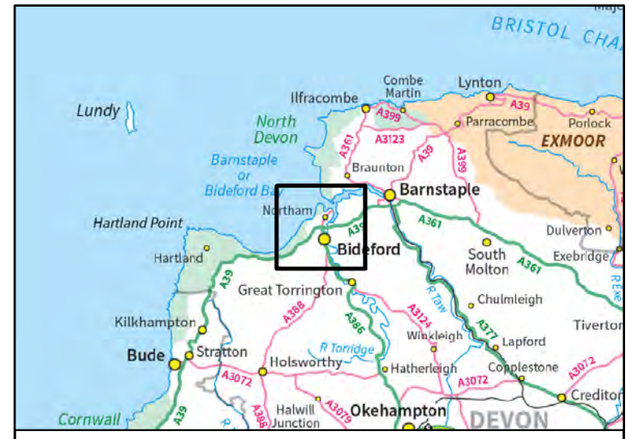
| Cable Corridor | Constraints | Length |
|---|---|---|
| MZ-13 | • Braunton Burrows SAC<br>• Taw-Torridge Estuary SSSI<br>• Braunton Burrows SSSI<br>• Greenaways and Freshmarsh, Braunton SSSI<br>• Braunton Swanpool SSSI<br>• Bideford to Foreland Point MCZ<br>• North Devon Biosphere Reserve<br>• Priority Habitats (intertidal mudflat, coastal sand dunes, deciduous woodland, and coastal and floodplain grazing marsh)<br>• North Devon AONB | 6.4km |
| MZ-14 | • Braunton Burrows SAC<br>• Taw-Torridge Estuary SSSI<br>• Braunton Burrows SSSI<br>• Greenaways and Freshmarsh, Braunton SSSI<br>• Braunton Swanpool SSSI<br>• Saunton to Baggy Point Coast SSSI<br>• Bideford to Foreland Point MCZ<br>• Exmoor Coast and Heaths IBA<br>• North Devon Biosphere Reserve<br>• Priority Habitats (intertidal mudflat, coastal sand dunes, deciduous woodland, coastal and floodplain grazing marsh, and maritime cliff and slope)<br>• North Devon AONB<br>• 1 listed building | 8.3km |
| MZ-15 | • Braunton Burrows SAC<br>• Taw-Torridge Estuary SSSI<br>• Braunton Burrows SSSI<br>• Greenaways and Freshmarsh, Braunton SSSI<br>• Braunton Swanpool SSSI<br>• Saunton to Baggy Point Coast SSSI<br>• Bideford to Foreland Point MCZ<br>• Exmoor Coast and Heaths IBA<br>• North Devon Biosphere Reserve<br>• Priority Habitats (intertidal mudflat, coastal sand dunes, deciduous woodland, coastal and floodplain grazing marsh, and maritime cliff and slope)<br>• North Devon AONB<br>• 1 listed building | 10.6km |

| Cable Corridor | Constraints | Length |
|---|---|---|
| NZ-16 | • Braunton Burrows SAC<br>• Taw-Torridge Estuary SSSI<br>• Braunton Burrows SSSI<br>• Greenaways and Freshmarsh, Braunton SSSI<br>• Braunton Swanpool SSSI<br>• Saunton to Baggy Point Coast SSSI<br>• Exmoor Coast and Heaths IBA<br>• North Devon Biosphere Reserve<br>• Priority Habitats (intertidal mudflat, coastal sand dunes, deciduous woodland, coastal and floodplain grazing marsh, and maritime cliff and slope)<br>• Horsey Island – managed realignment site<br>• North Devon AONB<br>• 1 listed building | 10.8km |
| NZ-17 | • Braunton Burrows SAC<br>• Taw-Torridge Estuary SSSI<br>• Braunton Burrows SSSI<br>• Greenaways and Freshmarsh, Braunton SSSI<br>• Braunton Swanpool SSSI<br>• Saunton to Baggy Point Coast SSSI<br>• Exmoor Coast and Heaths IBA<br>• North Devon Biosphere Reserve<br>• Priority Habitats (intertidal mudflat, coastal sand dunes, deciduous woodland, coastal and floodplain grazing marsh, and maritime cliff and slope)<br>• Horsey Island – managed realignment site<br>• North Devon AONB<br>• 1 listed building | 10.7km |
| NZ-18 | • Braunton Burrows SAC<br>• Taw-Torridge Estuary SSSI<br>• Braunton Burrows SSSI<br>• Greenaways and Freshmarsh, Braunton SSSI<br>• Braunton Swanpool SSSI<br>• Saunton to Baggy Point Coast SSSI<br>• Exmoor Coast and Heaths IBA<br>• North Devon Biosphere Reserve<br>• Priority Habitats (intertidal mudflat, coastal sand dunes, deciduous woodland, coastal and floodplain grazing marsh, and maritime cliff and slope)<br>• North Devon AONB<br>• Historic landfill | 10.5km |

| Cable Corridor | Constraints | Length |
|---|---|---|
| NZ-19 | • Braunton Burrows SAC<br>• Taw-Torridge Estuary SSSI<br>• Braunton Burrows SSSI<br>• Greenaways and Freshmarsh, Braunton SSSI<br>• Braunton Swanpool SSSI<br>• Saunton to Baggy Point Coast SSSI<br>• Exmoor Coast and Heaths IBA<br>• North Devon Biosphere Reserve<br>• Priority Habitats (intertidal mudflat, coastal sand dunes, deciduous woodland, coastal and floodplain grazing marsh, and maritime cliff and slope)<br>• Horsey Island – managed realignment site<br>• North Devon AONB<br>• 1 listed building | 10.1km |
| MZ-20 | • Braunton Burrows SAC<br>• Taw-Torridge Estuary SSSI<br>• Braunton Burrows SSSI<br>• Bideford to Foreland Point MCZ<br>• Priority Habitats (intertidal mudflat, coastal sand dunes, coastal and floodplain grazing marsh)<br>• RYA Boating Area<br>• Appledore Recommended Navigation Route | 4.2km |
| MZ-21 | • Braunton Burrows SAC<br>• Taw-Torridge Estuary SSSI<br>• Braunton Burrows SSSI<br>• Bideford to Foreland Point MCZ<br>• North Devon Biosphere Reserve<br>• Priority Habitats (intertidal mudflat, coastal sand dunes, coastal and floodplain grazing marsh)<br>• RYA Boating Area<br>• North Devon AONB<br>• North Devon Heritage Coast<br>• Common Land<br>• Historic landfill | 5.7km |

| Cable Corridor | Constraints | Length |
|---|---|---|
| SZ-22 | • Taw-Torridge Estuary SSSI<br>• Northam Burrows SSSI<br>• Bideford to Foreland Point MCZ<br>• North Devon Biosphere Reserve<br>• Priority Habitats (intertidal mudflat, coastal sand dunes, coastal and floodplain grazing marsh, traditional orchard, deciduous woodland)<br>• North Devon AONB<br>• 2 Scheduled Monuments<br>• >40 listed buildings<br>• 1 Grade II* Historic Park and Garden<br>• Westleigh Conservation Area<br>• Northam Burrows Country Park<br>• Common Land (at Northam Burrows)<br>• 3 permitted discharges<br>• Historic landfill | 10.6km |




Legend:

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- Landfall Zones
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- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- Local Nature Reserves (LNR)
- Country Parks
- RSPB Reserve Boundary
- Ancient Woodland
- Listed Buildings
- Listed Buildings 250m Buffer
- Scheduled Monuments
- Parks And Gardens
- Conservation Areas
- Main River
- Ordinary Watercourse
- Flood Zone 2
- Flood Zone 3

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: White Cross Onshore Cable Corridors – South Zone

| Figure: | Drawing No: |
|---|---|
| 4.1 | PC2978-RHD-ZZ-XX-DR-Z-0427 |

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Co-ordinate system: British National Grid

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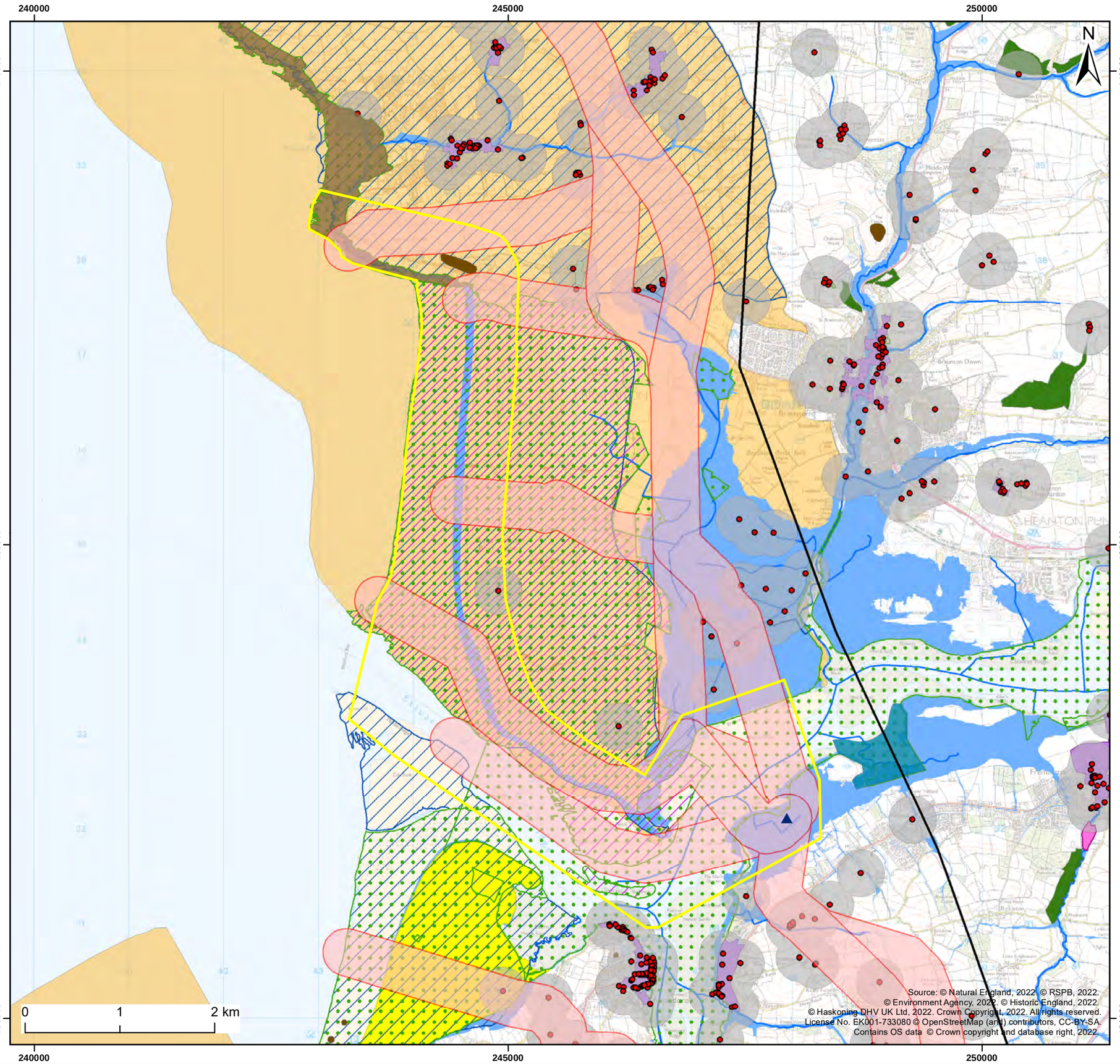


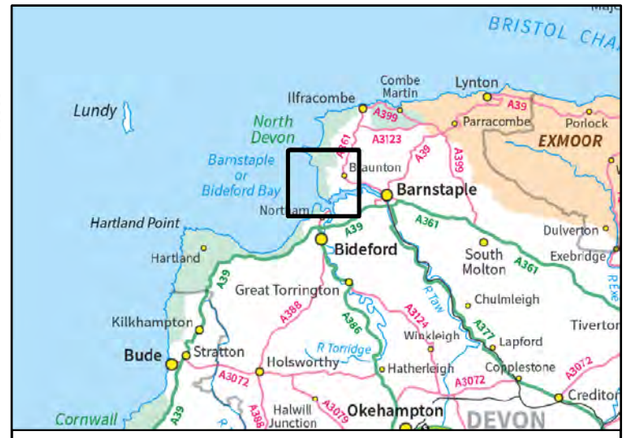


Legend:

- Area of Search
- Landfall Zones
- Potential Grid Connection Locations
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- Special Areas of Conservation (SAC)
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- Heritage Coast
- Local Nature Reserves (LNR)
- Country Parks
- RSPB Reserve Boundary
- Important Bird Areas (IBA)
- Ancient Woodland
- Listed Buildings
- Listed Buildings 250m Buffer
- Scheduled Monuments
- Parks And Gardens
- Conservation Areas
- Main River
- Ordinary Watercourse
- Flood Zone 2
- Flood Zone 3

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: White Cross Onshore Cable Corridors – Mid Zone

| Figure: | Drawing No: |
|---|---|
| 4.2 | PC2978-RHD-ZZ-XX-DR-Z-0428 |

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Co-ordinate system: British National Grid

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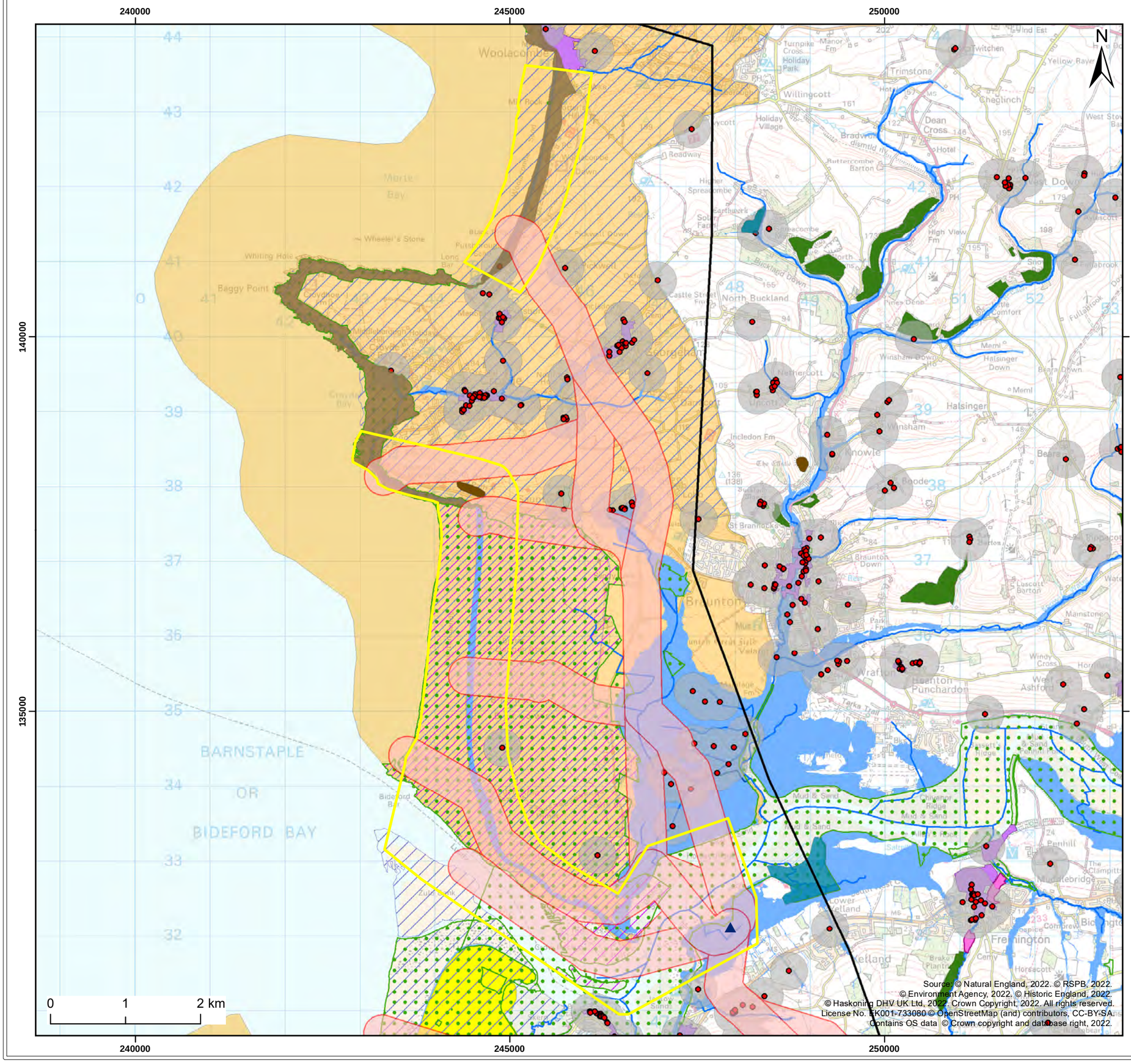


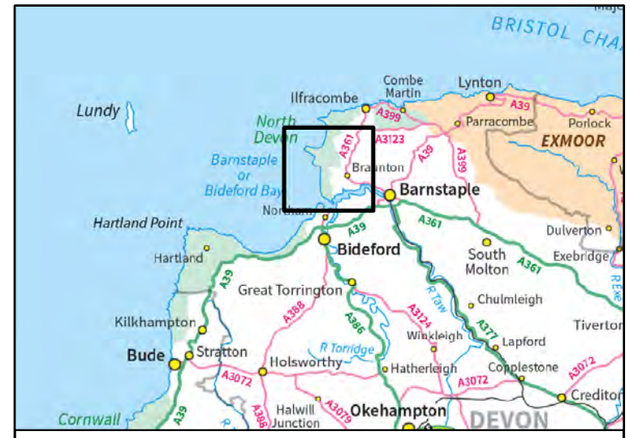


Legend:

- Area of Search
- Landfall Zones
- Potential Grid Connection Locations
- Onshore Cable Corridors
- Special Areas of Conservation (SAC)
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- Country Parks
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- Important Bird Areas (IBA)
- Ancient Woodland
- Listed Buildings
- Listed Buildings 250m Buffer
- Scheduled Monuments
- Parks And Gardens
- Conservation Areas
- Main River
- Ordinary Watercourse
- Flood Zone 2
- Flood Zone 3

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: White Cross Onshore Cable Corridors – North Zone

Figure: 4.3 | Drawing No: PC2978-RHD-ZZ-XX-DR-Z-0429

| Revision: | Date: | Drawn: | Checked: | Size: | Scale: |
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Co-ordinate system: British National Grid

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# 5. Onshore Substation – Identification of Long List

## 5.1 Introduction

62. To aid the decision-making process, following the identification and characterisation of the substation AoS, several substation zones were identified. As with the identification and characterisation of the AoS, several design principles and engineering assumptions were followed, along with the consideration of further data sets obtained by the project. Each of these are discussed below.

### 5.1.1 Design Assumptions

63. The maximum design parameters taken into consideration for the Onshore Substation options were:

- Construction compound dimensions (length) – 100m
- Construction compound dimensions (width) - 50m
- Construction compound total area – 5,000m$^2$
- Operational compound dimensions (max length) – 85m
- Operational compound dimensions (max width) – 50m
- Operation compound total area – 4,250m$^2$.

64. It is noted that dimensions for compounds are conservative (larger in size that that likely to be required), and that full reinstatement would be undertaken.

### 5.1.2 Site Selection Principles

65. The Onshore Substation options were identified and developed using the following design principles and selection criteria:

- Avoid residential titles (including whole garden) – 250m buffer
- Avoid direct significant impacts to international, European, and nationally designated areas (e.g. Ramsars, SACs, SPAs, and SSSIs etc.)
- Avoid nationally important designated landscapes and close proximity to the North Devon AONB
- Avoid ancient woodland (15m buffer from root system) and woodland habitat of principal importance
- Avoid protected hedgerows
- Avoid listed buildings (250m buffer / same as residential) and scheduled monuments
- Avoid areas that fall within Flood Zones 2 and 3
- For areas that are located within Flood Zones 2 and 3, consider locations identified as benefitting from the presence of flood defences
- Avoid areas that are high risk of surface water flooding

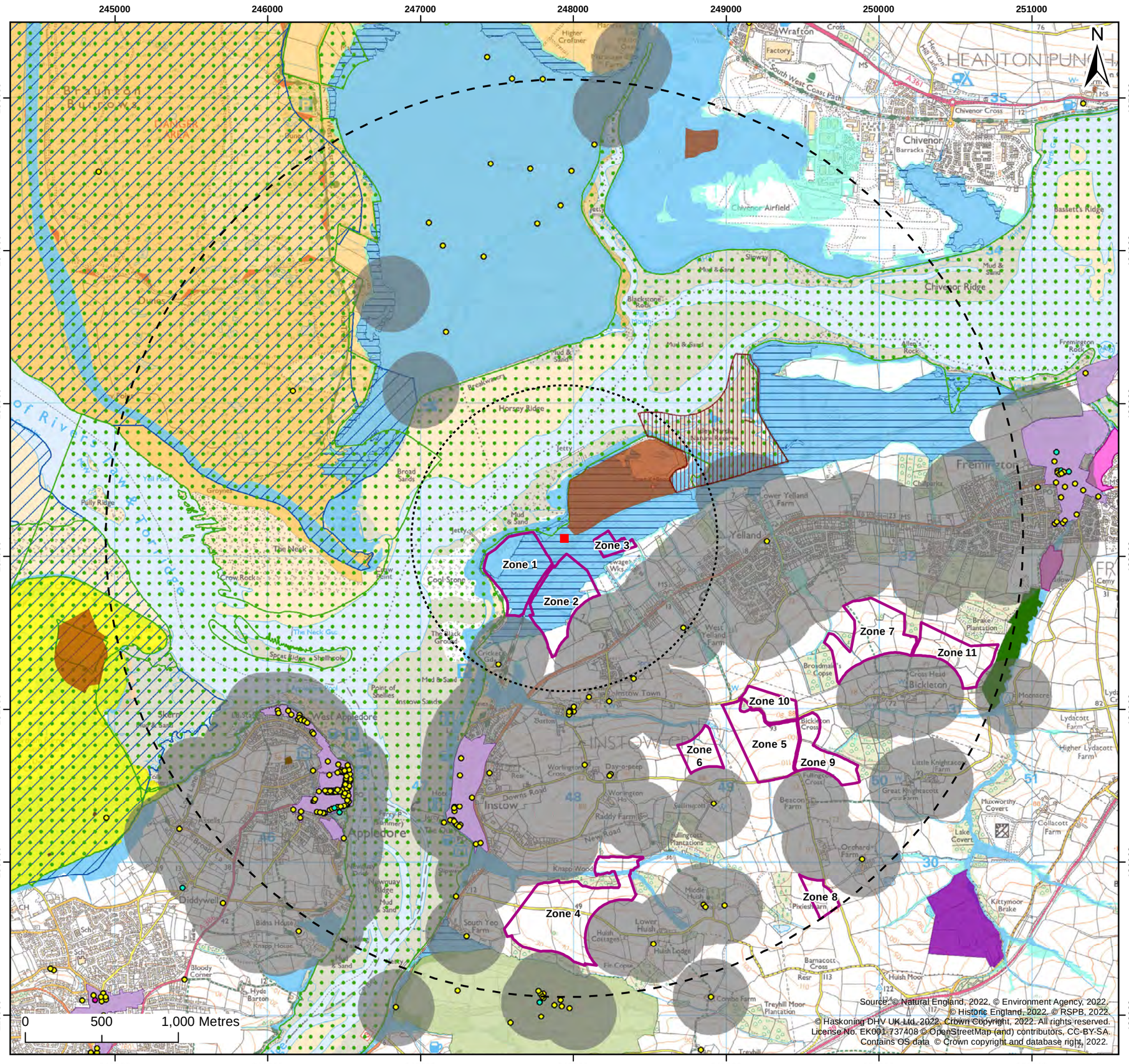
- Consider flood risk from other sources including but not limited to groundwater, sewers and reservoirs
- 100m buffer should be applied either side of high voltage overhead lines
- 50m buffer should be applied either side of high pressure gas mains
- 20m buffer should be applied either side of railway lines
- Avoid narrow roads and roads with 90° bends
- Minimise number of complex crossing, e.g. road, river and rail crossings (associated with cable routing)
- Consider the need for extra land take (either temporary or permanent) e.g. for road widening
- 200m buffer from airfields or landing strips
- Avoid areas of local amenity value, habitats of principal importance, landscape features (such as woodland and hedgerows), surface and ground water sources, and nature conservation areas (from Horlock Rules)
- Zones should take advantage of the screening provided by land form and existing features and the potential use of site layout and levels to keep intrusion into surrounding areas to a reasonably practicable minimum (from Horlock Rules)
- Zones should keep the visual, noise and other environmental effects to a reasonably practicable minimum (from Horlock Rules)
- The space required should be limited to the area required for development consistent with appropriate mitigation measures and to minimise the adverse effects on existing land use and Public Rights of Way (from Horlock Rules) including the England Coast Path, and avoid areas of Common Land
- Avoid historically contaminated sites, mineral extraction areas and quarries, and mines
- Avoid areas of poor ground conditions where possible
- Avoid Mineral Safeguarding Areas
- Approved planning applications i.e. Yelland Quay
- Slope / elevation – should be considered during siting.

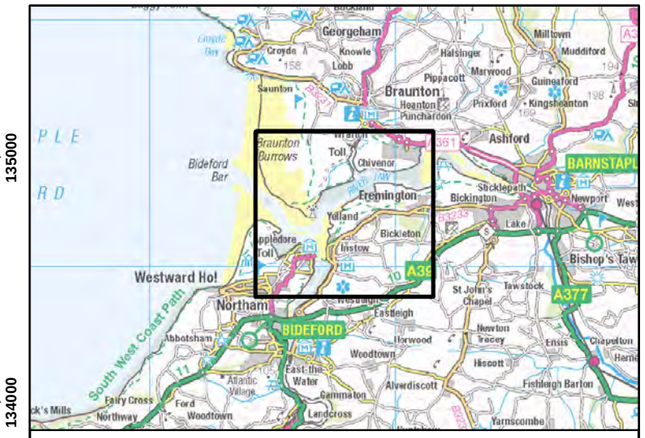
### 5.1.3 Datasets Used

66. The datasets used are listed in paragraph 12.

## 5.2 Identification and Description of Onshore Substation

67. Eleven potential (operational) substation zones have been identified taking into account the maximum operational footprint and existing constraints. The locations of the identified onshore substation zones are presented in Figure 5.1.




Legend:

- Existing Substation
- 1km Study area
- 3km Study Area
- Substation Zones
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- Local Nature Reserves (LNR)
- RSPB Reserve Boundary
- Country Parks
- Ancient Woodland
- Conservation Areas

**Listed Buildings**

**Grade**

- I
- II
- II*
- Scheduled Monuments
- Registered Parks And Gardens
- Authorised Landfill Site
- Historic Landfill Sites
- 250m Residential Buffer
- Flood Zone 2
- Flood Zone 3
- Areas Benefiting from Flood Defences



Client: Offshore Wind Ltd.

Project: White Cross Offshore Windfarm

Title: White Cross Long List Onshore Substation Zones

Figure: 5.1

Drawing No: PC2978-RHD-ZZ-XX-DR-Z-0448

| Revision: | Date: | Drawn: | Checked: | Size: | Scale: |
|---|---|---|---|---|---|
| P01 | 16/12/2022 | AB | CB | A3 | 1:25,000 |

Co-ordinate system: British National Grid

WHITE CROSS

Royal HaskoningDHV
Enhancing Society Together


# White Cross Offshore Wind Farm
# Short List Report

| | | |
|---|---|---|
| Document Code: | *FLO-WHI-REP-0015* | |
| Version Number: | 7.0 | |
| Date: | 8/03/2023 | |
| Prepared by: | *CB* | |
| Checked by: | *PT* | |
| Approved by: | *EF* | |

## Document History

| Version Number | Reason for Issue / Major Changes |
|---|---|
| v1.0 | Draft for review |
| v2.0 | Final Draft for review |
| v3.0 | Final for External Consultation |
| v4.0 | Draft for review following additional site selection for onshore substation |
| v5.0 | Update following review |
| v6.0 | Final |
| v7.0 | Final for Submission |

# Table of Contents

## Table of Figures



## Table of Tables

## Glossary of Acronyms

| Term | Definition |
|---|---|
| AfL | Agreement for Lease |
| AIS | Automatic Identification System |
| AOD | Above Ordnance Datum |
| AONB | Area of Outstanding Natural Beauty |
| AoS | Area of Search |
| BGS | British Geological Survey |
| cSAC | Candidate Special Area of Conservation |
| EIA | Environmental Impact Assessment |
| ES | Environmental Statement |
| EU | European Union |
| ha | Hectare |
| HDD | Horizontal Directional Drilling |
| HER | Historic Environment Record |
| IBA | Important Bird Area |
| km | Kilometre |
| LNR | Local Nature Reserve |
| m | Metre |
| MCZ | Marine Conservation Zone |
| NNR | National Nature Reserve |
| OS | Ordnance Survey |
| PDE | Project Design Envelope |
| PRoW | Public Right of Way |
| pSAC | Possible Special Area of Conservation |
| pSPA | Potential Special Protection Area |
| RSPB | Royal Society for the Protection of Birds |
| SAC | Special Area of Conservation |
| SPA | Special Protection Area |
| SSSI | Site of Special Scientific Interest |
| TJB | Transition Joint Bay |

# Glossary of Terminology

| Defined Term | Description |
|---|---|
| Agreement for Lease | An agreement for lease (AfL) is a non-binding agreement between a landlord and prospective tenant to grant and/or to accept a lease in the future. The AfL only gives the option to investigate a site for potential development. There is no obligation on the developer to execute a lease if they do not wish to. |
| Applicant | Offshore Wind Limited |
| Project Design Envelope | A description of the range of possible elements that make up the Project design options under consideration. This envelope is used to define the Project for Environmental Impact Assessment purposes when the exact parameters are not yet known. |
| Development Area | The area comprising the Onshore Development Area and the Offshore Development Area |
| Environmental impact assessment | Assessment of the potential impact of the proposed Project on the physical, biological and human environment during construction, operation and decommissioning. |
| Export Cable Corridor | The area in which the export cables will be laid, from the Offshore Substation Platform to the Onshore Substation comprising both the Offshore Export Cable Corridor and Onshore Export Cable Corridor. |
| High Voltage Alternating Current | High voltage alternating current is the bulk transmission of electricity by alternating current (AC), whereby the flow of electric charge periodically reverses direction. |
| High Voltage Direct Current | High voltage direct current is the bulk transmission of electricity by direct current (DC), whereby the flow of electric charge is in one direction. |
| Jointing bay | Underground structures constructed at regular intervals along the Onshore Export Cable Corridor to join sections of cable and facilitate installation of the cables into the buried ducts |
| Landfall | Where the offshore export cables come ashore |
| Link boxes | Underground chambers or above ground cabinets next to the cable trench housing electrical earthing links |
| Mean high water springs | The average tidal height throughout the year of two successive high waters during those periods of 24 hours when the range of the tide is at its greatest. |
| Mean low water springs | The average tidal height throughout a year of two successive low waters during those periods of 24 hours when the range of the tide is at its greatest. |
| Mean sea level | The average tidal height over a long period of time. |
| Mitigation | A term used interchangeably with Commitment(s). Mitigation measures (Commitments) are embedded within the assessment at the relevant point in the EIA (e.g. at Scoping). |
| Offshore Development Area | The Windfarm Site and Offshore Export Cable Corridor to Landfall |
| Offshore export cables | The cables which would bring electricity from the Offshore Substation Platform to the Landfall |
| Offshore Export Cable Corridor | The proposed offshore area in which the export cables will be laid, from the perimeter of the Windfarm Site to Landfall |

| | |
|---|---|
| Offshore infrastructure | All of the offshore infrastructure including wind turbines, Offshore Substation Platform(s) and all cable types |
| Offshore Substation Platform(s) | A fixed structure located within the Windfarm Site, containing electrical equipment to aggregate the power from the wind turbines and convert it into a more suitable form for export to shore |
| Offshore Transmission Owner | An OFTO, appointed in UK by Ofgem (Office of Gas and Electricity Markets), has ownership and responsibility for the transmission assets of an offshore windfarm. |
| Onshore Development Area | The onshore area above MHWS including the underground onshore export cables connecting to the Onshore Substation |
| Onshore Export Cables | The cables which bring electricity from Landfall to the Onshore Substation |
| Onshore Export Cable Corridor | The proposed onshore area in which the export cables will be laid, from Landfall to the Onshore Substation |
| Onshore infrastructure | The combined name for all infrastructure associated with the Project from Landfall to grid connection |
| Onshore Substation | Part of an electrical transmission and distribution system. Substations transform voltage from high to low, or the reverse by means of the electrical transformers |
| Transition bay | Underground structures at the Landfall that house the joints between the offshore export cables and the onshore export cables |
| White Cross Offshore Windfarm | 100MW capacity offshore windfarm including associated onshore and offshore infrastructure |
| Windfarm Site | The area within which the wind turbines, Offshore Substation Platform and inter-array cables will be present |

## Table of Units

| Term | Definition |
|---|---|
| AOD | Above Ordnance Datum |
| ha | Hectare |
| km | Kilometre |
| m | Metre |

# 1. Introduction

## 1.1 Purpose of this document

1. This report outlines the site selection process for the White Cross Offshore Windfarm (the Project) being undertaken by Royal HaskoningDHV on behalf of Offshore Wind Limited (OWL). It builds on the identification of the onshore and offshore Area of Search (AoS) (see document reference: PC2978-RHD-ZZ-XX-RP-Z-0013) and identification of Long List Export Cable corridors (see document reference: PC2978-RHD-ZZ-XX-RP-Z-0014). This report covers the process of assessment (Black, Red, Amber, Green (BRAG)) undertaken to identify a short list of options for the following project infrastructure elements:

   - Landfall
   - Offshore export cable route
   - Onshore cable route
   - Onshore Substation.

2. Each infrastructure element is presented in turn providing a general discussion of the rationale for identifying each option. The short list covers both offshore and onshore infrastructure as both influence and are influenced by the connections between them. Therefore, it should be noted that although each element will be assessed on its own merits, they need to be compatible with the adjoining component. For instance, an Offshore Cable route to the north, Landfall at South Zone and Onshore Cable Route in Mid Zone is not feasible.

### 1.1.1 Identification of the Offshore Windfarm location

3. The Agreement for Lease (AfL) area, known as the Windfarm Site, is located 52km north-west of the Cornwall and Devon coastline. The Windfarm Site boundary was established through site selection associated with the Crown Estate Test and Demonstration leasing opportunity. An Offshore Substation, if required, will be located within the AfL area.

### 1.1.2 Assumptions and Principles

4. To inform a robust Environmental Impact Assessment (EIA) process, it is important to define the assumptions and principles that underpin the site selection work to ensure that decisions are transparent. It is important to note that these assumptions and principles may be further refined as more information is obtained about the scale of the proposed development and the constraints present.

5. This site selection process is being undertaken to inform the EIA and to meet the requirements under Schedule 4(2) of the EIA Regulations to provide a description of reasonable alternatives.

6. In accordance with overarching policy and legislation, the design principles and engineering assumptions which are being considered for the Project are in line with best practice to avoid, reduce and minimise adverse impacts resulting from the construction, operation and decommissioning of project infrastructure. The design principles and engineering assumptions have been developed with consideration to industry guidance, including but not limited to:

   - The Crown Estate Cable Route Protocol 2017[1]
   - Overarching National Policy Statement for Energy (EN-1)
   - National Policy Statement for Renewable Infrastructure (EN-3)
   - National Policy Statement for Electricity Networks Infrastructure (EN-5)
   - Marine Policy Statement
   - Crown Estate's Cable Route Protocol
   - Electricity Act 1989
   - National Grid's Guidelines on Substation Siting and Design ('The Horlock Rules')[2]
   - Offshore Transmission Network Review led by the Department for Business, Energy & Industrial Strategy[3].

7. The desk-based constraints mapping of environmental and other consenting parameters was carried out on the basis of a Project Design Envelope (PDE). However, a detailed civil engineering review of these locations has not yet been undertaken to identify any significant engineering constraints that would preclude development, as these would require detailed geotechnical and other survey data that is not available or appropriate at this stage. However, engineering constraints have been considered on the basis of available information.

[1] The Cable Route Protocol comprises a set of requirements for offshore wind developers in the planning of off-shore export cable routes. Compliance with these requirements is secured within the offshore array AfL. Compliance with these requirements must be demonstrated as part of any application to The Crown Estate for a transmission assets AfL.

[2] The Horlock Rules: provide guidelines for, the design and siting of substations (in addition to cable sealing end compounds and line entries). When considering new electricity infrastructure, National Grid has regard to the degree to which options comply or deviate from these rules

[3] The Offshore Transmission Network Review looks into the way that the offshore transmission network is designed and delivered, consistent with the ambition to deliver net zero emissions by 2050.

## 1.2 Consultation

8. It is proposed that this report will form the basis of consultation with key stakeholders where possible, to achieve consensus on a preferred route.

9. To inform the route selection process, focussed individual consultation has taken place with experts from relevant organisations with a clear statutory role or non-statutory interest in the topics to be considered. Consultation was targeted at stakeholders with a significant interest and stake in the landfall and coastal environment. A series of meetings with stakeholders included the following steps:

   - Outline the route selection principles
   - Discuss the potential onshore or offshore cable corridor routes
   - Gain early feedback on unidentified constraints or opportunities.

10. Outcomes of the meetings included the suggestion of additional cable corridors:

    - Onshore cable corridors suggested (this will be explored further in the Onshore ES):
      - MZ-21 (North Bank of the Taw Estuary) is shown in Figure 4.21
        SZ-22 (Northam Burrows) is shown in Figure 4.22.
    - Offshore cable corridors suggested:
      - Corridor 7 – from the North Zone landfall connecting to the central core route to the OWF site
      - Corridor 8 – from the Mid Zone landfall connecting to the central core route to the OWF site.

11. Table 1.1 details the stakeholder meetings undertaken as part of the route selection process.

*Table 1.1 Stakeholder Consultation Undertaken*

| Meeting Purpose | Stakeholder Type | Organisation Name | Date |
|---|---|---|---|
| Onshore Route Selection Meeting | Statutory Consultee | Torridge District Council Planning | 26/01/2022 |
| Onshore Route Selection Meeting | Statutory Consultee | North Devon District Council Planning | 26/01/2022 |
| Onshore Route Selection Meeting | Statutory Consultee | Devon County Council (including County Ecologist and County Archaeologist) | 26/01/2022 |
| Offshore Route Selection Meeting | Statutory Consultee | Maritime and Coastguard Agency | 28/01/2022 |
| Offshore Route Selection Meeting | Fisheries organisation | Cornish Fish Producers Organisation | 28/01/2022 |
| Offshore Route Selection Meeting | Fisheries organisation | North Devon Fisherman's Association | 28/01/2022 |

| Meeting Purpose | Stakeholder Type | Organisation Name | Date |
|---|---|---|---|
| Onshore Route Selection Meeting | Landowner | Christie Devon Estates | 02/02/2022 |
| Onshore Route Selection Meeting | Statutory Consultee | Natural England | 29/06/2022 |
| Short List Report Review Comments on Onshore Cable Corridor | Statutory Consultee | Natural England | 17/08/2022 |

## 1.3 Datasets Used

12. The following data sets were used for route and site selection process:

- Areas of Outstanding Natural Beauty (AONB)
- Closed Disposal Sites
- Country Parks
- Heritage Coast
- Local Nature Reserves (LNR)
- Marine Conservation Zones (MCZ)
- National Nature Reserves (NNR)
- National Parks
- Ramsar
- Special Areas of Conservation (SAC)
- Possible Special Area of Conservation (pSAC)
- Candidate Special Area of Conservation (cSAC)
- Sites of Special Scientific Interest (SSSI)
- Special Protection Area (SPA)
- Potential Special Protection Area (pSPA)
- Conservation Areas
- Flood Zones
- Areas benefitting from flood defences
- Listed Buildings
- Scheduled Monuments
- Registered Parks and Gardens
- World Heritage Sites
- Historic Landfill Sites
- Active Landfill Sites
- RSPB Reserves
- Residential Properties
- Overhead Power Lines
- OS Woodland layer (in addition to Ancient Woodland)
- CRoW Act Open Access Land / Registered Common Land
- National Trust Land
- Long Distance Recreational Trails

- PRoW (if available)
- Tree Preservation Orders (if available)
- Historic maps
- Contour / topographic data.

## 2. Short List (BRAG) Methodology

13. Following the identification of the long list of options a Black-Red-Amber-Green (BRAG) assessment is undertaken to allow for comparative analysis of options, identifying the risks associated with each option. Higher risk options are given a red rating, whilst those with medium risks are coded amber and those with the least risk are assigned green. Black options are those which are not feasible from an engineering or environmental perspective. The aim is to ascertain which option carries the least risk with respect to the assessment criteria applied and based upon the professional judgement of the team of experts. Risk is determined prior to the implementation of mitigation such as trenchless techniques to avoid impacts. A summary of the option classification system is provided below:


14. Once the BRAG assessments are completed for each discipline, they will provide an aid to the decision-making process of site selection. This will ultimately help inform the options which may be discounted from the site selection process, and which options should be taken forward for further consideration. The BRAG assessment will also help identify areas where further work and information may be required in order to feed into the decision-making process.

15. The BRAG assessment methodology is an effective tool for comparing several different factors which need to be considered during the site selection process where:

- Each discipline can assess the key risks and opportunities
- The ranking process itself is a clear process by which it is possible to compare factors between each site
- It provides a consistent and repeatable framework in which to make decisions.

16. Furthermore, it is important to note:

- Each decision is led by expert opinion and applying professional judgement in the relative weighting of the different assessments
- The decision at key stages of the site selection process will be led by a workshop to bring together the different workstreams to test the decisions being made.

17. The outcome of this process is:

- An initial identification of a 'lowest risk' project design, based on the balance of risks.
- The identification of further studies that are required to support the conclusions reached through the BRAG assessment.

# 3. Route Selection Design Principles and Engineering Assumptions

18. The site selection process has been underpinned by a series of design assumptions and design principles which are used as a transparent framework for making site selection decisions at each stage of the site selection process. As different assumptions apply to different elements of the electrical transmission infrastructure, this section is broken down into different sub-sections for landfall, offshore cable corridor, onshore cable corridor, and onshore substation.

## 3.1 Landfall Zone

### 3.1.1 Design Assumptions

19. The maximum design parameters taken into consideration (to ensure room is available for the required maximum footprint) were as follows:

- Two export cable within the cable corridor[4]
- Transition bay dimensions length (m) (permanent land take) – 20m
- Transition bay dimensions width (m) (permanent land take) – 10m
- Landfall HDD compound length (m) – 200m
- Landfall HDD compound width (m) – 200m
- Maximum HDD length – 1,500m.

20. It is noted that dimensions for compound and transition bay are conservative (larger in size that that likely to be required) and that full reinstatement would be undertaken. The only remaining structure on the survey could be inspection manholes.

### 3.1.2 Site Selection Principles

21. The three landfall zones were identified and developed using the following high level site selection principles:

- Avoid direct significant impacts with sites designated for nature conservation at International, European, national and local level
- Avoid direct significant impacts on landscape and cultural heritage designations
- Avoid areas with substantial infrastructure or urban land use e.g. areas of housing and other energy infrastructure

[4] PDS states one single export cable will be installed if an Offshore Substation Platform is required. If an Offshore Substation is not required then two export cables needed.

- Avoid nearshore cable crossings that would result in prominent intertidal structures
- Minimise the number of crossings of existing offshore cables and pipelines
- Maintain sufficient space (minimum of 50m) for offshore cable installation (including anchor spread of installation vessels) whilst maintaining an appropriate safety buffer with existing sub-sea cables and pipelines
- Ensure potential landfall Horizontal Directional Drill (HDD) length is achievable
- Avoid areas where coastal cliffs experience high geomorphological activity (for cliff locations the rate of erosion is 10m per 100 years, therefore 5m over 50 years should be considered) or where there is slumping landward greater than 100m
- Ensure sufficient space inland to accommodate set back from the coast to reduce risk associated with coastal erosion.

### 3.1.3 Datasets Used

22. The following data sets were used for the identification of the Long List and within the BRAG assessment:

- Areas of Outstanding Natural Beauty (AONB)
- Vessel Automatic Identification System (AIS) data
- Closed Disposal Sites
- Landfill sites
- Historic landfill sites
- Permitted Waste Sites
- Marine Themes – cables and pipelines
- Offshore minerals aggregate agreements
- Emodnet seabed habitats
- BGS geological maps
- Flood Zone 2 and 3
- Source Protection Zones
- WFD waterbodies
- Strategic housing allocations (North Devon District and Torridge District)
- Country Parks
- National Cycle Network
- National Trails
- Devon County Public Rights of Way (PRoW)
- National Trust Open Land Data
- Registered Common Land
- Heritage Coast
- World Heritage Sites
- Scheduled Monuments

- Protected Wrecks
- Historic Parks and Gardens,
- Historic Battlefields
- Conservation Areas
- Listed Buildings
- Devon County Historic Environment Record (HER)
- Priority Habitat Inventory
- Ancient Woodland
- Royal Society for the Protection of Birds (RSPB) Reserves
- Local Nature Reserves (LNR)
- Marine Conservation Zones (MCZ)
- National Nature Reserves (NNR)
- National Parks
- Ramsar sites
- Special Areas of Conservation (SAC)
- Possible Special Area of Conservation (pSAC)
- Candidate Special Area of Conservation (cSAC)
- Sites of Special Scientific Interest (SSSI)
- Important Bird Areas (IBAs)
- Special Protection Area (SPA)
- Potential Special Protection Area (pSPA).

## 3.2 Offshore cable corridor

### 3.2.1 Design Assumptions

23. The maximum design parameters taken into consideration for the export cable corridor options were:

- Two export cable within the cable corridor[5]
- Offshore export cable corridor – 1km. It is noted that this will be subject to review where there are crossings of third-party cables / pipelines or other infrastructure constraints.

[5] PDS states one single export cable will be installed if an Offshore Substation Platform is required. If an Offshore Substation is not required then two export cables needed.

### 3.2.2 Routing Principles

24. Offshore export cable corridor options were developed using high level routing principles, including:

- Routing options need to be able to connect to viable landfall locations
- Routing options should be as short as possible
- Avoid direct long-term significant impacts to sites designated for nature conservation as far as possible
- Avoid direct significant impacts to ecologically important Annex I sandbanks and Annex I reefs as far as possible
- Minimise number of crossings of existing offshore cables and pipelines. Where crossing is required, cables and pipelines to be crossed at 90° or as near as possible to that, though tolerance angles can be agreed with infrastructure owners as design progresses
- Maintain required separation distances (minimum 50m) with other offshore cables and pipelines
- Maintain sufficient space for offshore cable installation (including anchor spread of installation vessels) whilst maintaining an appropriate safety buffer with existing sub-sea cables and pipelines
- Avoid wrecks as far as possible and completely avoid protected wrecks and a buffer zone of 250m
- Avoid anchorage areas
- Avoid actively dredged maintenance dredge areas
- Avoid disposal areas (closed or current)
- 'Seabed take' in aggregate dredging areas to be minimised and avoided where possible.

## 3.3 Onshore cable corridor

### 3.3.1 Design Assumptions

25. The maximum design parameters taken into consideration for the onshore export cable corridor options were:

- Two export cable within the cable corridor[6]
- Maximum cable corridor construction swathe width up to 50m
- Cable corridor construction swathe width at trenchless crossings – 60m
- Cable corridor construction swathe width at pinch points – 30m

[6] PDS states one single export cable will be installed if an Offshore Substation Platform is required. If an Offshore Substation is not required then two export cables needed.

- Trenchless crossing compounds length – 200m
- Trenchless crossing compounds width – 200m
- Maximum HDD length – 1,500m.

26. It is noted that dimensions for compounds and corridor widths are conservative and that full reinstatement would be undertaken. Corridors widths are conservative to provide flexibility to avoid unknown constraints such as archaeological features or utilities. The realistic cable corridor construction width may be less than 30m.

### 3.3.2 Routing Principles

27. Onshore cable corridor options were then developed using the following routing principles:

- Consider options to achieve most economic and efficient connection (shortest viable routes)
- Avoid direct significant (residual) impacts with sites designated for nature conservation at European, national and local level
- Avoid areas of important habitat, e.g. trees, ponds, wetlands, where possible
- Avoid proximity to residential dwellings (minimum 20m standoff distance)
- Minimise number of complex crossing, e.g. road, river and rail crossings
- Route cables along field boundaries where possible to minimise disturbance/disruption to farming practices
- Avoid proximity to Scheduled Monuments and listed buildings (minimum 40m standoff distance)
- Minimise impacts to residential areas in relation to access to services and road usage, including footpath closures where possible.

## 3.4 Onshore Substation

### 3.4.1 Design Assumptions

28. The maximum design parameters taken into consideration for the Onshore Substation options were:

- Construction compound dimensions (length) – 100m
- Construction compound dimensions (width) - 50m
- Construction compound total area – 5,000m$^2$
- Operational compound dimensions (max length) – 85m
- Operational compound dimensions (max width) – 50m
- Operation compound total area – 4,250m$^2$.

### 3.4.2 Routing Principles

29. The Onshore Substation options were identified and developed using the following design principles and selection criteria:

- Avoid residential titles (including whole garden) – 250m buffer
- Avoid direct significant impacts to international, European, and nationally designated areas (e.g. Ramsars, SACs, SPAs, and SSSIs etc.)
- Avoid nationally important designated landscapes and close proximity to the North Devon AONB
- Avoid ancient woodland (15m buffer from root system) and woodland habitat of principal importance
- Avoid protected hedgerows
- Avoid listed buildings (250m buffer / same as residential) and scheduled monuments
- Avoid areas that fall within Flood Zones 2 and 3
- For areas that are located within Flood Zones 2 and 3, consider locations identified as benefitting from the presence of flood defences
- Avoid areas that are high risk of surface water flooding
- Consider flood risk from other sources including but not limited to groundwater, sewers and reservoirs
- 100m buffer should be applied either side of high voltage overhead lines
- 50m buffer should be applied either side of high pressure gas mains
- 20m buffer should be applied either side of railway lines
- Avoid narrow roads and roads with 90° bends
- Minimise number of complex crossing, e.g. road, river and rail crossings (associated with cable routing)
- Consider the need for extra land take (either temporary or permanent) e.g. for road widening
- 200m buffer from airfields or landing strips
- Avoid areas of local amenity value, habitats of principal importance, landscape features (such as woodland and hedgerows), surface and ground water sources, and nature conservation areas (from Horlock Rules)
- Zones should take advantage of the screening provided by land form and existing features and the potential use of site layout and levels to keep intrusion into surrounding areas to a reasonably practicable minimum (from Horlock Rules)
- Zones should keep the visual, noise and other environmental effects to a reasonably practicable minimum (from Horlock Rules)
- The space required should be limited to the area required for development consistent with appropriate mitigation measures and to minimise the adverse

effects on existing land use and Public Rights of Way (from Horlock Rules) including the England Coast Path, and avoid areas of Common Land

- Avoid historically contaminated sites, mineral extraction areas and quarries, and mines
- Avoid areas of poor ground conditions where possible
- Avoid Mineral Safeguarding Areas
- Approved planning applications i.e. Yelland Quay
- Slope / elevation – should be considered during siting.

# 4. BRAG Assessment of Landfall Zone

## 4.1 Introduction

30. The following sub-sections summarise the results of the BRAG assessment of the long list landfall zone options that had been identified (see *Section 2* in the White Cross Long List Report (Royal HaskoningDHV, 2022b)) following the initial AoS (see *Section 1.3* in the White Cross Area of Search Report (Royal HaskoningDHV, 2022a)).

31. The BRAG assessment was also informed by additional information developed by Offshore Wind Limited Royal HaskoningDHV's Project Manager in their site walkover to the Landfall and Onshore Substation locations on 23rd September 2021, including visual observations and anecdotal information from local sources.

32. The landfall zones are shown in Figure 4.1.

## 4.2 Landfall North Zone

33. The North Zone landfall was discounted due to the following reasons:

34. Black: Significant transport and access issues resulting from long travel distances along width constrained and numerous sharp bends on B-road and minor roads (impacting on traffic and subsequent noise and air quality impacts as well), or requirement for significant haul road length across extensive areas with potential for archaeological receptors

35. Red: The northern portion of the landfall is steeply sloping and the HDD compound would require significant set-back and engineering complexity

36. Red: The southern area was constrained by residential property between National Trust owned land

37. Red: The presence of the Exmoor Coast and Heaths IBA (Important Bird Area).

240000

250000

140000

130000

N

North Zone

Mid Zone

South Zone

0 2 4 km


Legend:

- Landfall Zones
- Area of Search
- Potential Grid Connection Locations
- Closed Disposal Sites
- Marine Conservation Zones (MCZ)
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- Local Nature Reserves (LNR)
- Country Parks
- RSPB Reserve Boundary
- Important Bird Areas (IBA)
- Annex 1 Sandbanks
- Annex 1 Reef
- Anchorage area
- Pilot boarding place
- Anchorage area
- Military practice area
- Restricted area
- Submarine Cable
- Harbour facility
- Pipeline
- Harbour facility
- Navigation line
- Route, Ferry
- Route, Recommended
- Obstruction
- Wreck
- Obstruction
- Scheduled Monuments
- Conservation Areas
- Parks And Gardens

Client: Offshore Wind Ltd.

Project: White Cross Offshore Windfarm

Title: White Cross Land Fall Zones

Figure: 4.1

Drawing No: PC2978-RHD-ZZ-XX-DR-Z-0430

| Revision: | Date: | Drawn: | Checked: | Size: | Scale: |
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| P01 | 15/12/2022 | AB | CB | A3 | 1:90,000 |
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Co-ordinate system: British National Grid



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## 4.3 Landfall Mid Zone

### 4.3.1 Ecology

38. Red: Braunton Burrows SAC is across much of the landfall zone outside and in the entry of the estuary. However, it considered that any impacts to the mudflats and sandflats not covered by seawater at low tide habitat[7] on the foreshore would only be temporary during construction.

39. Red: Bideford to Foreland Point MCZ overlaps the non-estuarine intertidal component of the zone. However, the landfall location is not in close proximity to features for conservation importance (honeycomb worm (*Sabellaria alveotata*) reefs and littoral chalk communities). The nearest are located approximately 5km to the south of Kipling Tor. The zone does contain areas of intertidal sand and muddy (A2.2) and subtidal sand (A5.2). However, it considered that any impacts to these broad scale habitats would only be temporary during construction.

40. Red: SSSIs (Taw-Torridge Estuary SSSI and the Braunton Burrows SSSI) overlap the entire landfall zone including intertidal, onshore and estuary.

41. Red: North Devon Biosphere Reserve extends across the entire intertidal zone.

42. Red: A County Wildlife Site is located on Horsey Island, just inside the boundary. However, this could be avoided.

43. Amber: Exmoor Coast and Heaths Important Bird Area is present along the intertidal at the north end of the zone. However, this could be avoided.

44. Amber: UK Habitats of Principal Importance (Maritime cliff and slope, coastal sand dunes, deciduous woodland, coastal and floodplain grazing marsh, saltmarsh, and intertidal mudflats and sandflats) are present across large areas of the zone. Rocky reefs within are present within areas of the estuary within the zone.

### 4.3.2 Water and Sediment Quality

45. Black: Extensive areas on land within the zone on the north side of the Taw Estuary are within Flood Zone 2 and 3 and furthermore confirmed that tidal inundation occurs and as such the Horsey Island stretch is therefore unsuitable. Any routes along or crossing this section are discounted. Other than this there are only very

[7]Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site. See citation: https://sac.jncc.gov.uk/habitat/H1140/

small widths of Flood Zone 2 and 3 crossed within the intertidal zone at Saunton Sands and thus Amber.

46. Red: The landfall zone is located within an Environment Agency designated main river (Taw Estuary).

47. Red: An area of historic landfill is present to the north-east of the substation within the zone, which is unavoidable.

### 4.3.3 Archaeology and Cultural Heritage

48. Red: There is a high potential unknown heritage assets including prehistoric sites and findspots at Baggy Point, and for Modern (WW2) findspots associated with US Army Assault training centre. There is also potential for prehistoric palaeo-environmental remains within River Taw towards Yelland and unrecorded remains from periods listed above, relating to former, coastal defenses, fishing industry and wreck remains.

49. Amber: There is one Scheduled Monument within the zone.

50. Amber: There is one listed building within the zone.

51. Amber: There is a concentration of Mesolithic, Neolithic and general prehistoric findspots at Croyde and Baggy Point, largely comprising flint artefact scatters. Additionally, there are several early-medieval and post-medieval sites and findspots at Baggy Point. There is also a large number of modern HER records (mostly WW2) along Braunton Burrows associated with the US Army Assault training centre. Prehistoric palaeo-environmental remains recorded near Yelland in the River Taw. Also, there are a large number of post-medieval records relating to former structures and fishing apparatus.

52. Amber: 12 UKHO wreck and obstruction records within the zone.

53. Amber: 1 HER wreck record within the zone.

### 4.3.4 Noise

54. Red: There are a number of properties along Croyde Road within the north end of the zone, and at the south, the nearest residential are Appledore (130m), Instow (120m), and West Yelland (310m)

### 4.3.5 Traffic and Transport

55. Red: Length along minor roads is 200m - 3.98km for north of the River Taw (including some tight bends of 90 degrees), and 680m south of the River Taw (though with large splays on any key bends).

56. Red: Some routes will be fairly tight and not wide enough for HGVs so would require traffic management and possibly widening, better access south of the River Taw, though north of the River Taw the intention could be to open a haul road close off the B3231 and access the northern bank of the River Taw by the haul road to avoid locally narrow roads.

57. Amber: Length along B roads is 1.33km to 4.2km for north of the River Taw, and 5.1km to 5.6km for south of the River Taw.

### 4.3.6 Land Use and Socio economics

58. Black: The Taw and Taw-Torridge Estuary is a commercially navigable waterway, in particular use of it is relevant to the Appledore Shipyard and any reduction in estuary depth would result in a significant risk to navigation and could impact on the economic viability of the shipbuilding facilities. By discounting a route through the estuary this impact decreases to Green (no impact).

59. Red: The Coastal Path runs through the Saunton Sands Car Park access road.

60. Red: A National Cycle Network Route runs parallel within the zone along the south of the River Taw.

61. Red: Boating takes place within the Taw and Torridge Estuaries.

62. Red: Area of the zone at Yelland Quay is identified as inert waste recycling policy area. The Yelland Quay mixed development application is now approved and covers the area to the east of existing Yelland substation.

63. Amber: Saunton Sands Hotel and Saunton Beach Villas are located within the zone but would only experience at most indirect disturbance (noise, dust, and visual).

64. Amber: Extent along the South West Coastal Path on the south bank of the River Taw. However, this is avoidable.

65. Amber: There are 7 Public Rights of Way (PRoWs) within the zone including the Tarka Trail.

### 4.3.7 Landscape

66. Red: North Devon AONB extends across the majority of the zone, north of the River Taw.

67. Red: North Devon Heritage Coast extends across the majority of the zone, north of the River Taw.

68. Amber: Depending on location, the landfall zone ranges from constrained views albeit with large number of recreational receptors (but few residential) or wide views with only recreational receptors. However, the zone comprises semi-natural to

openly natural views and thus whilst sensitive has the potential to accommodate temporary and small scale construction works.

### 4.3.8 Engineering and Infrastructure

69. Black: Significant constraints to cables within the estuary therefore this should be discounted. In addition, there are likely to be significant constraints to HDD exit at the northern end of the landfall (Shelley Cove) along Saunton Down section, therefore this should be discounted. Offshore (Amber) HDD Space Constraints on HDD Drill Path and HDD Swathe are the presence of cables in northern section of Saunton Sands. These are to be avoided.

70. Red: HDD Indicative Minimum Design Horizontal Length ranges from 350m, to 750m, and 1090m.

71. Red: Some Onshore HDD Space Constraints on HDD Drill Path and HDD Swathe constraints depending on exact HDD location and route ranging from unconstrained to constrained.

72. Amber: Onshore HDD Compound Space Constraints is fairly constrained in places.

73. Amber: There are at least 2 cables making landfall at the northern end of the zone and these are avoidable.

74. Amber: There are 5 wrecks or obstructions within the zone but they are avoidable.

75. Amber: A small area designated a harbour facility is located on the south side of the River Taw but it is avoidable.

76. Amber: Large areas of the estuary and southern half of Saunton Sands are covered by Military Practice areas and are unavoidable.

## 4.4 Landfall South Zone

### 4.4.1 Ecology

77. Red: Mermaid's Pool to Rowden Gut SSSI across entire cliff frontage of the zone.

78. Red: North Devon Biosphere Reserve extends across the entire intertidal zone

79. Red: Mermaid's Pool to Rowden Gut SSSI across entire cliff frontage of the zone.

80. Red: There are a number of County Wildlife Sites along the coastline within this zone. However, these could be avoided.

81. Amber: Bideford to Foreland Point MCZ overlaps the far northern extent of the zone.

82. Amber: An area of ancient woodland is located within the zone. However, this can be avoided given the zone size.

83. Amber: UK Habitats of Principal Importance (Maritime cliff and slope and deciduous woodland) are present across large areas of the zone. Rocky reefs parallel to much of the zone though not in certain stretches.

### 4.4.2 Water and Sediment Quality

84. Amber: Very small width of Flood Zone 2 and 3 crossed in the intertidal zone.

### 4.4.3 Archaeology and Cultural Heritage

85. Red: High potential for prehistoric sites along the cliffs in this zone. Also potential for early-medieval sites, and post-medieval sites, however, unrecorded assets would likely be of agricultural origin and not of high significance.

86. Amber: There is a concentration of Mesolithic, Neolithic, general prehistoric, early medieval and post-medieval sites and find recorded along the cliffs. Also, large number of post-medieval records relating to former structures and fishing apparatus.

87. Amber: 1 UKHO wreck and obstruction records.

### 4.4.4 Noise

88. Red: A small number of residential properties at the northern end within the boundary and a scattering of residential along the zone on the border or immediately outside.

### 4.4.5 Traffic and Transport

89. Red: There is minor road access but no clear route to all sections of the zone. Roads are very narrow roads and some tight (90 degree) bends.

90. Red: Actual routes to landfall area are variable within limited road / access provision which could require significant haul road.

### 4.4.6 Land Use and Socio economics

91. Red: The Coastal Path runs parallel within the zone.

### 4.4.7 Landscape

92. Red: North Devon AONB extends across the entirety of the zone.

93. Red: North Devon Heritage Coast extends across the entirety of the zone.

94. Amber: Open views from numerous recreational sources (Coastal Path) but very few residential receptors in a natural and open landscape which is therefore sensitive. Given landform has some potential to accommodate construction works.

### 4.4.8 Engineering and Infrastructure

95. Red: No access onto the beach anywhere in the zone.

## 4.5 Landfall Zone Conclusions

96. Of the three landfalls, the North Zone was considered to be unsuitable and with significant (mainly access but also other less significant) constraints. On balance and through consideration of the BRAG assessment, and summarised key elements for the Mid Zone and South Zone landfalls in Table 4.1, it is considered that the Mid Zone landfall and the South Zone landfall are suitable areas to consider onshore and offshore export cable route connections. It is noted that a number of the red or amber concerns can be avoided or minimised with standard mitigation measures and this has been taken into account. Furthermore, the following recommendations taken:

- The Mid Zone landfall is reduced to encompass only the northern 2/3 of Saunton Sands / Braunton Burrows and excluding the cliffline to the north, and to retain a section of the Taw Estuary excluding the eastern element across the Horsey Island frontage. It should also exclude any consideration of a route along the estuary itself. Any routes within these excluded areas are therefore discounted.

*Table 4.1 Summary of Differences of Mid Zone and South Zone Landfalls*

| Constraints | Mid Zone Landfall | South Zone Landfall |
|---|---|---|
| Special Areas of Conservation (SAC) | Braunton Burrows SAC across much of the landfall zone outside and in the entry of the estuary | Tintagel-Marsland-Clovelly Coast SAC |
| Marine Conservation Zones (MCZ) | Bideford to Foreland Point MCZ within the non-estuarine intertidal component of the zone | Bideford to Foreland Point MCZ across the far northern extent of the zone |
| Sites of Special Scientific Interest (SSSI) | SSSI across the entire landfall zone including intertidal, onshore and estuary within the taw-Torridge Estuary SSSI and the Braunton Burrows SSSI | Mermaid's Pool to Rowden Gut SSSI across entire cliff frontage of the zone |
| Ancient Woodland | None within zone | An area of ancient woodland is located within the zone - though this can be avoided given the zone size |
| County Wildlife Sites | On Horsey Island there is a County Wildlife Site - just inside the boundary - though this could be avoided | There are a number of County Wildlife Sites along the coastline within this zone - though these could be avoided |
| Important Bird Areas | Exmoor Coast and Heaths is present along the intertidal at the north end of the zone and could be avoided<br><br>Taw-Torridge IBA within estuary. | None nearby |
| UK Habitats of Principal Importance e.g. woodland / rivers / hedgerows / unimproved grassland / coastal habitats / etc. | Maritime cliff and slope, coastal sand dunes, deciduous woodland, coastal and floodplain grazing marsh, saltmarsh, and intertidal mudflats and sandflats are present across large areas of the zone. Rocky reefs within areas of the estuary within the zone | Maritime cliff and slope and deciduous woodland are present across large areas of the zone. Rocky reefs parallel to much of the zone though not in certain stretches |
| Flood zones crossed | Very small width of Flood Zone 2 and 3 crossed in the intertidal zone at Saunton Sands, but extensive areas on land within the zone within the estuary | Very small width of Flood Zone 2 and 3 crossed in the intertidal zone |
| Proximity to EA designated main rivers | Within the landfall zone (Taw Estuary) | None within or adjacent to zone |
| Historic Landfill | An area of historic landfill is present to the north-east of the substation within the zone, which is unavoidable | None within zone |
| Distance from nearest scheduled monument (m) | One Scheduled Monument within zone | No SM in zone |
| Known designated heritage assets | One listed building within zone | No listed building within zone (though adjacent to boundary |

| Constraints | Mid Zone Landfall | South Zone Landfall |
|---|---|---|
| Known non-designated heritage assets | • Concentration of Mesolithic, Neolithic and general prehistoric findspots at Croyde and Baggy Point, largely comprising flint artefact scatters<br>• Several early-medieval and post-medieval sites and findspots at Baggy Point<br>• large number of modern HER records (mostly WW2) along Braunton Burrows associated with the US Army Assault training centre<br>• Prehistoric paleoenvironmental remains recorded near Yelland in the River Taw. Also, large number of post-medieval records relating to former structures and fishing apparatus | Concentration of Mesolithic, Neolithic, general prehistoric, early medieval and post-medieval sites and find recorded along the cliffs. Also, large number of post-medieval records relating to former structures and fishing apparatus |
| Unknown heritage assets (potential for buried archaeology) | • High potential for Prehistoric sites and findspots at Baggy Point<br>• High potential for Modern (WW2) findspots associated with US Army Assault training centre<br>• Also potential for Prehistoric paleoenvironmental remains within River Taw towards Yelland and unrecorded remains from periods listed above, relating to former, coastal defences, fishing industry and wreck remains | High potential for Prehistoric sites along the cliffs in this zone. Also potential for early-medieval sites, and post-medieval sites, however, unrecorded assets would likely be of agricultural origin and not of high significance |
| UKHO records | 12 UKHO wreck and obstruction records | 1 UKHO wreck and obstruction records |
| HER wreck records | 1 HER wreck record | None present |
| Distance to properties | There are a number of properties along Croyde Road within the north end of the zone, and at the south, the nearest residential are Appledore (130m), Instow (120m), and West Yelland (310m) | A small number of residential properties at the northern end within the boundary and a scattering of residential along the zone on the border or immediately outside |
| Access Appraisal | Some routes will be fairly tight and not wide enough for HGVs so would require traffic management and possibly widening, better access south of the Taw, though north of the Taw the intention could be to open a haul road close off the B3231 and access the northern bank of the Taw by the haul road to avoid locally narrow roads | Actual routes to landfall area are variable within limited road / access provision which could require significant haul road |

| Constraints | Mid Zone Landfall | South Zone Landfall |
|---|---|---|
| County Geological Sites | None present | A County Geological Site lies across the southern frontage of the Zone - though this could be avoided through HDD |
| National Trust Land | None within | A small area within which could be avoided through slight reduction in zone extent |
| National Coastal Path | The Coastal Path runs through the Saunton Sands Car Park access road | Coastal path runs parallel within the zone |
| Number of ProW crossings | There are 7 PRoWS within the zone including the Tarka Trail | Three footpaths are present within the zone |
| National Cycle Network Routes | Route runs parallel within the zone along the south of the River Taw | Not within or adjacent to the zone |
| RYA General Boating Area | Boating within the Taw and Torridge Estuaries | None nearby |
| Planning Applications | • Area of the zone at Yelland Quay is identified as inert waste recycling policy area.<br>• The Yelland Quay mixed development application is now approved and this covers the area to the east of existing Yelland substation | None within |
| Pipelines, Cables, Outfalls | At least 2 cables landfall at the northern end of the zone and are avoidable | An outfall linked to the Cornborough Sewage Treatment Works is located within the zone but is avoidable |
| Wrecks and obstructions | Five wrecks or obstructions within zone but avoidable | One wreck or obstruction within zone but avoidable |
| Industrial areas | A small area designated harbour facility is located on the south side of the River Taw but is avoidable | None within zone |
| Military practice areas | Large areas of the estuary and southern half of Saunton Sands are covered by Military Practice areas and are unavoidable | None within zone |

# 5. BRAG Assessment of Offshore Cable Corridors

97. The following sub-sections summarise the results of the BRAG assessment of the long list offshore cable corridors that had been identified (see *Section 3* in the White Cross Long List Report (Royal HaskoningDHV, 2022b)) following the initial AoS (see *Section 1.4* in the White Cross Area of Search Report (Royal HaskoningDHV, 2022a)).

## 5.1 Landfall North Zone

98. As concluded in Section 4.2.4, the North Zone landfall was considered to be unsuitable and/or unfeasible and therefore no offshore cable corridors were considered further from this landfall zone.

## 5.2 Landfall Mid Zone

99. The cable corridors are shown in the following figures:

- MZ-2 (Northern) is shown in Figure 5.1
- MZ-3 (Southern) is shown in Figure 5.2
- MZ-6 (Central) is shown in Figure 5.3.

### 5.2.1 MZ-2 (Northern)

100. Red: Water depth is within 10m and 20m in Barnstaple or Bideford Bay for two crossings.

101. Amber: The Bristol Channel Approaches / Dynesfeydd Môr Hafren Special Area of Conservation (SAC) is overlapped by this option. Any impact will be temporary as the designation is for marine mammals.

102. Amber: The Bideford to Foreland Point Marine Conservation Zone (MCZ) is overlapped by this option. Impact is predicted to be temporary.

103. Amber: The North Devon Biosphere Reserve is overlapped by this option. Impact is predicted to be temporary.

104. Amber: 6.7km of corridor will overlap Annex 1 Reef benthic habitat. Habitat is scattered and could be avoided through micro-siting.

105. Amber: 69.9km of corridor will overlap Annex 1 Sandbank.

106. Amber: 5 wrecks listed in the Devon Historic Environment Record (HER) are located within the cable corridor.

107. Amber: 1 undated record (feature) and 1 modern record (WW2 defense structure) are listed in the HER within the cable corridor.

108. Amber: 6 wrecks and 12 obstructions are located within the cable corridor.

109. Amber: There is the general potential for unrecorded wreck and aviation remains are within the cable corridor.

110. Amber: 3 palaeo-channels and a floodplain in this cable corridor are recorded in the West Coast Palaeo-landscapes Project.

111. Amber: 2.69km$^2$ of the cable corridor is located within the Braunton Burrows Military Training Area. This extent can be avoided.

112. Amber: 4.6km offshore from corridor commencement overlaps the Appledore Recommended Route.

113. Amber: 4 telecoms cables are overlapped by this cable corridor.

### 5.2.2 MZ-6 (Central)

114. Amber: The Bristol Channel Approaches / Dynesfeydd Môr Hafren Special Area of Conservation (SAC) is overlapped by this option. Any impact will be temporary as the designation is for marine mammals.

115. Amber: The Bideford to Foreland Point Marine Conservation Zone (MCZ) is overlapped by this option. Impact is predicted to be temporary.

116. Amber: The North Devon Biosphere Reserve is overlapped by this option. Impact is predicted to be temporary.

117. Amber: 14km of corridor will overlap Annex 1 Reef benthic habitat. Habitat is scattered and could be avoided through micro-siting.

118. Amber: 62km of corridor will overlap Annex 1 Sandbank.

119. Amber: 5 wrecks and 10 obstructions are located within the cable corridor.

120. Amber: 3 wrecks listed in the Devon Historic Environment Record (HER) are located within the cable corridor.

121. Amber: There is the general potential for unrecorded wreck and aviation remains are within the cable corridor.

122. Amber: 3 palaeo-channels and a floodplain in this cable corridor are recorded in the West Coast Palaeo-landscapes Project

123. Amber: 2.69km$^2$ of the cable corridor is located within the Braunton Burrows Military Training Area. This extent can be avoided.

124. Amber: The cable corridor could lap RYA General Boating Area 2.5km offshore.

125. Amber: 4 telecoms cables are overlapped by this cable corridor.

126. Amber: 6.7km$^2$ of cable corridor overlaps with disposal sites. This could be potentially avoided through micro-siting.

### 5.2.3 MZ-3 (Southern)

127. Amber: The Bristol Channel Approaches / Dynesfeydd Môr Hafren Special Area of Conservation (SAC) is overlapped by this option. Any impact will be temporary as the designation is for marine mammals.

128. Amber: The Bideford to Foreland Point Marine Conservation Zone (MCZ) is overlapped by this option. Impact is predicted to be temporary.

129. Amber: The North Devon Biosphere Reserve is overlapped by this option. Impact is predicted to be temporary.

130. Amber: 8.6km of corridor will overlap Annex 1 Reef benthic habitat. Habitat is scattered and could be avoided through micro-siting.

131. Amber: 69.2km of corridor will overlap Annex 1 Sandbank.

132. Amber: 3 wrecks and 5 obstructions are located within the cable corridor.

133. Amber: 5 wrecks listed in the Devon Historic Environment Record (HER) are located within the cable corridor.

134. Amber: There is the general potential for unrecorded wreck and aviation remains are within the cable corridor.

135. Amber: 3 palaeo-channels and a floodplain in this cable corridor are recorded in the West Coast Palaeo-landscapes Project

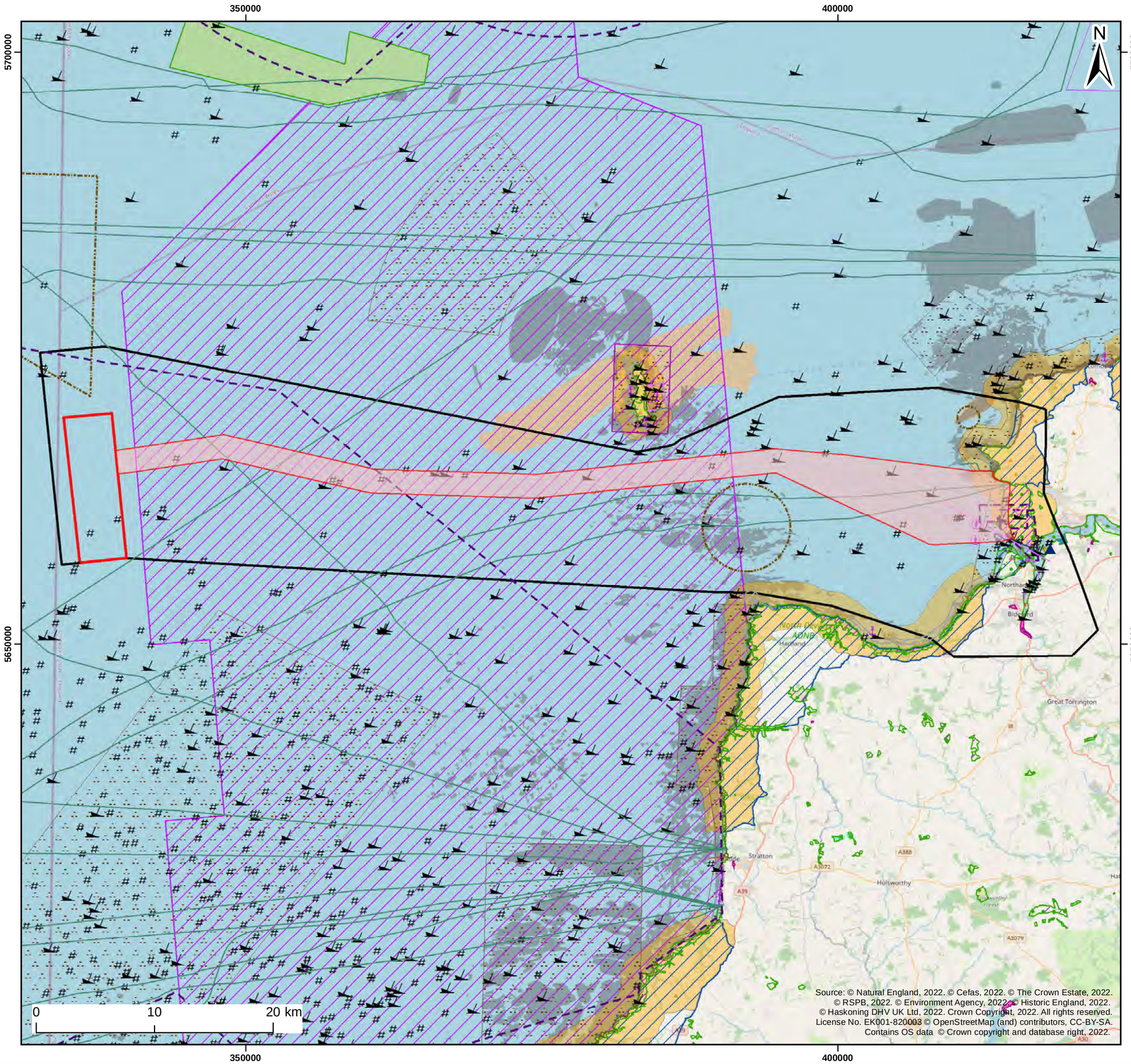
136. Amber: 2.69km$^2$ of the cable corridor is located within the Braunton Burrows Military Training Area. This extent can be avoided.

137. Amber: 2.9km offshore from corridor commencement overlaps the Appledore Recommended Route.

138. Amber: The cable corridor could lap RYA General Boating Area 2.5km offshore.

139. Amber: 4 telecoms cables are overlapped by this cable corridor.

140. Amber: 6.89km$^2$ of cable corridor overlaps with disposal sites. This could be potentially avoided through micro-siting.





Legend:

- Project Boundary
- Offshore Cable Corridor
- Area of Search
- Potential Grid Connection Locations
- Offshore Wave Site Pre-planning Application
- Closed Disposal Sites
- Marine Conservation Zones (MCZ)
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- National Nature Reserves (NNR)
- Local Nature Reserves (LNR)
- Important Bird Areas (IBA)
- RSPB Reserve Boundary
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- Annex 1 Reef
- Anchorage area
- Pilot boarding place
- Anchorage area
- Military practice area
- Restricted area
- Harbour area (administrative)
- Submarine Cable
- Harbour facility
- Pipeline
- Harbour facility
- Navigation line
- Route, Ferry
- Route, Recommended
- Obstruction
- Wreck
- Obstruction

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: White Cross Offshore Route MZ-2

| Figure: | Drawing No: |
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| 5.1 | PC2978-RHD-ZZ-XX-DR-Z-0431 |

| Revision: | Date: | Drawn: | Checked: | Size: | Scale: |
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Co-ordinate system: WGS 1984 UTM Zone 30N

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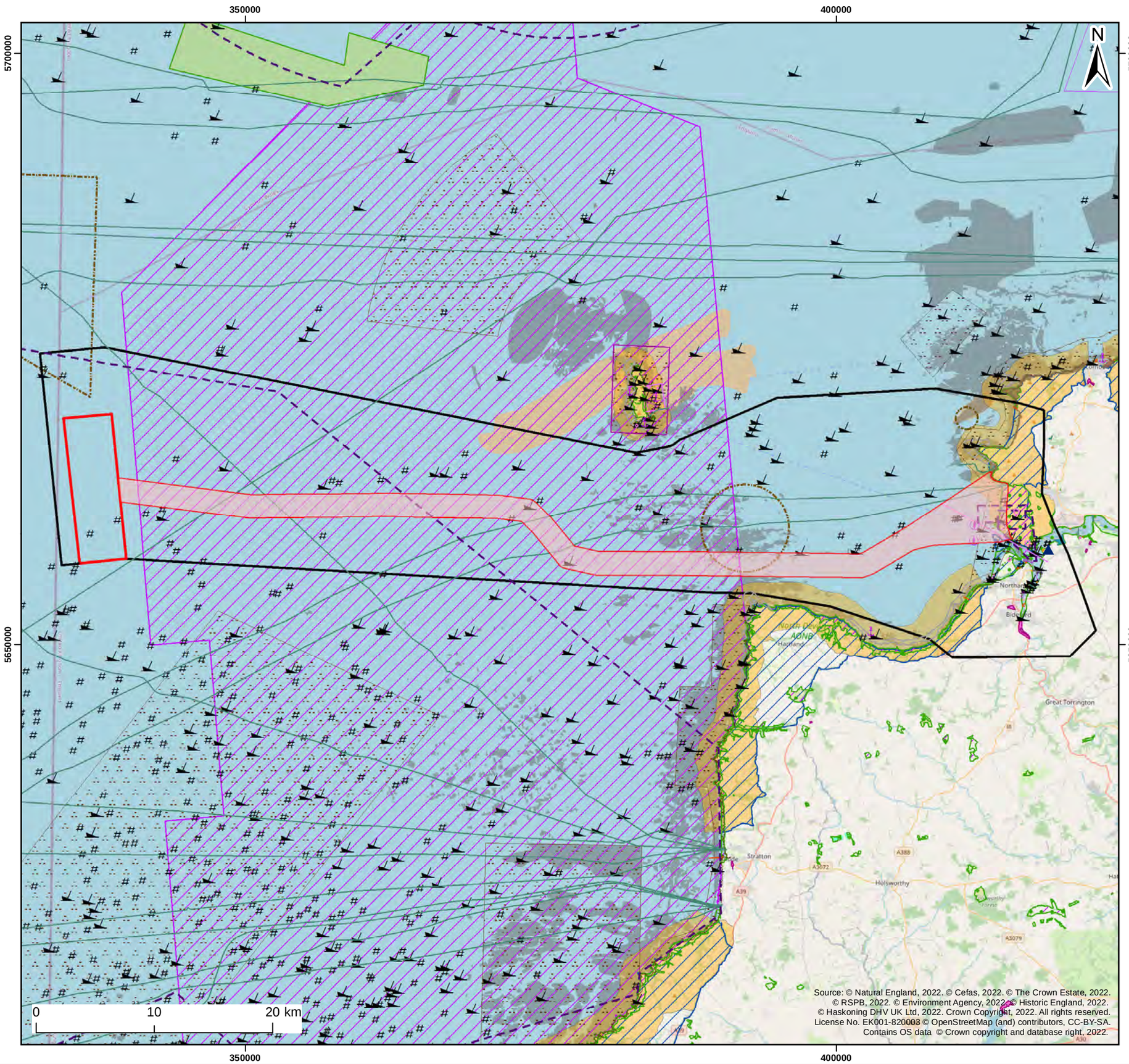



Legend:

- Project Boundary
- Offshore Cable Corridor
- Area of Search
- Potential Grid Connection Locations
- Offshore Wave Site Pre-planning Application
- Closed Disposal Sites
- Marine Conservation Zones (MCZ)
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
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- Submarine Cable
- Harbour facility
- Pipeline
- Harbour facility
- Navigation line
- Route, Ferry
- Route, Recommended
- Obstruction
- Wreck
- Obstruction

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: White Cross Offshore Route MZ-3

| Figure: | Drawing No: |
|---|---|
| 5.2 | PC2978-RHD-ZZ-XX-DR-Z-0432 |

| Revision: | Date: | Drawn: | Checked: | Size: | Scale: |
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Co-ordinate system: WGS 1984 UTM Zone 30N

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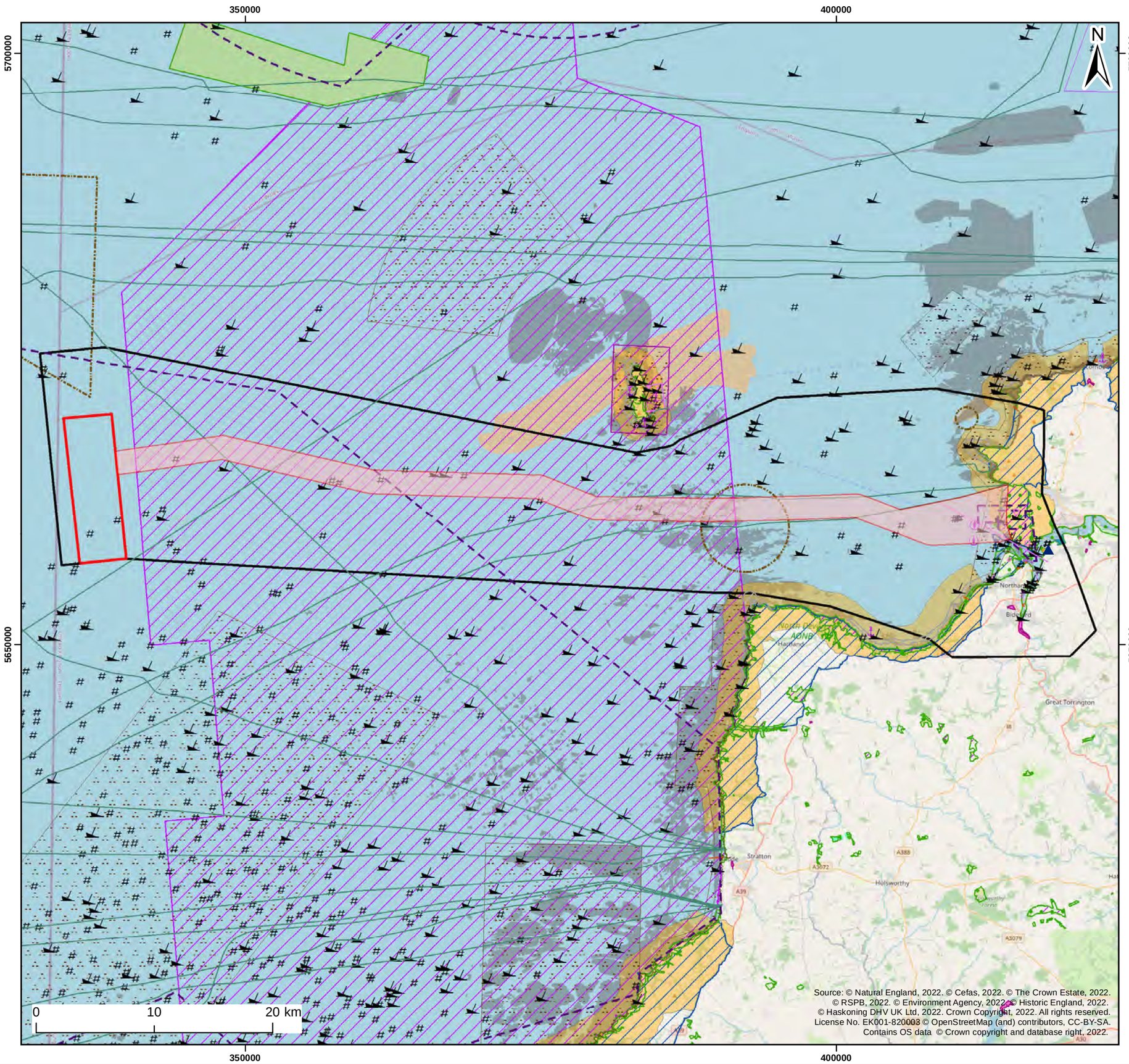


Legend:

- Project Boundary
- Offshore Cable Corridor
- Area of Search
- Potential Grid Connection Locations
- Offshore Wave Site Pre-planning Application
- Closed Disposal Sites
- Marine Conservation Zones (MCZ)
- Special Areas of Conservation (SAC)
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- National Nature Reserves (NNR)
- Local Nature Reserves (LNR)
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- RSPB Reserve Boundary
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- Anchorage area
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- Anchorage area
- Military practice area
- Restricted area
- Harbour area (administrative)
- Submarine Cable
- Harbour facility
- Pipeline
- Harbour facility
- Navigation line
- Route, Ferry
- Route, Recommended
- Obstruction
- Wreck
- Obstruction

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: White Cross Offshore Route MZ-6

Figure: 5.3 | Drawing No: PC2978-RHD-ZZ-XX-DR-Z-0433

| Revision: | Date: | Drawn: | Checked: | Size: | Scale: |
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Co-ordinate system: WGS 1984 UTM Zone 30N

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## 5.3 Landfall South Zone

141. The cable corridors are shown in the following figures:

- SZ-1 (Northern) is shown in Figure 5.4
- SZ-4 (Southern) is shown in Figure 5.5
- SZ-7 (Central) is shown in Figure 5.6.

### 5.3.1 SZ-1 (Northern)

142. Red: Water depth is within 10m and 20m in Barnstaple or Bideford Bay for two crossings.

143. Amber: The Bristol Channel Approaches / Dynesfeydd Môr Hafren Special Area of Conservation (SAC) is overlapped by this option. Any impact will be temporary as the designation is for marine mammals.

144. Amber: The North Devon Biosphere Reserve is overlapped by this option. Impact is predicted to be temporary.

145. Amber: 6.7km of corridor will overlap Annex 1 Reef benthic habitat. Habitat is scattered and could be avoided through micro-siting.

146. Amber: 70.3km of corridor will overlap Annex 1 Sandbank.

147. Amber: 5 wrecks and 9 obstructions are located within the cable corridor.

148. Amber: 3 wrecks listed in the Devon Historic Environment Record (HER) are located within the cable corridor.

149. Amber: There is the general potential for unrecorded wreck and aviation remains are within the cable corridor.

150. Amber: 3 palaeo-channels and a floodplain in this cable corridor are recorded in the West Coast Palaeo-landscapes Project

151. Amber: 4 telecoms cables are overlapped by this cable corridor.

### 5.3.2 SZ-7 (Central)

152. Amber: The Bristol Channel Approaches / Dynesfeydd Môr Hafren Special Area of Conservation (SAC) is overlapped by this option. Any impact will be temporary as the designation is for marine mammals.

153. Amber: The Bideford to Foreland Point Marine Conservation Zone (MCZ) is overlapped by this option. Impact is predicted to be temporary.

154. Amber: The North Devon Biosphere Reserve is overlapped by this option. Impact is predicted to be temporary.

155. Amber: 14.5km of corridor will overlap Annex 1 Reef benthic habitat. Habitat is scattered and could be avoided through micro-siting.

156. Amber: 65km of corridor will overlap Annex 1 Sandbank.

157. Amber: 5 wrecks and 9 obstructions are located within the cable corridor.

158. Amber: 3 wrecks listed in the Devon Historic Environment Record (HER) are located within the cable corridor.

159. Amber: There is the general potential for unrecorded wreck and aviation remains are within the cable corridor.

160. Amber: 3 palaeo-channels and a floodplain in this cable corridor are recorded in the West Coast Palaeo-landscapes Project

161. Amber: 4 telecoms cables are overlapped by this cable corridor.

162. Amber: 6.7km$^2$ of cable corridor overlaps with disposal sites. This could be potentially avoided through micro-siting.

### 5.3.3 SZ-4 (Southern)

163. Amber: The Bristol Channel Approaches / Dynesfeydd Môr Hafren Special Area of Conservation (SAC) is overlapped by this option. Any impact will be temporary as the designation is for marine mammals.

164. Amber: The North Devon Biosphere Reserve is overlapped by this option. Impact is predicted to be temporary.

165. Amber: 8.6km of corridor will overlap Annex 1 Reef benthic habitat. Habitat is scattered and could be avoided through micro-siting.

166. Amber: 64.9km of corridor will overlap Annex 1 Sandbank.

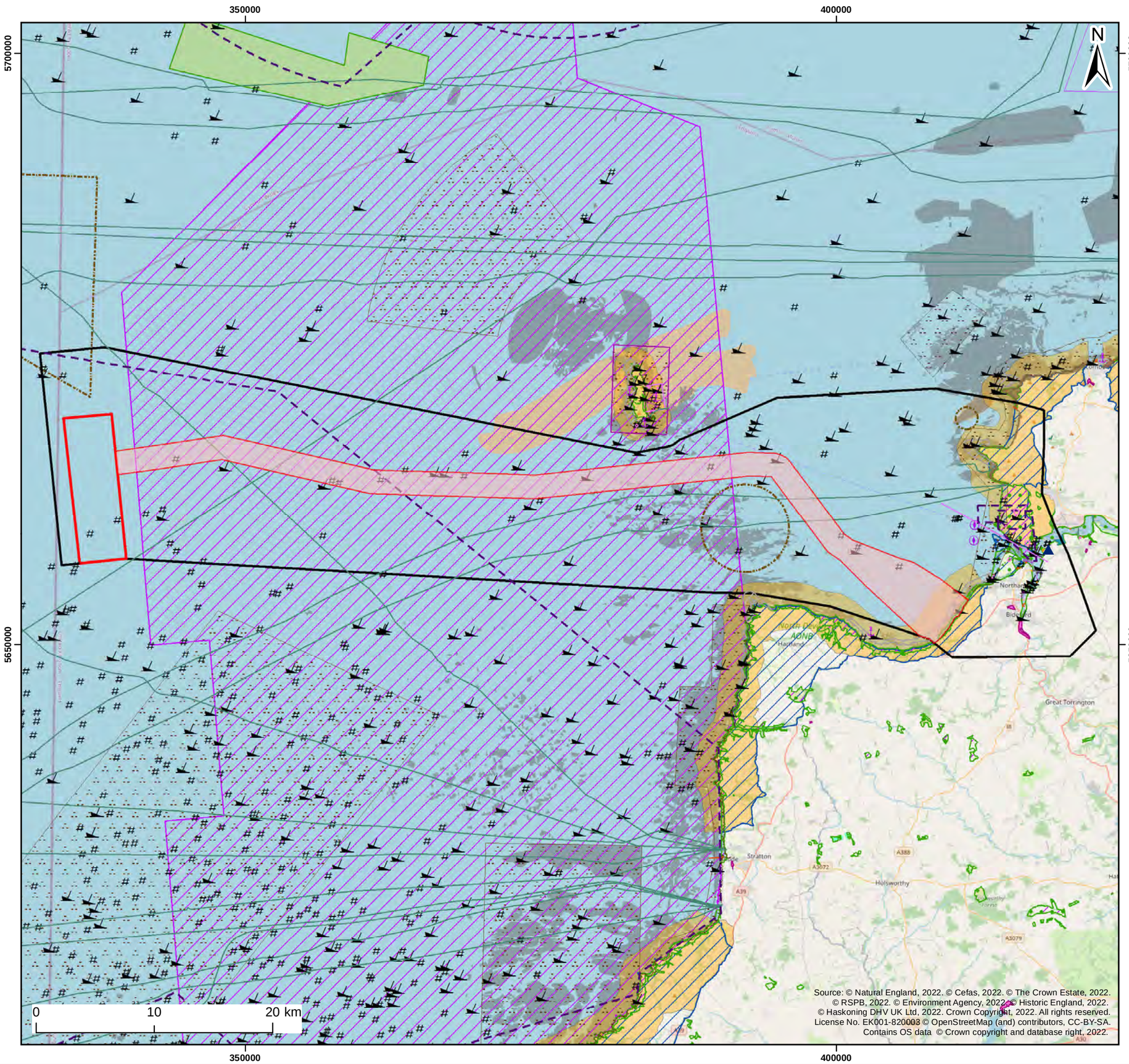
167. Amber: 2 wrecks and 2 obstructions are located within the cable corridor.

168. Amber: 3 wrecks listed in the Devon Historic Environment Record (HER) are located within the cable corridor.

169. Amber: There is the general potential for unrecorded wreck and aviation remains are within the cable corridor.

170. Amber: 4 telecoms cables are overlapped by this cable corridor.

171. Amber: 6.89km$^2$ of cable corridor overlaps with disposal sites. This could be potentially avoided through micro-siting.




Legend:

- Project Boundary
- Offshore Cable Corridor
- Area of Search
- Potential Grid Connection Locations
- Offshore Wave Site Pre-planning Application
- Closed Disposal Sites
- Marine Conservation Zones (MCZ)
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- National Nature Reserves (NNR)
- Local Nature Reserves (LNR)
- Important Bird Areas (IBA)
- RSPB Reserve Boundary
- Annex 1 Sandbanks
- Annex 1 Reef
- Anchorage area
- Pilot boarding place
- Anchorage area
- Military practice area
- Restricted area
- Harbour area (administrative)
- Submarine Cable
- Harbour facility
- Pipeline
- Harbour facility
- Navigation line
- Route, Ferry
- Route, Recommended
- Obstruction
- Wreck
- Obstruction

Client: Offshore Wind Ltd.

Project: White Cross Offshore Windfarm

Title: White Cross Offshore Route SZ-1

Figure: 5.4

Drawing No: PC2978-RHD-XX-ZZ-DR-Z-0434

| Revision: | Date: | Drawn: | Checked: | Size: | Scale: |
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| P01 | 16/12/2022 | AB | CB | A3 | 1:320,000 |
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Co-ordinate system: WGS 1984 UTM Zone 30N

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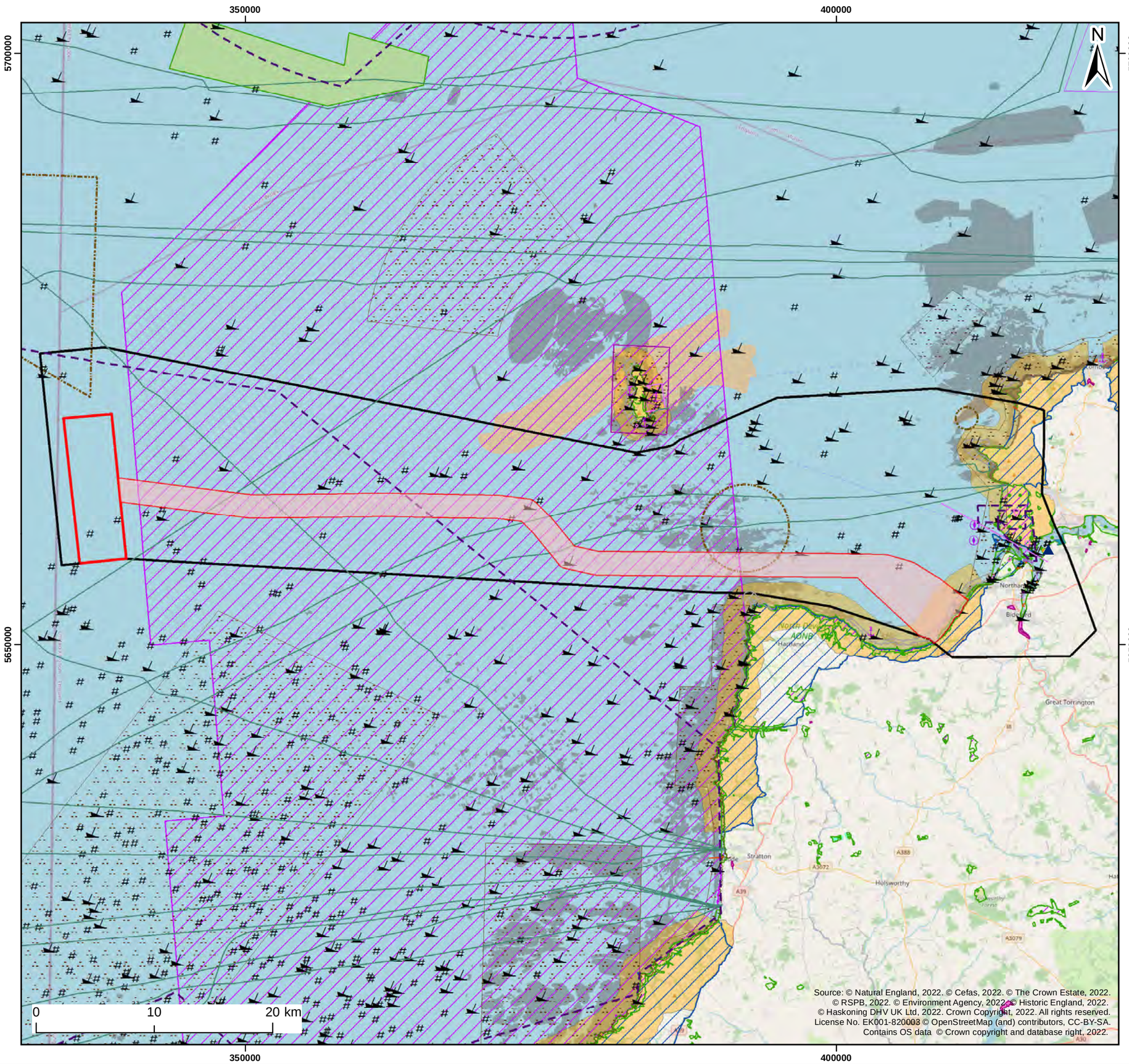


Legend:

- Project Boundary
- Offshore Cable Corridor
- Area of Search
- Potential Grid Connection Locations
- Offshore Wave Site Pre-planning Application
- Closed Disposal Sites
- Marine Conservation Zones (MCZ)
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- National Nature Reserves (NNR)
- Local Nature Reserves (LNR)
- Important Bird Areas (IBA)
- RSPB Reserve Boundary
- Annex 1 Sandbanks
- Annex 1 Reef
- Anchorage area
- Pilot boarding place
- Anchorage area
- Military practice area
- Restricted area
- Harbour area (administrative)
- Submarine Cable
- Harbour facility
- Pipeline
- Harbour facility
- Navigation line
- Route, Ferry
- Route, Recommended
- Obstruction
- Wreck
- Obstruction

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: White Cross Offshore Route SZ-4

Figure: 5.5 | Drawing No: PC2978-RHD-XX-ZZ-DR-Z-0435

| Revision: | Date: | Drawn: | Checked: | Size: | Scale: |
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Co-ordinate system: WGS 1984 UTM Zone 30N

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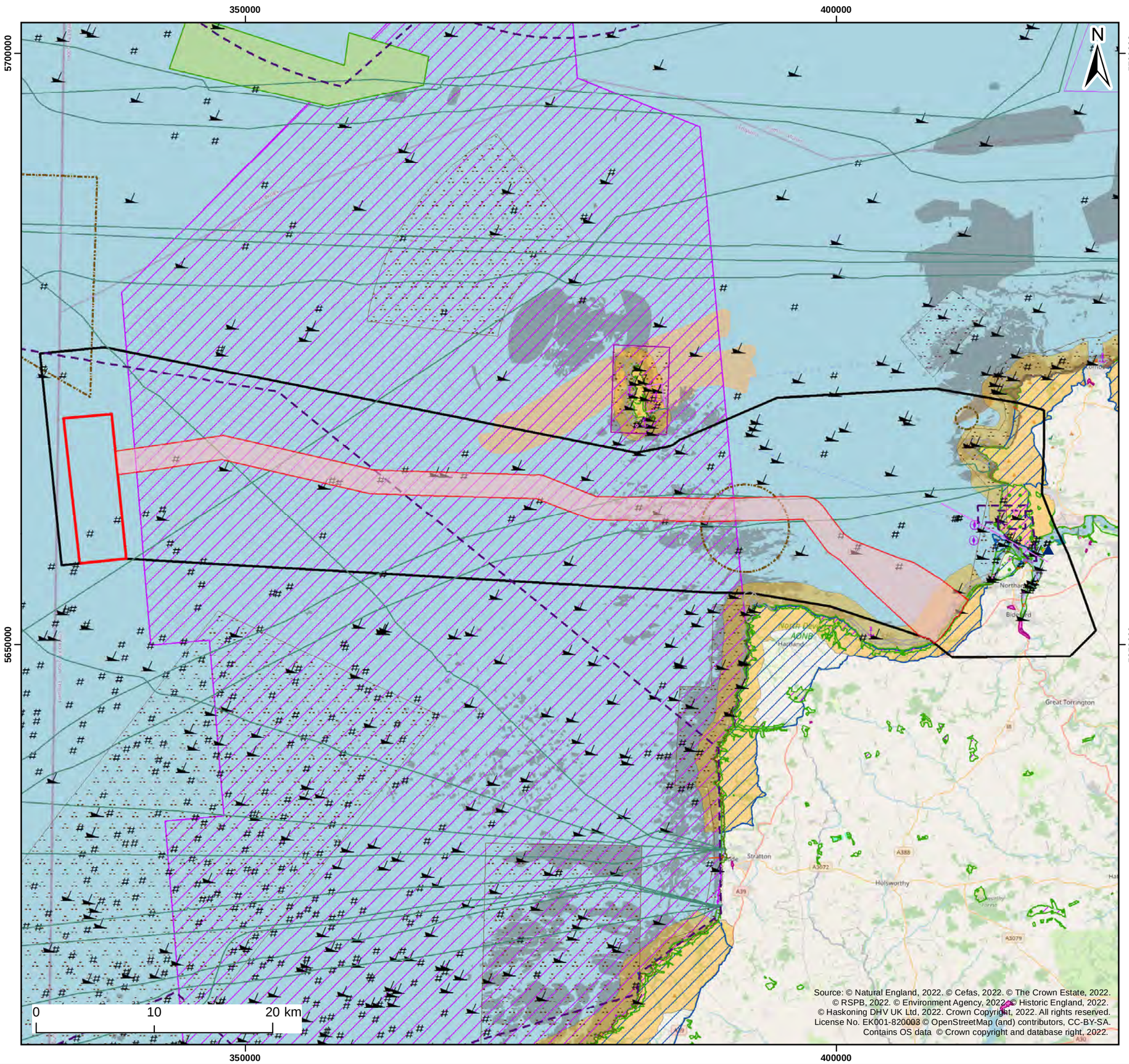


Legend:

- Project Boundary
- Offshore Cable Corridor
- Area of Search
- Potential Grid Connection Locations
- Offshore Wave Site Pre-planning Application
- Closed Disposal Sites
- Marine Conservation Zones (MCZ)
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- National Nature Reserves (NNR)
- Local Nature Reserves (LNR)
- Important Bird Areas (IBA)
- RSPB Reserve Boundary
- Annex 1 Sandbanks
- Annex 1 Reef
- Anchorage area
- Pilot boarding place
- Anchorage area
- Military practice area
- Restricted area
- Harbour area (administrative)
- Submarine Cable
- Harbour facility
- Pipeline
- Harbour facility
- Navigation line
- Route, Ferry
- Route, Recommended
- Obstruction
- Wreck
- Obstruction

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: White Cross Offshore Route SZ-7

Figure: 5.6 | Drawing No: PC2978-RHD-XX-ZZ-DR-Z-0436

| Revision: | Date: | Drawn: | Checked: | Size: | Scale: |
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Co-ordinate system: WGS 1984 UTM Zone 30N

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## 5.4 Offshore Export Corridor Conclusions

172. On the balance and basis of the BRAG assessment and summarised key elements for the Mid Zone and South Zone landfalls in Table 5.1, the preferred corridor is the northern route for the Mid Zone and the northern route for the South Zone.

173. Of the many receptors identified in the BRAG assessment, many are small in scale and avoidable through micro-siting or buffering which can be determined following more detailed surveys, or through changing the alignment of the cable route within the corridor to optimise outcomes (such as on cable crossings). However, the following are considered to be potentially high-risk elements which rule out two of the offshore export cable corridors:

- The Central Corridor added in following consultation contains concentrated and extensive areas of potential Annex 1 reef habitat (higher than other corridors), which significantly raises the potential for constraints both in terms of habitat but also in terms of cable burial (which is preferred)
- The Central Corridor runs an extensive distance through a disused former licensed disposal area, and the South Corridor runs partway through a disused former licensed disposal area. Information on both sites is unknown but there are likely to be elevated risks for any route running through these sites
- The Southern Corridor (close to Hartland Point) runs across an area where there is extensive reef and where there is high physical (tidal and current) activity with anecdotal information indicating that sediment coverage is likely to be limited and highly mobile

174. On the basis of the above issues regarding the Central and Southern Offshore Corridors, the Northern Offshore Corridor is identified as the preferred offshore route from the final selected / preferred landfall. It is noted that various receptors within the Northern Corridor will need to be considered throughout the EIA process, whereby survey and data collection along with resolution of the cable route itself is undertaken to avoid these where possible. These include:

- Ensuring no impact on the Bristol Channel Approaches SAC
- Ensuring no long-term impact on the Bideford to Foreland Point MCZ
- Avoiding potential Annex 1 reef habitat
- Avoiding wrecks and obstructions
- Avoiding features of archaeological potential
- Avoiding the Braunton Burrows Military Training Area (unless agreement reached with the MoD)
- Maximises distance and depth over which crossing of the Appledore Recommended Route occurs
- Maximise distance from Pilot Boarding Station
- Avoid cable crossings where depth is <20m.

*Table 5.1 Summary of Offshore Cable Route Differences from Mid Zone and South Zone Landfalls*

| Criteria | Mid Zone Landfall | | | Southern Zone Landfall | | |
|---|---|---|---|---|---|---|
| | MZ-2 (Northern) Figure 3.2 | MZ-6 (Central) Figure 3.7 | MZ-3 (Southern) Figure 3.3 | SZ-1 (Northern) Figure 3.1 | SZ-7 (Central) Figure 3.8 | SZ-4 (Southern) Figure 3.4 |
| Approximate Length of Cable Route (km) | 76.3km | 76.47km | 77.8km | 77km | 75.05km | 73.5km |
| Proximity to marine MCZ (m) | Overlaps with, but predicted to be temporary impact | Overlaps with, but predicted to be temporary impact | Overlaps with, but predicted to be temporary impact | 840m | 840m | 840m |
| Total length of corridor overlap with Annex 1 Reef (km) | 6.7km - though scattered which could enable avoidance through micro-siting | 14km - though scattered which could enable avoidance through micro-siting | 8.6km - though scattered which could enable avoidance through micro-siting | 6.7km - though scattered which could enable avoidance through micro-siting | 14.5km - though scattered which could enable avoidance through micro-siting | 8.6km - though scattered which could enable avoidance through micro-siting |
| Total length of corridor overlap with Annex 1 Sandbanks (km) | 69.6km | ~62km | 69.2km | 70.3km | ~65km | 64.9km |
| Distance to Protected Wrecks | 6.1km | 9.15km | 13.7km | 6.1km | 9.15km | 13.7km |
| Number of wrecks and obstructions within cable corridor | 6 wrecks<br>12 obstructions | 5 wrecks<br>10 obstructions | 3 wrecks<br>5 obstructions | 5 wrecks<br>9 obstructions | 5 wrecks<br>9 obstructions | 2 wrecks<br>2 obstructions |
| Devon HER wreck records within cable corridor | 5 wreck records | 3 wreck records | 5 wreck records | 3 wreck records | 3 wreck records | 3 wreck records |
| West Coast Palaeolandscapes Project | 3 palaeochannels and a floodplain recorded in this zone | 3 palaeochannels and a floodplain recorded in this zone | 3 palaeochannels and a floodplain recorded in this zone | 3 palaeochannels and a floodplain recorded in this zone | 3 palaeochannels and a floodplain recorded in this zone | 1 palaeochannel recorded |
| Extent within Braunton Burrows Military Training Area ($km^2$) | 2.69$km^2$ - though can be avoided | 2.69$km^2$ - though can be avoided | 2.69$km^2$ - though can be avoided | None | None | None |

| Criteria | Mid Zone Landfall | | | Southern Zone Landfall | | |
|---|---|---|---|---|---|---|
| | MZ-2 (Northern) Figure 3.2 | MZ-6 (Central) Figure 3.7 | MZ-3 (Southern) Figure 3.3 | SZ-1 (Northern) Figure 3.1 | SZ-7 (Central) Figure 3.8 | SZ-4 (Southern) Figure 3.4 |
| Appledore Recommended Route | Overlaps 4.6km offshore from corridor commencement | Overlaps3.9km offshore from corridor commencement | Overlaps 2.9km offshore from corridor commencement | Does not overlap | Does not overlap | Does not overlap |
| RYA General Boating Area | Unlikely to overlap | Could overlap 2.5km offshore | Could overlap 2.5km offshore | Unlikely to overlap | Unlikely to overlap | Unlikely to overlap |
| Overlap with disposal sites | None within or nearby | 13km$^2$ | 6.89km$^2$ - though potential to avoid through micro-siting | None within or nearby | 13km$^2$ | 6.89km$^2$ - though potential to avoid through micro-siting |

# 6. BRAG Assessment of Onshore Cable Corridors

## 6.1 Introduction

175. The following sub-sections summarise the results of the BRAG assessment of the long list onshore cable corridors that had been identified (see *Section 4* in the White Cross Long List Report (Royal HaskoningDHV, 2022b)) following the initial AoS (see *Section 1.3* in the White Cross Area of Search Report (Royal HaskoningDHV, 2022a)).

176. From the Long List options identified in *Section 4* in the White Cross Long List Report (Royal HaskoningDHV, 2022b), Table 6.1 identifies those onshore cable corridors taken forward into the BRAG (in bold), and reasons why others were discounted. In addition, the table identifies two additional routes added following stakeholder engagement.

177. The onshore cable corridors are shown in the following figures:

- MZ-5 (Shelley Cove) is shown in Figure 6.1
- MZ-6 (Saunton MoD) is shown in Figure 6.2
- MZ-9 (Saunton Car Park) is shown in Figure 6.3
- MZ-13 (Saunton MoD) is shown in Figure 6.4
- MZ-14 (Saunton Car Park) is shown in Figure 6.5
- MZ-15 (Shelley Cove) is shown in Figure 6.6
- MZ-21 (North Bank of the Taw Estuary) is shown in Figure 6.7
- SZ-10 (Abbotsham South) is shown in Figure 6.8
- SZ-11 (Abbotsham North) is shown in Figure 6.9
- SZ-12 (Peppercombe) is shown in Figure 6.10
- SZ-22 (Northam Burrows) is shown in Figure 6.11.

178. It is noted (as described in Section 1.3) that a request was made to consider a route through and making landfall at Northam Burrows. This route falls outside any landfall, but consideration has been made solely for the corridor alone in the below). Overall, it is considered that the corridor alone is sufficiently constrained or potentially impacting on key receptors to result in the exclusion of any potential landfall at Northam Burrows.

*Table 6.1 Onshore Cable Corridors*

| Route | Route Name | Figure | Decisions |
|---|---|---|---|
| MZ-1 | North Launch - Taw Estuary | 4.1 | Discounted due to potential impacts along the estuary route such as impact on national and international designated site features and potential risks to navigation. Potential impacts to nationally and internationally designated sites and risks to navigation are due to the difficulty in burying the cable under the bed of the estuary. This would result in the need for the cable being laid on the estuary bed with rock protection covering it to a height of approx. 1.5m. This would impact of draft for vessels and also the estuarine processes. The proposed development to the north-east of the substation conflicts with routeing |
| MZ-2 | North Launch – Shelley Cove | 4.2 | Horsey Island route is unfeasible due to managed realignment scheme and proposed development to the north-east of the substation conflicts with routeing |
| NZ-3 | North Launch – W – Woolacombe | 4.3 | Landfall is unfeasible / unsuitable and Horsey Island route is unfeasible due to managed realignment scheme as well as proposed development to the north-east of the substation conflicts with routeing |
| MZ-4 | North Launch – Saunton MoD | 4.4 | Horsey Island route is unfeasible due to managed realignment scheme and proposed development to the north-east of the substation conflicts with routeing |
| MZ-5 | North-west Launch – W – Shelley Cove | 4.5 | Carried forward for BRAG assessment |
| MZ-6 | North-west Launch – Saunton MoD | 4.6 | Carried forward for BRAG assessment |
| NZ-7 | North-west Launch – W – Woolacombe | 4.7 | North Zone Landfall is unfeasible / unsuitable |
| MZ-8 | North Launch – Saunton Car Park | 4.8 | Horsey Island route is unfeasible due to managed realignment scheme and proposed development to the north-east of the substation conflicts with routeing |
| MZ-9 | North-west Launch – Saunton Car Park | 4.9 | Carried forward for BRAG assessment |
| SZ-10 | Abbotsham South | 4.10 | Carried forward for BRAG assessment |
| SZ-11 | Abbotsham North | 4.11 | Carried forward for BRAG assessment |
| SZ-12 | Peppercombe | 4.12 | Carried forward for BRAG assessment |
| MZ-13 | West Launch – Saunton MoD | 4.13 | Carried forward for BRAG assessment |
| MZ-14 | West Launch – Saunton Car Park | 4.14 | Carried forward for BRAG assessment |
| MZ-15 | West Launch – Shelley Cove | 4.15 | Carried forward for BRAG assessment |

| Route | Route Name | Figure | Decisions |
|---|---|---|---|
| NZ-16 | West Launch – W – Woolacombe | 4.16 | North Zone Landfall is unfeasible / unsuitable |
| NZ-17 | West Launch – E – Woolacombe | 4.17 | North Zone Landfall is unfeasible / unsuitable |
| NZ-18 | North-west Launch – E – Woolacombe | 4.18 | North Zone Landfall is unfeasible / unsuitable |
| NZ-19 | North Launch – W – Woolacombe | 4.19 | Landfall is unfeasible / unsuitable and Horsey Island route is unfeasible due to managed realignment scheme as well as proposed development to the north-east of the substation conflicts with routeing |
| MZ-20 | Taw Estuary | 4.20 | Discounted due to potential impacts along the estuary route such as impact on national and international designated site features and potential risks to navigation |
| MZ-21 | West Launch – North side of Taw Estuary | 4.21 | Carried forward for BRAG assessment (on request) |
| SZ-22 | Northam Burrows | 4.22 | Carried forward for BRAG assessment (on request) |

## 6.2 Black Criteria

179. There is a significant constraint to the engineering feasibility in relation to the HDD exit and topography of the cliff for MZ-5 and MZ-15, which are options that route along Saunton Down and out the cliff.

180. Three onshore cable corridors from the Mid Zone Landfall (Yelland Launch) (MZ-5, MZ-6, and MZ-9) are constrained by a spacing less than 40m in width due to the proposed Yelland development. MZ-9 is also spatially constrained by the Saunton Car Park (however trenching would be adequate).

181. A recommended route (MZ-21) for consideration that runs along the southern boundary of the Braunton Burrows SAC has the potential to impact on geomorphological activity of this site, including the spit, and has a high risk of potential cable exposure which could impact the cable and the European site, such that at present a likely significant effect would arise. It is considered that there are other potential alternative routes that would avoid potential long-term impacts on the site. Therefore this route is discounted.

182. There are residential properties across the entire corridor for SZ-22 (a recommended route to consider) which are unavoidable.

183. Feedback from stakeholders and further detail on potential cable design and indicative construction requirements has now resulted in the updated assessment concluding that corridors MZ-13 and MZ-14 would result in a black constraint. Along American Road, the increased scale of construction plant required may result in significant temporary disturbance to non-degraded (and degraded) habitat within

the SAC. A significant adverse effect would arise, and would be unconsentable as other routes could be followed which do not have direct impact.

## 6.3 Red Criteria

184. Three onshore cable corridors from Landfall 5E02 (SZ-10, SZ-11, and SZ-12) exceed 15km in length.

185. Three onshore cable corridors from the Southern Landfall (SZ-10, SZ-11, and SZ-12) have steep sections where the gradient is steeper than 1 in 4.

186. The South Zone corridors (SZ-10, SZ-11, SZ-12, and SZ-22) all have high numbers of simple obstacle crossings (in excess of 16) compared to less than 6 for all other landfall zone routes.

187. Two onshore cable corridors from Mid Zone Landfall (Western Launch) (MZ-6 and MZ-14) and three onshore cable corridors from the Southern Landfall (SZ-10, SZ-12, and SZ-22) are spatially constrained at pinch points.

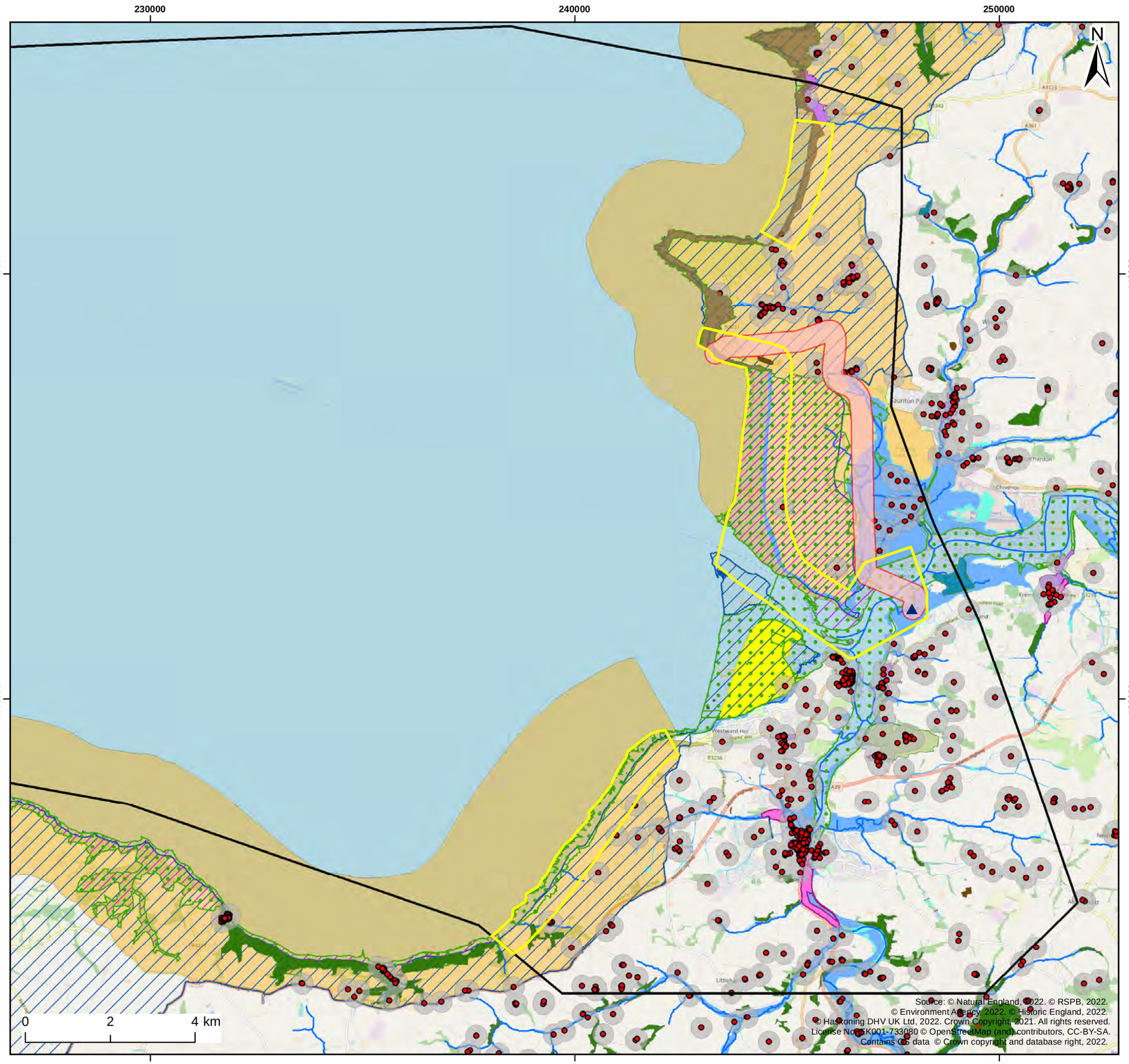
188. Three onshore cable corridors from the Mid Zone Landfall (Yelland Launch) (MZ-5, MZ-6, and MZ-9), three onshore cable corridors from the Mid Zone Landfall (Western Launch) (MZ-13, MZ-14, and MZ-15), and one onshore cable corridor from Northam Burrows (SZ-22) contain in excess of 500m length within Flood Zones 2 and 3.

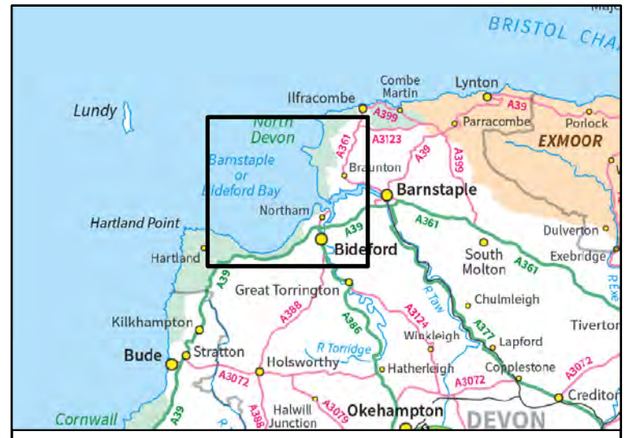
189. Two onshore cable corridor from the Mid Zone Landfall (MZ-6 and MZ-13) are partially located within the Braunton Burrows SAC. The length (2.2km) required to HDD under to avoid a potential direct impact is too long. Consequently, a likely significant direct impact is predicted. However, the site is in unfavourable condition and is undergoing a range of extensive clearance activities and other works under the Dynamic Dunescapes project. Given these potential disturbances and the possibility that the Project could contribute and enhance the works proposed for the Dynamic Dunescapes project it is considered that possible mitigation measures for the White Cross cable installation works are identifiable with no long-term adverse effect on the SAC features.

190. Three onshore cable corridor from Mid Zone Landfall (MZ-6 and MZ-13, MZ-21), and the Northam Burrows recommended corridor (SZ-22) are partially located within SSSIs.

191. All Landfall routes and onshore cable corridors fall within the North Devon Biosphere Reserve.

192. Three onshore cable corridors from the Southern Landfall (SZ-10, SZ-11, and SZ-12) are fall partially within Local Nature Reserves.




Legend:

- Area of Search
- Landfall Zones
- Potential Grid Connection Location
- Onshore Cable Corridor
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- Local Nature Reserves (LNR)
- Country Parks
- RSPB Reserve Boundary
- Important Bird Areas (IBA)
- Ancient Woodland
- Listed Buildings
- Listed Buildings 250m Buffer
- Scheduled Monuments
- Parks And Gardens
- Conservation Areas
- Main River
- Ordinary Watercourse
- Flood Zone 2
- Flood Zone 3



| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: White Cross Onshore Cable Corridor MZ-5

Figure: 6.1 | Drawing No: PC2978-RHD-ZZ-XX-DR-Z-0437

| Revision: | Date: | Drawn: | Checked: | Size: | Scale: |
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Co-ordinate system: British National Grid

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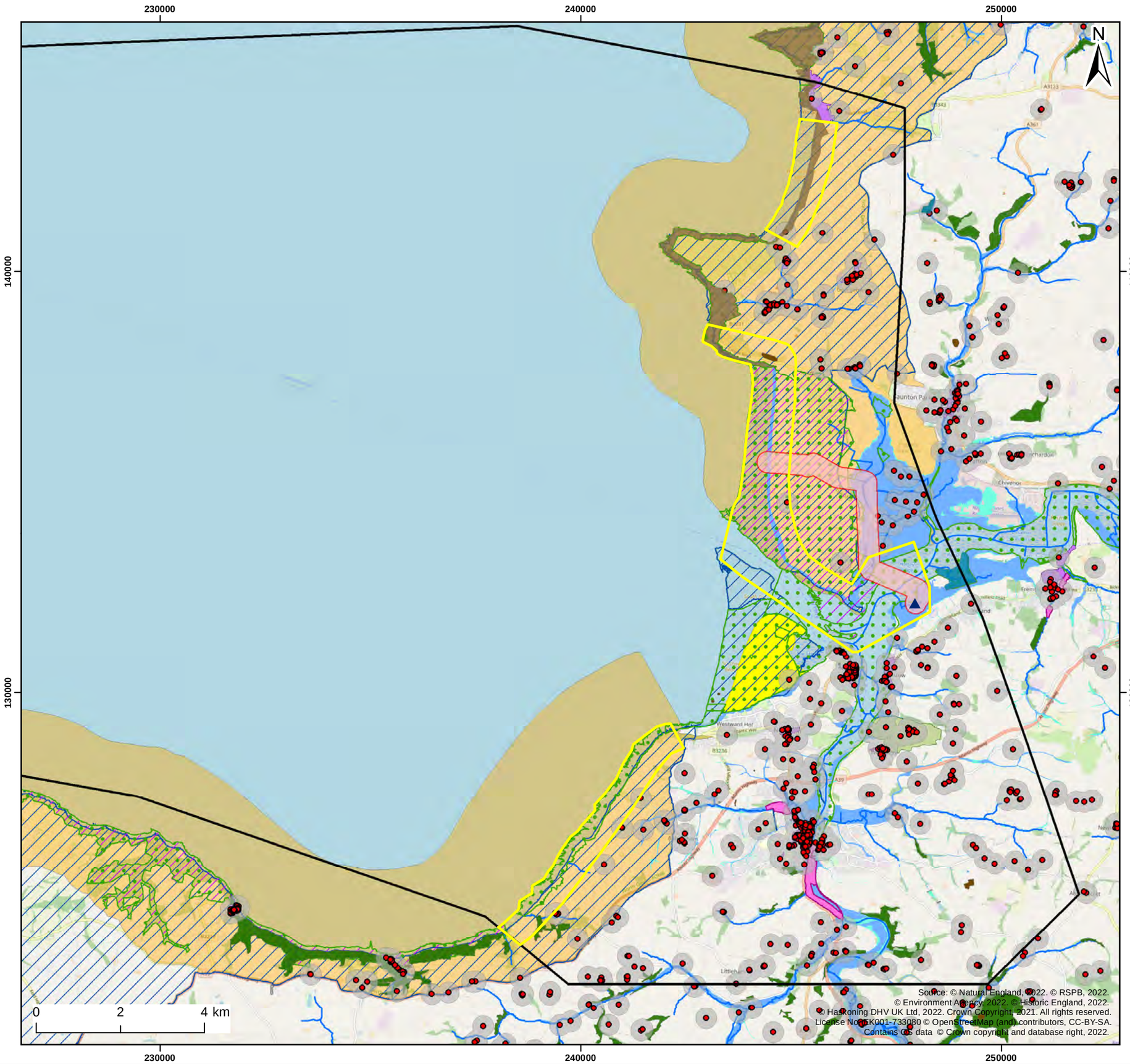




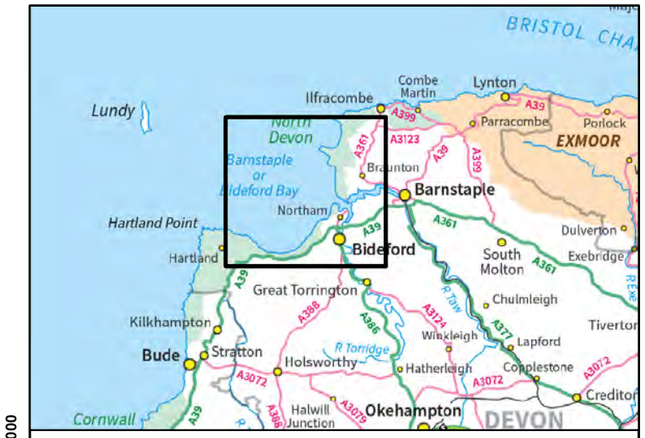


Legend:

- Area of Search
- Landfall Zones
- Potential Grid Connection Location
- Onshore Cable Corridor
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- Local Nature Reserves (LNR)
- Country Parks
- RSPB Reserve Boundary
- Important Bird Areas (IBA)
- Ancient Woodland
- Listed Buildings
- Listed Buildings 250m Buffer
- Scheduled Monuments
- Parks And Gardens
- Conservation Areas
- Main River
- Ordinary Watercourse
- Flood Zone 2
- Flood Zone 3

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: White Cross Onshore Cable Corridor MZ-6

Figure: 6.2 | Drawing No: PC2978-RHD-ZZ-XX-DR-Z-0438

| Revision: | Date: | Drawn: | Checked: | Size: | Scale: |
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Co-ordinate system: British National Grid

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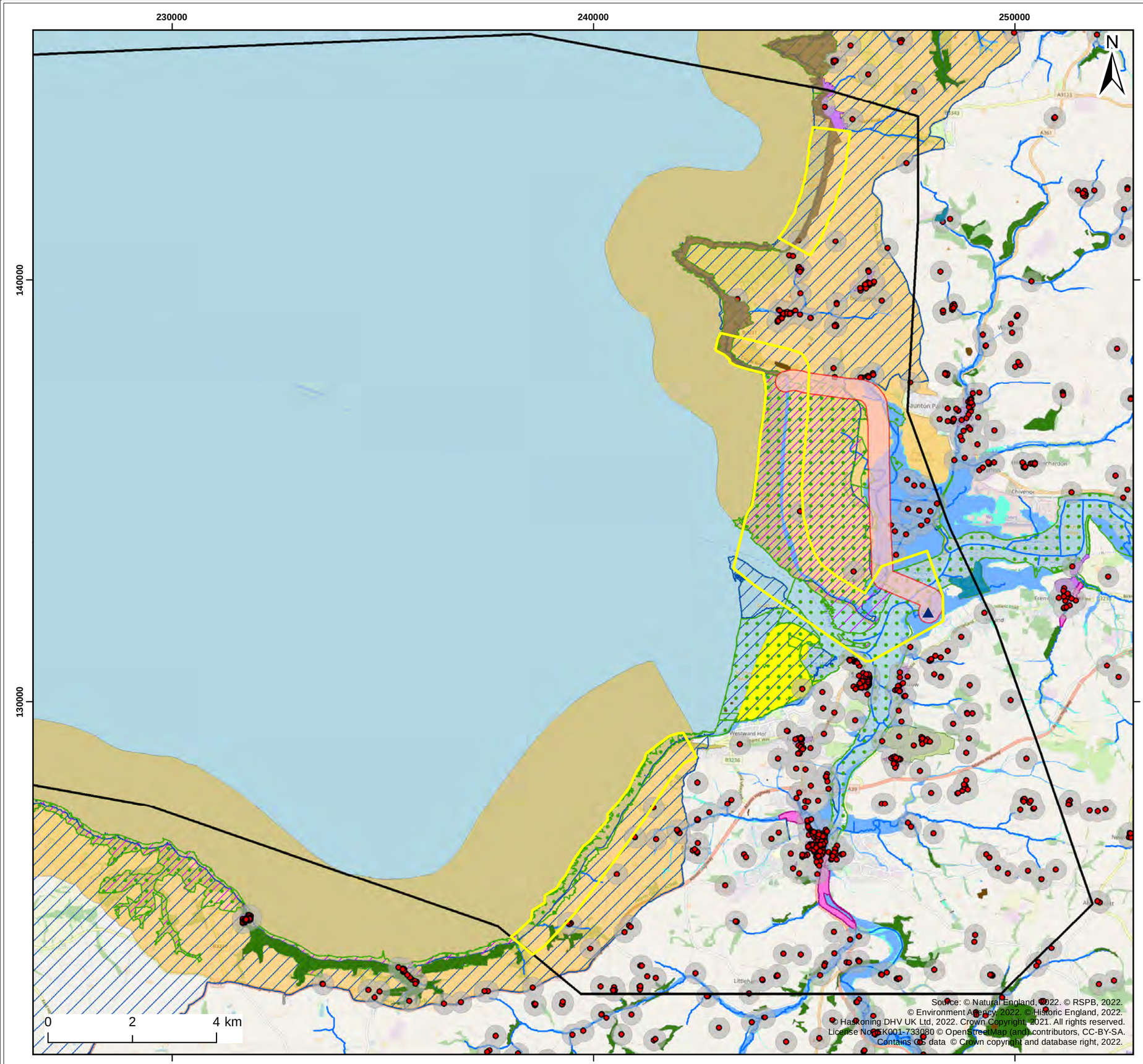



Legend:

- Area of Search
- Landfall Zones
- Potential Grid Connection Location
- Onshore Cable Corridor
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
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- Country Parks
- RSPB Reserve Boundary
- Important Bird Areas (IBA)
- Ancient Woodland
- Listed Buildings
- Listed Buildings 250m Buffer
- Scheduled Monuments
- Parks And Gardens
- Conservation Areas
- Main River
- Ordinary Watercourse
- Flood Zone 2
- Flood Zone 3

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: White Cross Onshore Cable Corridor MZ-9

| Figure: | Drawing No: |
|---|---|
| 6.3 | PC2978-RHD-ZZ-XX-DR-Z-0439 |

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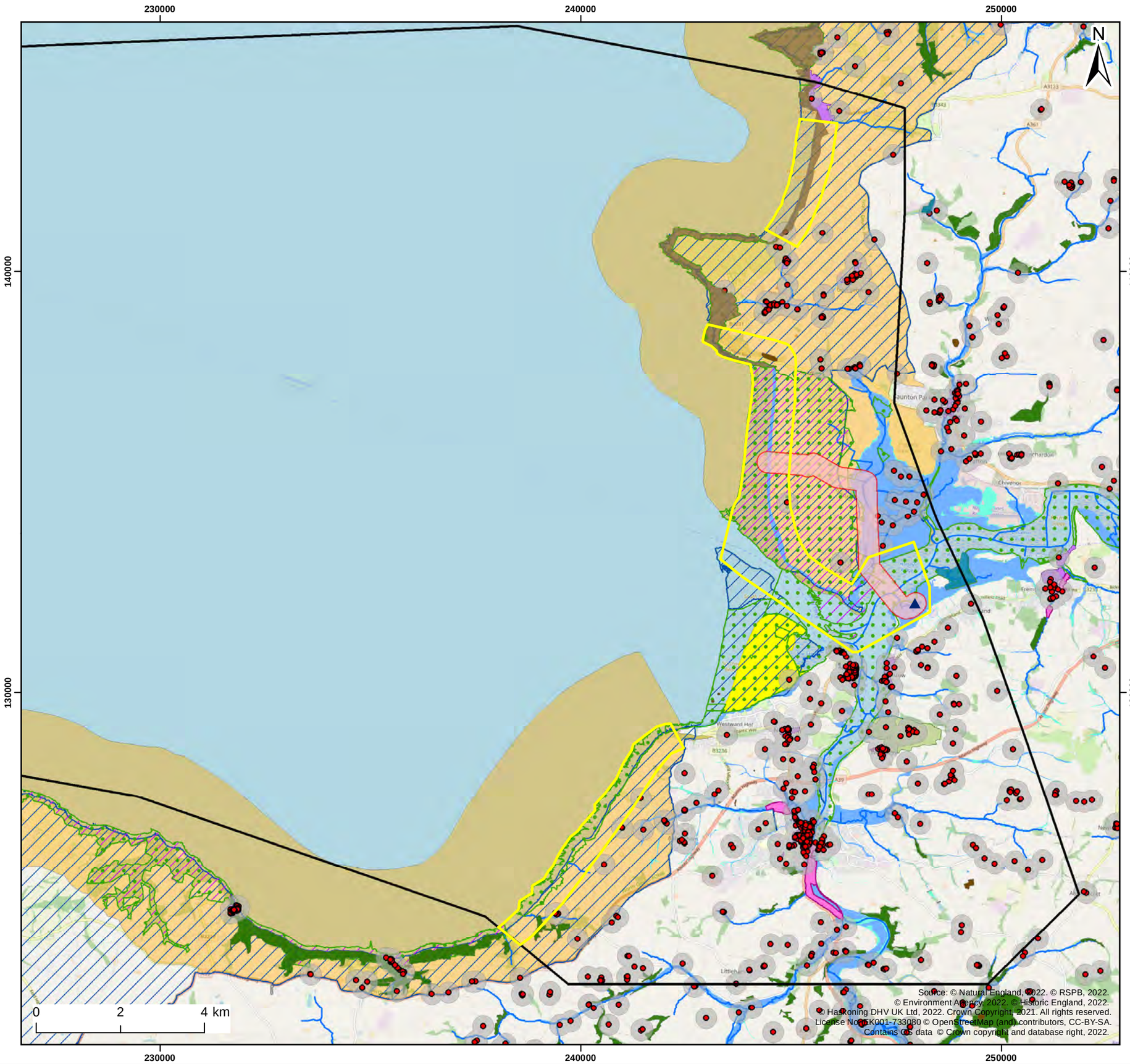


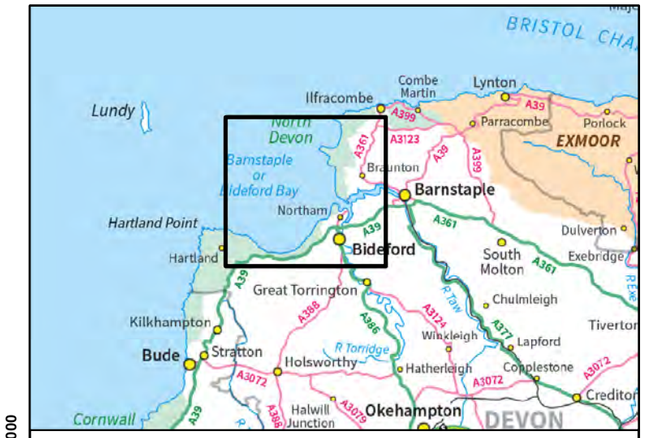


Legend:

- Area of Search
- Landfall Zones
- Potential Grid Connection Location
- Onshore Cable Corridor
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- Local Nature Reserves (LNR)
- Country Parks
- RSPB Reserve Boundary
- Important Bird Areas (IBA)
- Ancient Woodland
- Listed Buildings
- Listed Buildings 250m Buffer
- Scheduled Monuments
- Parks And Gardens
- Conservation Areas
- Main River
- Ordinary Watercourse
- Flood Zone 2
- Flood Zone 3

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: White Cross Onshore Cable Corridor MZ-13

| Figure: | Drawing No: |
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| 6.4 | PC2978-RHD-ZZ-XX-DR-Z-0440 |

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Co-ordinate system: British National Grid

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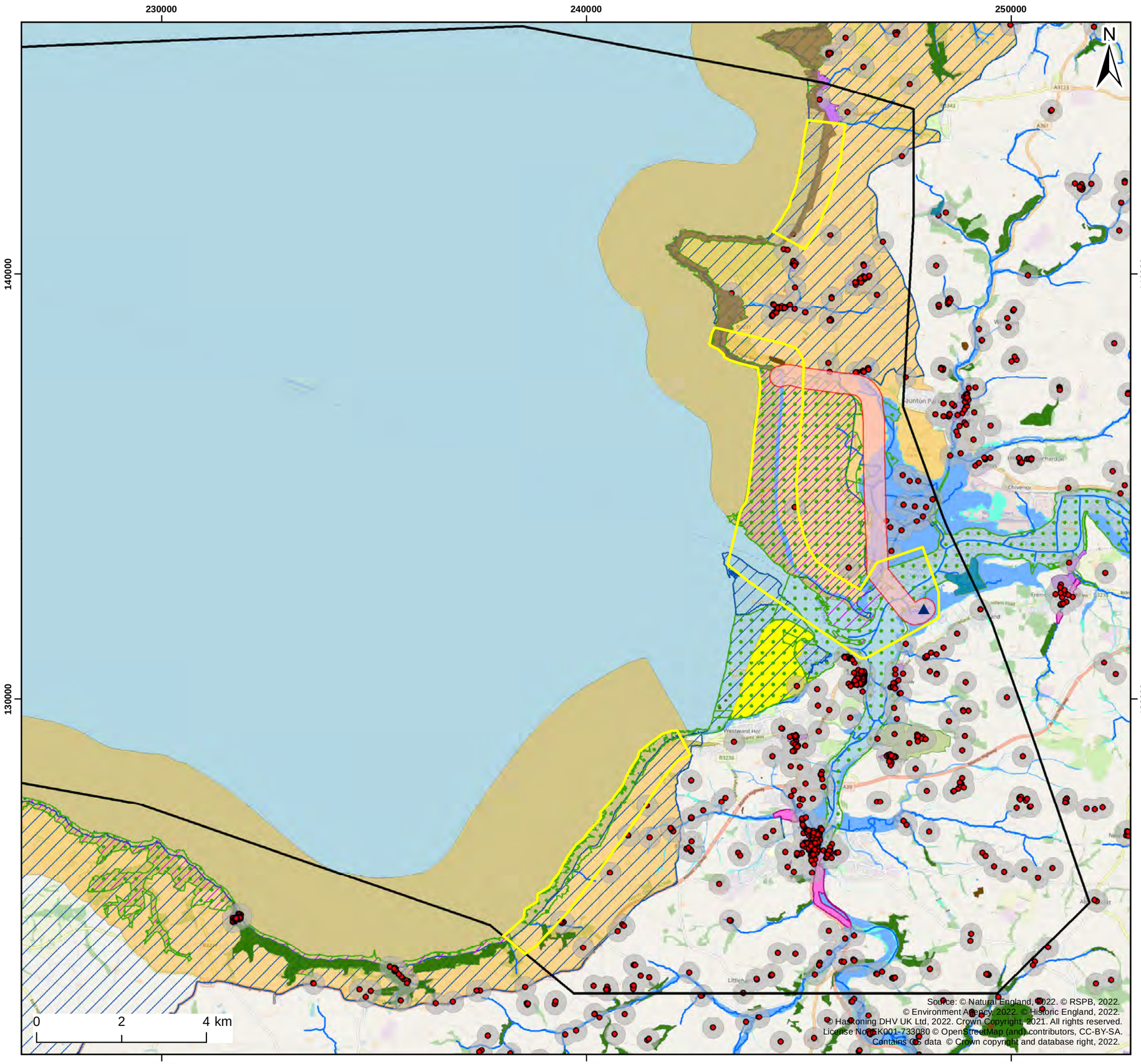




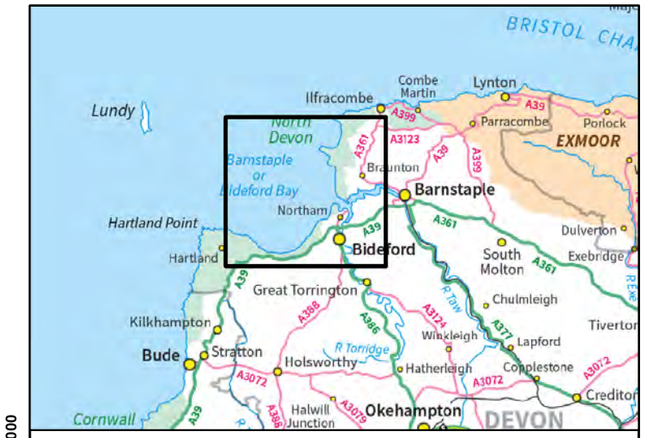


Legend:

- Area of Search
- Landfall Zones
- Potential Grid Connection Location
- Onshore Cable Corridor
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- Local Nature Reserves (LNR)
- Country Parks
- RSPB Reserve Boundary
- Important Bird Areas (IBA)
- Ancient Woodland
- Listed Buildings
- Listed Buildings 250m Buffer
- Scheduled Monuments
- Parks And Gardens
- Conservation Areas
- Main River
- Ordinary Watercourse
- Flood Zone 2
- Flood Zone 3

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: White Cross Onshore Cable Corridor MZ-14

| Figure: | Drawing No: |
|---|---|
| 6.5 | PC2978-RHD-ZZ-XX-DR-Z-0441 |

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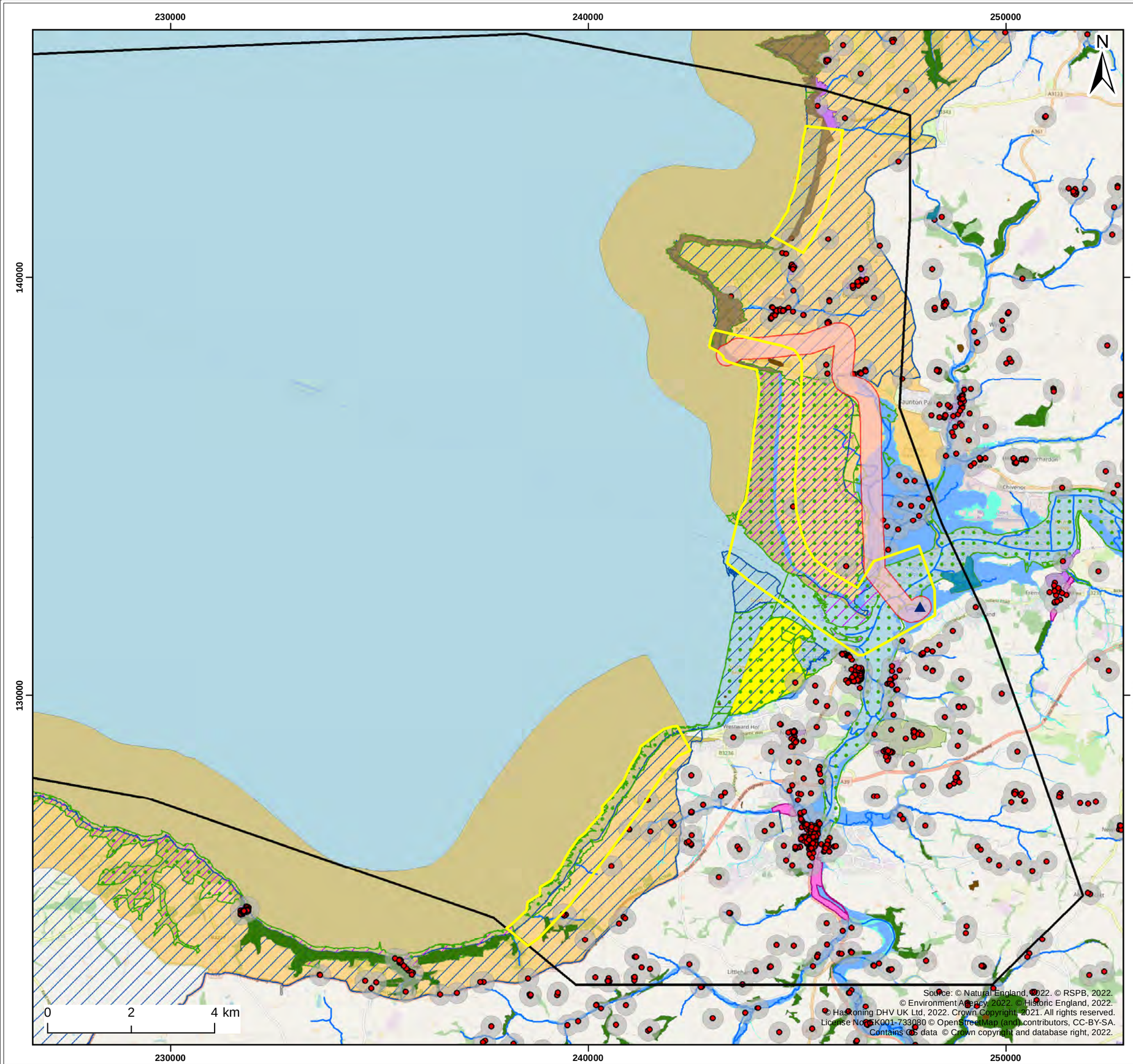


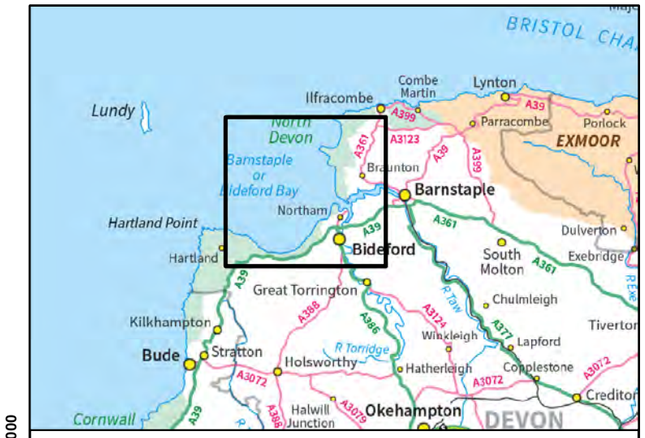


Legend:

- Area of Search
- Landfall Zones
- Potential Grid Connection Location
- Onshore Cable Corridor
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- Local Nature Reserves (LNR)
- Country Parks
- RSPB Reserve Boundary
- Important Bird Areas (IBA)
- Ancient Woodland
- Listed Buildings
- Listed Buildings 250m Buffer
- Scheduled Monuments
- Parks And Gardens
- Conservation Areas
- Main River
- Ordinary Watercourse
- Flood Zone 2
- Flood Zone 3

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: White Cross Onshore Cable Corridor MZ-15

| Figure: | Drawing No: |
|---|---|
| 6.6 | PC2978-RHD-ZZ-XX-DR-Z-0442 |

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230000
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Legend:

- Area of Search
- Landfall Zones
- Potential Grid Connection Location
- Onshore Cable Corridor
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- Local Nature Reserves (LNR)
- Country Parks
- RSPB Reserve Boundary
- Important Bird Areas (IBA)
- Ancient Woodland
- Listed Buildings
- Listed Buildings 250m Buffer
- Scheduled Monuments
- Parks And Gardens
- Conservation Areas
- Main River
- Ordinary Watercourse
- Flood Zone 2
- Flood Zone 3

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: White Cross Onshore Cable Corridor MZ-21

| Figure: | Drawing No: |
|---|---|
| 6.7 | PC2978-RHD-ZZ-XX-DR-Z-0443 |

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Co-ordinate system: British National Grid

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4 km



Legend:

- Area of Search
- Landfall Zones
- Potential Grid Connection Location
- Onshore Cable Corridor
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- Local Nature Reserves (LNR)
- Country Parks
- RSPB Reserve Boundary
- Important Bird Areas (IBA)
- Ancient Woodland
- Listed Buildings
- Listed Buildings 250m Buffer
- Scheduled Monuments
- Parks And Gardens
- Conservation Areas
- Main River
- Ordinary Watercourse
- Flood Zone 2
- Flood Zone 3

Client: Offshore Wind Ltd.

Project: White Cross Offshore Windfarm

Title: White Cross Onshore Cable Corridor SZ-10

Figure: 6.8

Drawing No: PC2978-RHD-ZZ-XX-DR-Z-0444

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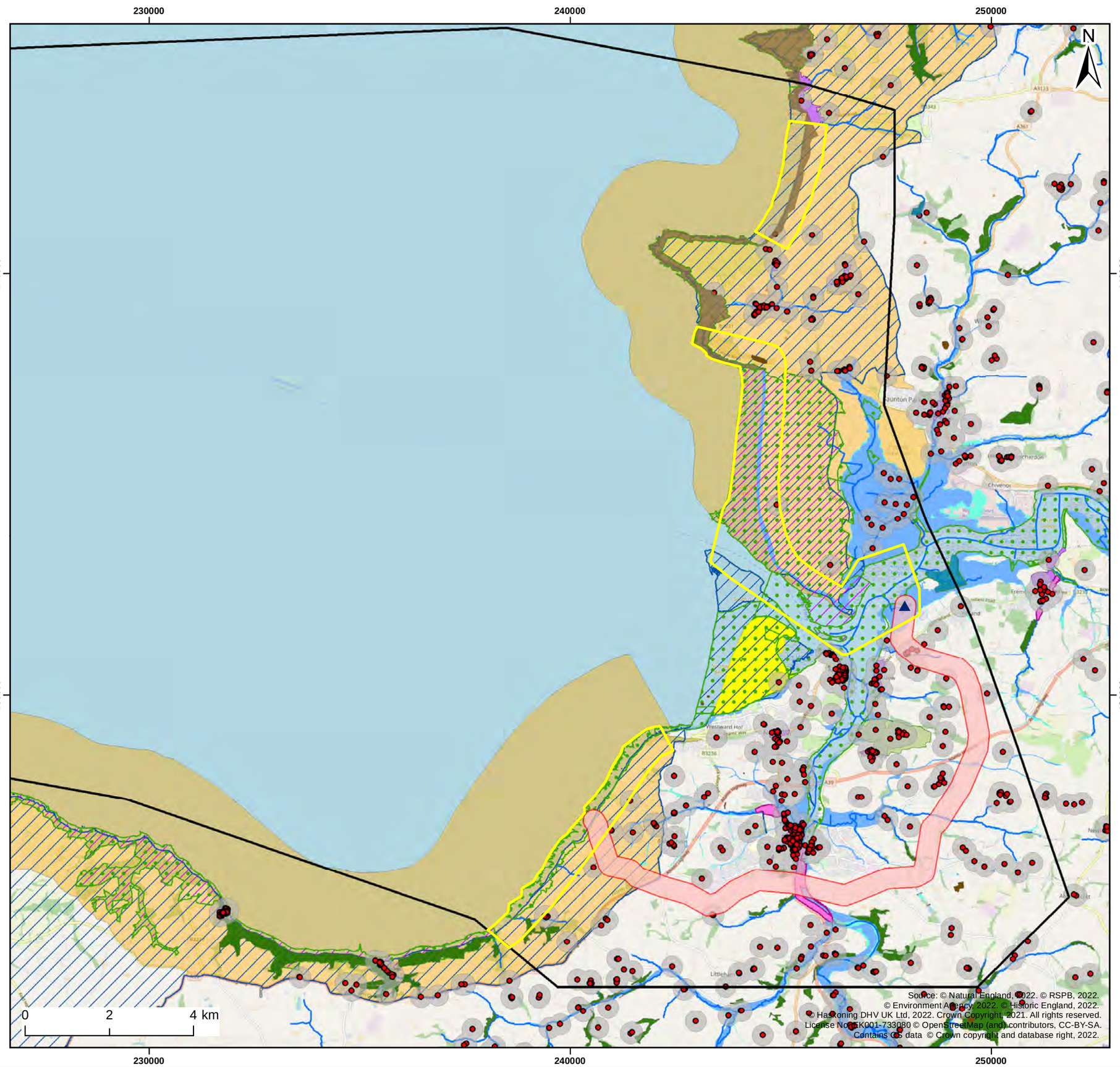



Legend:

- Area of Search
- Landfall Zones
- Potential Grid Connection Location
- Onshore Cable Corridor
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- Local Nature Reserves (LNR)
- Country Parks
- RSPB Reserve Boundary
- Important Bird Areas (IBA)
- Ancient Woodland
- Listed Buildings
- Listed Buildings 250m Buffer
- Scheduled Monuments
- Parks And Gardens
- Conservation Areas
- Main River
- Ordinary Watercourse
- Flood Zone 2
- Flood Zone 3

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: White Cross Onshore Cable Corridor SZ-11

| Figure: | Drawing No: |
|---|---|
| 6.9 | PC2978-RHD-ZZ-XX-DR-Z-0445 |

| Revision: | Date: | Drawn: | Checked: | Size: | Scale: |
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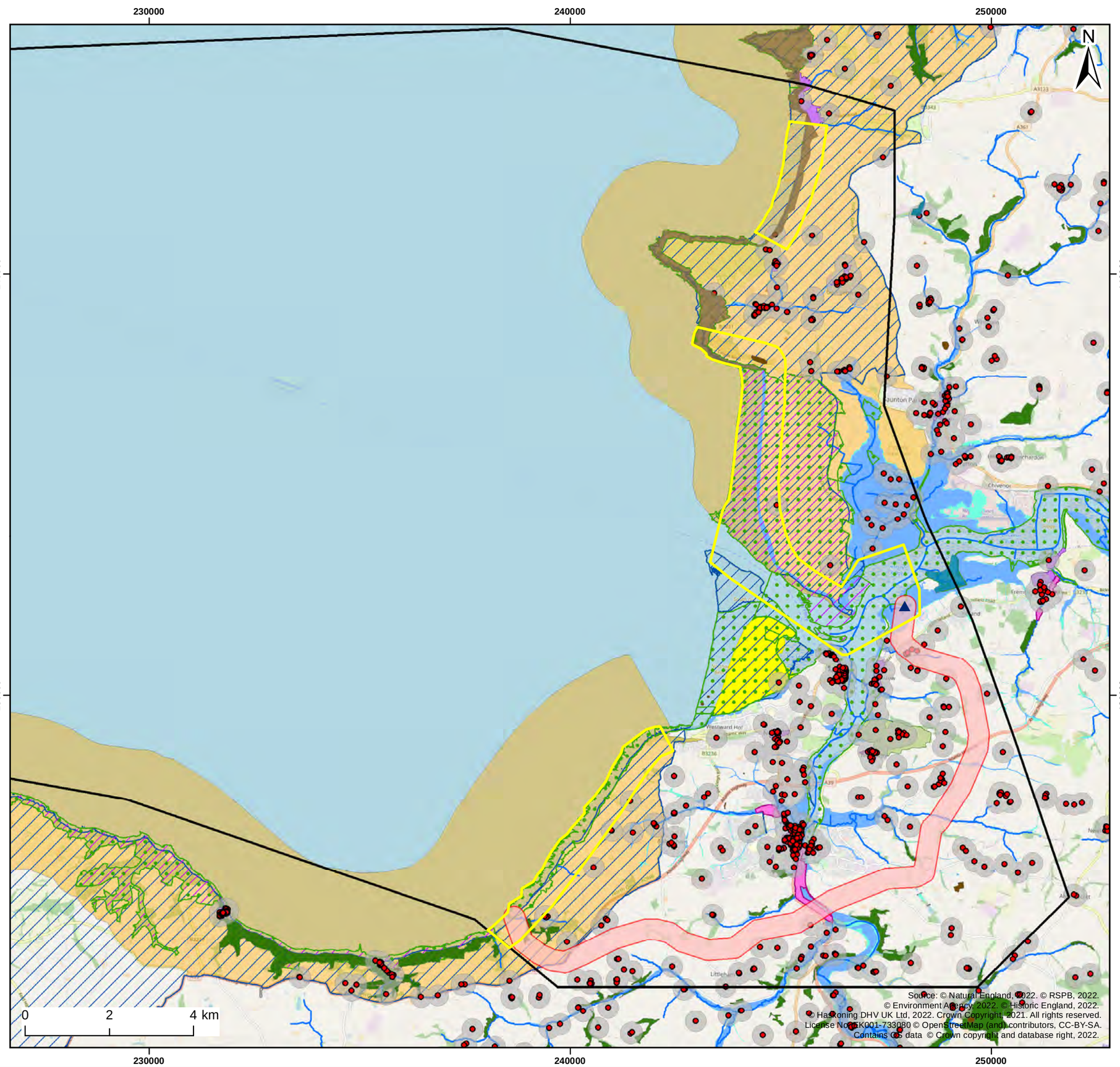



Legend:

- Area of Search
- Landfall Zones
- Potential Grid Connection Location
- Onshore Cable Corridor
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- Local Nature Reserves (LNR)
- Country Parks
- RSPB Reserve Boundary
- Important Bird Areas (IBA)
- Ancient Woodland
- Listed Buildings
- Listed Buildings 250m Buffer
- Scheduled Monuments
- Parks And Gardens
- Conservation Areas
- Main River
- Ordinary Watercourse
- Flood Zone 2
- Flood Zone 3

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: White Cross Onshore Cable Corridor SZ-12

| Figure: | Drawing No: |
|---|---|
| 6.10 | PC2978-RHD-ZZ-XX-DR-Z-0446 |

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230000
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Legend:

- Area of Search
- Landfall Zones
- Potential Grid Connection Location
- Onshore Cable Corridor
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- Local Nature Reserves (LNR)
- Country Parks
- RSPB Reserve Boundary
- Important Bird Areas (IBA)
- Ancient Woodland
- Listed Buildings
- Listed Buildings 250m Buffer
- Scheduled Monuments
- Parks And Gardens
- Conservation Areas
- Main River
- Ordinary Watercourse
- Flood Zone 2
- Flood Zone 3

Client: Offshore Wind Ltd.

Project: White Cross Offshore Windfarm

Title: White Cross Onshore Cable Corridor SZ-22

Figure: 6.11

Drawing No: PC2978-RHD-ZZ-XX-DR-Z-0447

| Revision: | Date: | Drawn: | Checked: | Size: | Scale: |
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Co-ordinate system: British National Grid

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193. One onshore cable corridor from Mid Zone Landfall (Yelland Launch) (MZ-5) and one onshore cable corridor from Mid Zone Landfall (Western Launch) (MZ-15) are located within Important Bird Areas.

194. All Landfall routes are bisected by rivers, non-designated woodland and hedgerows.

195. Three onshore cable corridors from the Southern Landfall (SZ-10, SZ-11, and SZ-12) are potentially constrained by Listed Buildings close to East Yelland, whilst the Northam Burrows recommended route (SZ-22) contains over 50 listed buildings which would need to be avoided.

196. One onshore cable corridor from Mid Zone Landfall (Yelland Launch) (MZ-5), one onshore cable corridor from Mid Zone Landfall (Western Launch) (MZ-15), three onshore cable corridors from the Southern Landfall (SZ-10, SZ-11 and SZ-12), and the Northam Burrows recommended route (SZ-22) are constrained by numerous undesignated archaeological sites and high potential archaeological sites.

197. All Landfall routes are within Areas of Outstanding Natural Beauty.

198. The Northam Burrows recommended route (SZ-22) contains a high number of residential properties as it passes by and through the edges of a number of settlements.

199. Three onshore cable corridors from the Southern Landfall (SZ-10, SZ-11, and SZ-12) are potentially constrained by residential areas near West Yelland.

## 6.4 Amber Criteria

200. Two onshore cable corridor from Mid Zone Landfall (Yelland Launch) (MZ-5 and MZ-9) and two onshore cable corridor from Mid Zone Landfall (Western Launch) (MZ-14 and MZ-15), and the Northam Burrows recommended route (SZ-22) are between 7.5km and 15km in length.

201. One onshore cable corridor from Mid Zone Landfall (Yelland Launch) (MZ-6) and two onshore cable corridor from Mid Zone Landfall (Western Launch) (MZ-14 and MZ-21), and the Northam Burrows recommended route (SZ-22) are located in generally undulating topography.

202. All Landfall routes encounter complex obstacle crossings requiring HDD.

203. One onshore cable corridor from the Southern Landfall (SZ-11) potentially has a spatial constraint between 100m - 200m, which in and of itself is not a significant constraint but it is noted that future OWF projects are very likely to consider landfalling here as it is one of the scarce potential landfall locations along a significant length of coast and thus future significant OWFs could be constrained.

204. Three onshore cable corridors from the Southern Landfall (SZ-10, SZ-11, and SZ-12) have minor sections (less than 500m) of the corridor within Flood Zone 2 and 3.

205. Two onshore cable corridors from Mid the Zone Landfall (Yelland Launch) (MZ-5 and MZ-9) and two onshore cable corridors from the Mid Zone Landfall (Western Launch) (MZ-14 and MZ-15) are partially located within the Braunton Burrows SAC, however, it is expected that route refinement would in general avoid encroaching on and impacting on the SAC.

206. One onshore cable corridor from the Mid Zone Landfall (Western Launch) (MZ-21) is located within the Bideford to Foreland MCZ.

207. Two onshore cable corridors from the Mid Zone Landfall (Yelland Launch) (MZ-5 and MZ-9), two onshore cable corridors from Mid Zone Landfall (Western Launch) (MZ-14 and MZ-15) and one onshore cable corridor from the Southern Landfall (SZ-12) are partially located within SSSIs. Two onshore cable corridors from the Southern Landfall (SZ-10 and SZ-11) are located in geological SSSIs.

208. Three onshore cable corridors from the Southern Landfall (SZ-10, SZ-11, and SZ-12) are partially located within Ancient Woodland, though this is likely to be avoided through micro-siting.

209. Two onshore cable corridor from the Mid Zone Landfall (Yelland Launch) (MZ-6 and MZ-9), three onshore cable corridors from the Mid Zone Landfall (Western Launch) (MZ-13, MZ-14, and MZ-21), and the Northam Burrows recommended route (SZ-22) are partially located within Important Bird Areas.

210. All Landfall routes are located in proximity to UK Habitats of Principal Importance.

211. All Landfall routes cross one main river.

212. The Northam Burrows recommended route (SZ-22) contains two scheduled monuments.

213. One onshore cable corridor from Mid Zone Landfall (Yelland Launch) (MZ-9) and one onshore cable corridor from Mid Zone Landfall (Western Launch) (MZ-14) are near to Listed Buildings.

214. The Northam Burrows recommended route (SZ-22) covers an extent of the Tapeley Park Historic Park and Garden.

215. The Northam Burrows recommended route (SZ-22) covers an extent of the Westleigh Conservation Area.

216. Two onshore cable corridors from Mid Zone Landfall (Yelland Launch) (MZ-6 and MZ-9) and two onshore cable corridors from Mid Zone Landfall (Western Launch)

(MZ-13, MZ-14, and MZ-21) are constrained by numerous undesignated archaeological sites and high potential archaeological sites.

217. Two onshore cable corridors from Mid Zone Landfall (Yelland Launch) (MZ-5 and MZ-9), two onshore cable corridors from Mid Zone Landfall (Western Launch) (MZ-14 and MZ-15), three onshore cable corridors from the Southern Landfall (SZ-10, SZ-11 and SZ-12) are near to residential properties.

218. All Landfall routes (with the exception of MZ-21) require road crossings.

219. The Northam Burrows recommended route (SZ-22) and one onshore cable corridor from the Southern Landfall (SZ-11) contain an area identified as strategic housing / commercial allocation.

220. One onshore cable corridor from Mid Zone Landfall (Yelland Launch) (MZ-5), one onshore cable corridor from Mid Zone Landfall (Western Launch) (MZ-15), three onshore cable corridors from the Southern Landfall (SZ-10, SZ-11 and SZ-12) and the Northam Burrows recommended route (SZ-22) require 5 or more PRoW crossings.

221. Three onshore cable corridors from Mid Zone Landfall (Yelland Launch) (MZ-5, MZ-6 and MZ-9) and three onshore cable corridors from Mid Zone Landfall (Western Launch) (MZ-13, MZ-14, MZ-15, and MZ-21) and the Northam Burrows recommended route (SZ-22) will have temporary impacts to key tourism and recreational facilities.

222. Three onshore cable corridors from Mid Zone Landfall (Yelland Launch) (MZ-5, MZ-6 and MZ-9) and two onshore cable corridors from Southern Landfall (SZ-10 and SZ-12) have historic landfills within the cable corridor.

## 6.5 Onshore Export Cable Corridor Conclusions

223. Of the onshore cable routes considered the following have significant and unresolvable impacts that discount them at this stage. These are MZ-5, MZ-6, MZ-9, MZ-15, MZ-21, and SZ-22. Table 6.2 presents a summary of the key parameters where differences occur for the remaining onshore cable corridors.

224. There are potential engineering constraints or risks associated with all of the five remaining routes, however, the South Zone landfall routes (SZ-10, SZ-11, and SZ-12) are significantly longer, which not only brings additional engineering risks, but there are constraints regarding steep topography, a larger number of complex obstacle crossings (A roads, rivers, and landfall), and other width constraints to these corridors (at the northern end specifically an area of residential buildings significantly reducing available width. There are also a large number of simple obstacle crossings for these routes compared to the Mid Zone landfall routes. It is

also considered that there will be significant access difficulties in access due to the highway network along the South Zone landfall routes including the potential need for haul roads and highway widening.

225. The South Zone landfall routes (SZ-10, SZ-11, and SZ-12) have a greater potential to result in significant impacts on archaeological receptors both known and unidentified, including proximity to a large number of listed buildings at one particular width constrained location. MZ-14 also contains a large number of listed buildings which are potentially avoidable, but MZ-13 contains no listed buildings.

226. There are a number of national designated site constraints and potential risks associated with all the route options, many of them can be avoided. Of the two Mid Zone landfall routes, there is the potential for impacting on the Braunton Burrows SAC. It was previously considered that if chosen MZ-14 would have been likely to be able to avoid the majority of impacts through HDD. The other (MZ-13) had been considered to provide potential opportunities associated with ongoing projects (the Dynamic Dunescapes project) to manage and mitigate potential impacts such that no long-term negative impacts would arise with a greater potential for enhancement of the current site features. Following stakeholder consultation (with Natural England, Dynamic Dunescapes, the MoD, the landowner and others) and design development, it now considered that MZ-13 and MZ-14 (in its original indicative alignment) are now considered to contain black constraints. Namely the potential for direct impacts to the Braunton Burrows SAC.

227. Due to these black constraints, we have therefore re-visited, re-examined and refined a corridor option based on MZ-14. This option (see Figure 3) has refined the cable route to avoid the SAC all the way until it crosses under the SAC at the northern (golf course) end. This refinement keeps the corridor outside (though close to) the SAC boundary, and also avoids access areas required for MoD activities, as well as avoiding the potential greater disturbance from trenching in MoD track infrastructure that would require greater plant. The route passes between the SAC and the SSSI near Sandy Lane Car Park (which it would do by HDD under the road between them). The route would then continue northwards outside the SAC, until it turns to pass under the SAC around the golf course area. The HDD would essentially avoid any surface disturbance within the SAC. This route would then emerge within the Saunton Sands Car Park and continue out to the foreshore as defined for corridor MZ-14.

*Table 6.2 Summary of Onshore Cable Route Differences from Mid Zone and South Zone Landfalls*

| Criteria | Mid Zone Landfall | | | Southern Zone Landfall | | |
|---|---|---|---|---|---|---|
| | MZ-13 (Saunton MoD) | MZ-14 (Saunton Car Park) | MZ-14 (Saunton Car Park) (Alternative | SZ-10 (Abbotsham South) | SZ-11 (Abbotsham North) | SZ-12 (Peppercombe) |
| Total length (km) | 6.4km | 8.3km | 8.3-8.8km | 17.7km | 16.8km | 18.7km |
| Topographic Constraints Along Cable Corridor | Generally flat though undulating through the dunes | Generally flat | Generally flat | At least 3 very steep sections before crossing the Torridge, and at least a further three steep sections to the landfall zone | At least 3 very steep sections before crossing the Torridge, and at least a further three steep sections to the landfall zone | At least 3 very steep sections before crossing the Torridge, and at least a further three steep sections to the landfall zone |
| Approx. No of Potential Complex Obstacle Crossings | Taw Estuary (which would be avoided by HDD) | Taw Estuary Braunton Burrows SAC (which would both be avoided by HDD) | Taw Estuary Braunton Burrows SAC (which would both be avoided by HDD) | A39, River Torridge and A386, and A39 (which would all be avoided by HDD) | A39, River Torridge and A386, and A39 (which would all be avoided by HDD) | A39, River Torridge and A386, and A39 (which would all be avoided by HDD) |
| Approx. No of Simple Obstacle Crossings | 1 | 4 | 4 | 26 | 18 | 22 |
| Potential Spacing Constraints Along Cable Route | None | Potential constraint of width less than 40m in Saunton Car Park (but trenching would be adequate) | Potential constraint of width less than 40m in Saunton Car Park (but trenching would be adequate) | A constrained width of 50m and a small number of 100m - 200m constrained widths | A small number of 100m - 200m constrained widths | A constrained width of 50m and a small number of 100m - 200m constrained widths |

| Criteria | Mid Zone Landfall | | | Southern Zone Landfall | | |
|---|---|---|---|---|---|---|
| | MZ-13 (Saunton MoD) | MZ-14 (Saunton Car Park) | MZ-14 (Saunton Car Park) (Alternative | SZ-10 (Abbotsham South) | SZ-11 (Abbotsham North) | SZ-12 (Peppercombe ) |
| Ground Conditions Along Cable Route (Flood zones) | Extensive length (over 500m) within Flood Zone 2 and 3 | Extensive length (over 500m) within Flood Zone 2 and 3 | Extensive length (over 500m) within Flood Zone 2 and 3 | Minor sections (less than 500m) of the corridor are in Flood Zone 2 and 3 and some are avoided through need to HDD anyway | Minor sections (less than 500m) of the corridor are in Flood Zone 2 and 3 and some are avoided through need to HDD anyway | Minor sections (less than 500m) of the corridor are in Flood Zone 2 and 3 and some are avoided through need to HDD anyway |
| Special Areas of Conservation (SAC) | At least 3.7km - 4.2km length of the corridor runs through the SAC, and would result in some permanent (albeit small) above ground structures (which would result in AEOI and need for compensatory habitat - which would only be justified if there were no alternative options). Furthermore, construction would due to increased scale | 2.6km of corridor runs through the SAC, however, at least 1km could be HDD and avoid impact, and 600m in the shore area could be trenched rapidly with limited impact (though some short HDD may be recommended for avoidance of existing cables as well as avoiding some dunes). Along America Way construction would due to increased scale of plant and disturbance result in significant | 1.6km of corridor runs through the SAC, however, at least 1km could be HDD and avoid impact, and 600m in the shore area could be trenched rapidly with limited impact (though some short HDD may be recommended for avoidance of existing cables as well as avoiding some dunes) such that works are | None within or adjacent to corridor. | None within or adjacent to corridor. | None within or adjacent to corridor. |

| Criteria | Mid Zone Landfall | | | Southern Zone Landfall | | |
|---|---|---|---|---|---|---|
| | MZ-13 (Saunton MoD) | MZ-14 (Saunton Car Park) | MZ-14 (Saunton Car Park) (Alternative | SZ-10 (Abbotsham South) | SZ-11 (Abbotsham North) | SZ-12 (Peppercombe) |
| | of plant and disturbance result in significant temporary disturbance to non-degraded habitat as well as degraded habitat. A significant adverse effect would arise, and would be unconsentable as other routes could be followed which do not have permanent impact. | temporary disturbance to non-degraded habitat as well as degraded habitat. A significant adverse effect would arise, and would be unconsentable as other routes could be followed which do not have permanent impact. | considered to be consentable. | | | |

| Criteria | Mid Zone Landfall | | | Southern Zone Landfall | | |
|---|---|---|---|---|---|---|
| | MZ-13 (Saunton MoD) | MZ-14 (Saunton Car Park) | MZ-14 (Saunton Car Park) (Alternative | SZ-10 (Abbotsham South) | SZ-11 (Abbotsham North) | SZ-12 (Peppercombe) |
| Sites of Special Scientific Interest (SSSI) | Taw-Torridge Estuary SSSI[8] (avoided through HDD). Braunton Burrows SSSI[9], and Greenaways and Freshmarsh, Braunton SSSI[10] are within the corridor but can be avoided, with the exception of Braunton Burrows SSSI | Taw-Torridge Estuary SSSI (avoided through HDD). Braunton Burrows SSSI, Greenaways and Freshmarsh, Braunton SSSI, Braunton Swanpool SSSI[11], and Saunton to Baggy Point Coast SSSI are within the corridor but could potentially | Taw-Torridge Estuary SSSI (avoided through HDD). Braunton Burrows SSSI, Greenaways and Freshmarsh, Braunton SSSI, Braunton Swanpool SSSI[12], and Saunton to Baggy Point Coast SSSI are | Mermaid's Foot to Rowden Gut SSSI is across entire corridor at landfall, but could potentially be avoided through HDD. This is geologically designated SSSI and on the advice of Natural England has been | Mermaid's Foot to Rowden Gut SSSI is across entire corridor at landfall, but could potentially be avoided through HDD. This is geologically designated SSSI and on the advice of Natural England has been downgraded to a amber. | Mermaid's Foot to Rowden Gut SSSI is across half the corridor at landfall, but could potentially be avoided through routeing or HDD |

[8] The Taw-Torridge Estuary is of major importance for its overwintering and migratory populations of wading birds. In addition, rare plants grow along its shores.

[9] Braunton Burrows is one of the largest dune systems in Britain, about 5km long north-south and 1g km wide, with lime-rich dune sup to 30 m high, and an extensive system of variably-flooded slacks, grassland and scrub, inland of a wide sandy foreshore. There is thus a variety of habitats for many flowering and lower plants, and for many birds and invertebrates. Several species are nationally rare or vulnerable. There are also important features of geological interest.

[10] Greenaways and Freshmarsh, Braunton is of special interest for its herb-rich marshy grasslands and also the rich water-plant communities occurring in the drainage ditches. These habitats are of particular importance as they now have a very restricted distribution in Devon. The site occupies the northern fringe of Braunton Marsh, the land being generally flat and low-lying with a high water table. The soils are derived from marine alluvium with a peaty surface horizon in places.

[11] Braunton Swanpool is important for its reedbed and herb-rich marshy grasslands, habitats which are rare in North Devon. The site lies near sea-level in a shallow basin of old river terrace drift. The water table is at or near the surface for much of the year, with a general movement of water from north to south.

| Criteria | Mid Zone Landfall | | | Southern Zone Landfall | | |
|---|---|---|---|---|---|---|
| | MZ-13 (Saunton MoD) | MZ-14 (Saunton Car Park) | MZ-14 (Saunton Car Park) (Alternative | SZ-10 (Abbotsham South) | SZ-11 (Abbotsham North) | SZ-12 (Peppercombe) |
| | where direct albeit temporary impact could arise | be avoided through routeing or HDD | within the corridor but could potentially be avoided through routeing or HDD | downgraded to a amber. | | |
| Listed Buildings | None within but some adjacent | One on the inside of the boundary but would be avoided as it is the north side of Saunton Road | One on the inside of the boundary but would be avoided as it is the north side of Saunton Road | 17 within the boundary close to East Yelland and a potential constraint | 19 within the boundary close to East Yelland and a potential constraint | 17 within the boundary close to East Yelland and a potential constraint |
| Undesignated archaeological sites and potential archaeological sites | 1 Mesolithic, 6 post-medieval, 4 undated and large number of modern records (mostly WW2 associated with US Army Assault training base). Also 1 UKHO record | 2 early-med, 5 early-medieval, 1 medieval, 14 post-medieval, 3 undated and large number of modern records (mostly WW2 associated with US Army Assault training base). Also 1 UKHO record | | 1 prehistoric, 3 Mesolithic, 5 Bronze Age, 4 Iron Age, 3 Roman, 4 early-medieval, 8 medieval, 24 post-medieval, 8 modern and 23 undated | 1 prehistoric, 4 Mesolithic, 2 Bronze Age, 3 Iron Age, 2 Roman, 13 early-medieval, 10 medieval, 23 post-medieval, 10 modern and 24 undated | 1 prehistoric, 4 Bronze Age, 4 Iron Age, 3 Roman, 9 early-medieval, 9 medieval, 34 post-medieval, 11 modern and 33 undated. |
| Number of residential properties | 0 | 41 - but all avoidable | 41 - but all avoidable | 61 - whilst most are avoidable there is a constraint | 118 - whilst most are avoidable there is a constraint | 68 - whilst most are avoidable there is a constraint |

| Criteria | Mid Zone Landfall | | | Southern Zone Landfall | | |
|---|---|---|---|---|---|---|
| | MZ-13 (Saunton MoD) | MZ-14 (Saunton Car Park) | MZ-14 (Saunton Car Park) (Alternative | SZ-10 (Abbotsham South) | SZ-11 (Abbotsham North) | SZ-12 (Peppercombe ) |
| Residential across entire corridor | No | No | No | Near West Yelland there is a constraint due to residential across a large area | Near West Yelland there is a constraint due to residential across a large area | Near West Yelland there is a constraint due to residential across a large area |
| Number of road crossings | 1 | 3 | 3 | 21 | 18 | 21 |
| Planning | None | None | None | None | Strategic Allocation across part of corridor which should be avoidable | None |
| Number of ProW crossings | 2 | 2 | 2 | 6 | 5 | 6 |
| Tourism and recreational facilities (holiday accommodation, pubs etc) | Three car parks are located along the corridor, with at least two likely to be unavoidably affected | Three car parks are located along the corridor, with at least two likely to be unavoidably affected | Three car parks are located along the corridor, with at least two likely to be unavoidably affected | No notable facilities or receptors identified | No notable facilities or receptors identified | No notable facilities or receptors identified |
| Historic Landfill | None | None | None | Near Jennetts Reservoir | None | Near Jennetts Reservoir |

# 7. BRAG Assessment of Onshore Substation Zone

## 7.1 Introduction

228. The following sub-sections summarise the results of the BRAG assessment of the long list onshore substation zones that had been identified (see *Section 5* in the White Cross Long List Report (Royal HaskoningDHV, 2022b)) following the initial AoS (see *Section 1.3* in the White Cross Area of Search Report (Royal HaskoningDHV, 2022a)).

229. The onshore substation zones are shown in Figure 7.1.

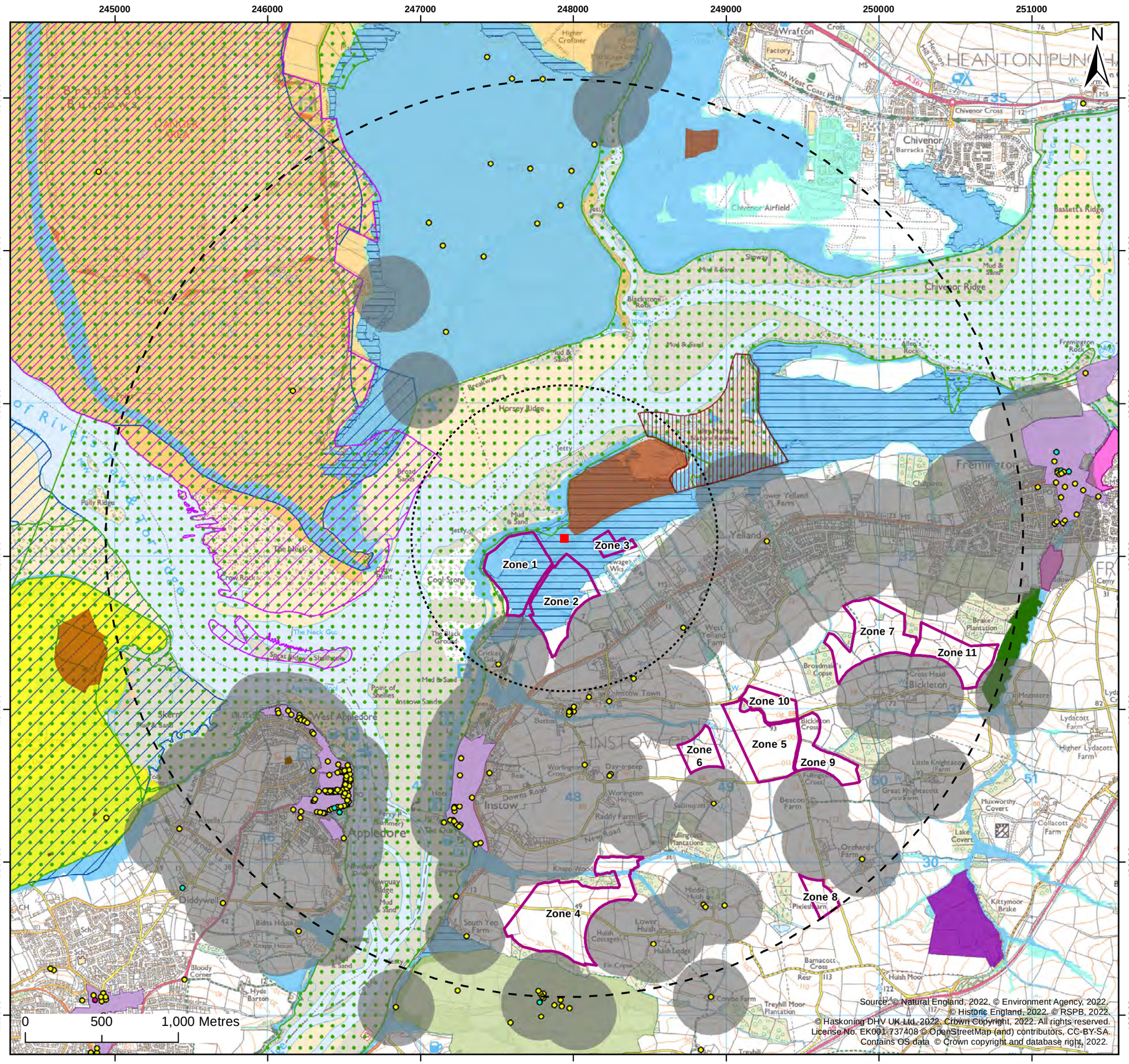
## 7.2 Black Criteria

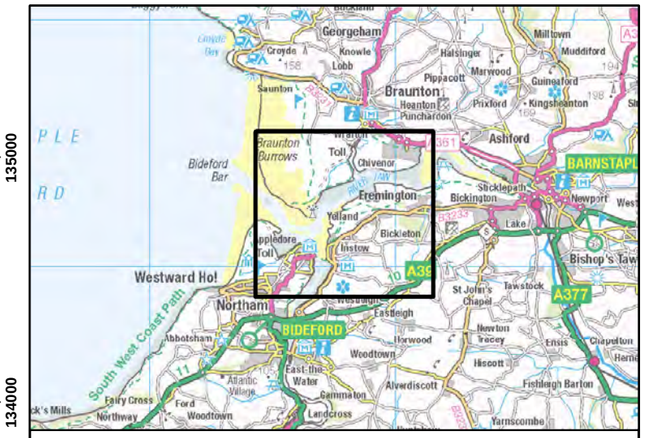
230. Black constraints relating to highway network constraints were identified at Zones 5, 6, 7, 9, 10 and 11. The existing environment in these zones would prohibit the potential for widening the highway network without significant environmental effects. Access would therefore likely only be achievable by smaller vehicles and would require the use of escort pilot vehicles to manage the potential for conflicts. Traffic could also impact upon sensitive communities. Zones 6, 7, and 11 would also require new access tracks ranging from 200m to 1km in length.

231. Black constraint: Locating the substation in Zone 4 would result in an impact to sensitive landscapes. Particularly Tapeley Park and potential influence on wide-ranging views gained from the east and west of this part of the Taw-Torridge estuary.

232. Black constraints: Locating the substation in Zone 5, 7 or 10 is likely to increase the extent of landscape/visual impacts owing to the additional cable routeing from the existing Yelland substation. The zone is very open and elevated with a potential to be highly visible and affect views of receptors over wide geographic extent.

233. Black constraints were identified at Zones 5, 6, 7, 9, 10 and 11 as these are sloping zones that would require extensive retaining structures to create necessary, large, almost level platform as insufficient land is available to create reasonably graded earthworks. The elevated location means that these zone will be visible from receptors at a range of elevations and therefore difficult to mitigate views of it through landform / planting.




Legend:

- Existing Substation
- 1km Study area
- 3km Study Area
- Substation Zones
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- Local Nature Reserves (LNR)
- RSPB Reserve Boundary
- Country Parks
- Ancient Woodland
- Conservation Areas

**Listed Buildings**

**Grade**

- I
- II
- II*
- Scheduled Monuments
- Registered Parks And Gardens
- Authorised Landfill Site
- Historic Landfill Sites
- 250m Residential Buffer
- Flood Zone 2
- Flood Zone 3
- Areas Benefiting from Flood Defences

| Client: | Project: |
|---|---|
| Offshore Wind Ltd. | White Cross Offshore Windfarm |

Title: White Cross Long List Onshore Substation Zones

| Figure: | Drawing No: |
|---|---|
| 7.1 | PC2978-RHD-ZZ-XX-DR-Z-0448 |

| Revision: | Date: | Drawn: | Checked: | Size: | Scale: |
|---|---|---|---|---|---|
| P01 | 16/12/2022 | AB | CB | A3 | 1:25,000 |
| | | | | | |

Co-ordinate system: British National Grid



WHITE CROSS

Royal HaskoningDHV
Enhancing Society Together

## 7.3 Red Criteria

234. Red constraint: Zone 1 is located in Coastal and Floodplain Grazing Marsh Priority Habitat. Grazing marshes are particularly important for the number of breeding waders such as snipe they support. The protection of either Priority Habitats is not statutory, but "specific consideration" should be afforded by Local Planning Authorities when dealing with them in relation to planning and development control.

235. Red constraint: Zones 1, 2 and 3 are located within Flood Zones 2 and 3. However, these areas benefit from flood defences are therefore not considered a black constraint.

236. Red constraint: Zone 10 contains a non-designated heritage asset (a Medieval Field System).

237. Red constraint: Zones 6, 7 and 11 would require new access roads to be constructed.

238. Red constraint: Zones 4 and 8 would require new access roads to be constructed as access is via narrow single lane roads and is not wide enough for two vehicles to pass and would therefore require localised widening for a distance of approximately 500m and 1.3km respectively.

239. Red constraint: Zones 1, 2, 3, 5, 6, 7, 9, 10 and 11 could impact upon the communities at Yelland and Instow.

240. Red constraint: Zones 1 is the closest of the Zones to the North Devon Coast AONB. There is relatively close range and extensive visibility from Braunton Burrows looking back across the estuary where this Zone would appear in relatively close proximity. The Zone is not within the AONB but its proximity and the open character of the landscape risk potential effects on the AONB setting.

241. Red constraint: Zones 1, 2, 4, 6, 8, 9 and 11 have been identified as having higher sensitivity to development. Locating the substation is Zone 4, 6, 8, 9 and 11 is likely to increase the extent of landscape/visual impacts during construction owing to the additional cable routeing from the existing Yelland substation.

242. Red constraint: Zones 1, 2 and 3 are relatively flat, lying close to the River Taw estuary. The Zones are within a flood zone area and would potentially require a substantial increase in the elevation of the platform level and consequently the overall height over the substation; resulting in wider visual impacts.

243. Red constraint: As a sloping site Zone 8 will require extensive retaining structures to create necessary, large, almost level platform as insufficient land is available to create reasonably graded earthworks. The location means that the site will be seen from receptors at a range of elevations, and therefore difficult to mitigate views of

it through landform / planting. Red on account on slightly less steeply sloping site than others to south of area of search.

244. Red constraint: Zones 4 to 11 are greater than 1km from East Yelland National Grid Substation and would require significant reassessment and resurveying required in order to reroute onshore cable corridor.

## 7.4 Amber Criteria

245. Amber constraint: Zones 1, 2, 3, 4, and 11 are in proximity to National and International Designated Sites for Nature Conservation. The Taw-Torridge SSSI and is within 500m of Zones 1, 2, and 3. Zones 4 and 11 are approximately 350m and 15m, respectively, from Ancient Woodland.

246. Amber constraint: Zone 3 is located approximately 450m from RSPB Isley Marsh. Zone 11 is approximately 450 SW of Fremington Local Nature Reserve.

247. Amber constraint: Zones 2, 4, 7, 9, and 11 are in proximity to Proximity to UK Habitats of Principal Importance. Zones 4, 7, 9, and 11 are adjacent to Deciduous Woodland Priority Habitat. A small area of Zone 2 is within Coastal and floodplain grazing marsh Priority Habitat. However there is sufficient space within zone to avoid the Priority Habitat.

248. Amber constraint: Zone 4 is located within 100m of Flood Zone 3.

249. Amber constraint: Historic Landfill approximately 75m north of Zone 3 at Yelland Quay.

250. Amber constraint: Known non-designated heritage assets are present in Zone 1, 7, and 8. The Braunton Areas A, B, C and D of US Assault Training Centre and North Devon US Assault Training Centre heritage assets extend into the northern portion of Zone 1. Western portion of Zone 7 contains a Medieval Field System. Northern portion of Zone 8 contains the site of former quarry.

251. Amber constraint: Distant visual impact on the heritage setting may occur in Zones 1, 2, 5, 6, and 8. However, some screening could result from hedgerows and rolling topography in Zone 5, 6, and 8.

252. Amber constraint: Zones 2 is in proximity to the North Devon Coast AONB. The North Devon Coast AONB is located to the north of the Taw & Torridge Estuary. The zone is not within the AONB but its proximity and the open character of the landscape elevate its potential to affect the AONB setting, although on account of the slight separation from the estuary edge the rating is amber.

253. Amber constraint: Zones 1 to 11 all have residential properties within 250m-450m of zone boundary.

254. Amber constraint: Access to the Zones 4, 5, 9, and 10 is achievable but would require significant length of hedgerow to be removed to provide visibility of oncoming traffic. Zones 1 and 2 would require new access roads to be constructed.

255. Amber constraint: Vehicle routeing for Zone 8 would be south towards the existing landfill site and then north east towards Barnstaple. There are low concentrations of sensitive receptors along this route.

256. Amber constraint: Zones 1, 2 and 3 are in close proximity to the Yelland Quay development.

257. Amber constraint: Surface water to provide drainage outlet is between 50m - 250m in Zones 2, 4, and 9.

258. Amber constraint: Zones 2, 4, and 9 are located within Flood Zones 2 and 3. However, Zone 2 benefits from flood defences.

259. Amber constraint: Zones 4, 5, 6, 7, 8, 9, 10, and 11 are all over 2km from the existing National Grid substation.

260. Amber constraint: Zones 1, 2, and 3 fall within policy area defined as Coast and Estuary Zone (ST09), which will be a planning consideration that considers - amongst other things - (7) Development within the Undeveloped Coast and estuary will be supported where it does not detract from the unspoilt character, appearance and tranquillity of the area, nor the undeveloped character of the Heritage Coasts, and it is required because it cannot reasonably be located outside the Undeveloped Coast and estuary.

261. Amber constraint: Zones 3 and 11 are sensitive to development. Zone 3 is within a relatively open landscape with some localised industrial influences in very close proximity. However, location of this inland of estuary coast reduces rating to amber. Zone 11 is predominantly rural, agricultural landscape and contains large number of small-scale fields defined by hedgerows which would be sensitive to development. Zone 11 has distinctive rolling topography and sits on north-facing slope of culm plateau, contained by distinctive swathe of woodland and plantation forestry.

262. Amber constraint: Zone 11 may affect properties south of B3233 and Instow Town more distant but increasingly elevated with open views to Zone. Close proximity to Tarka Trail (also NCN route 3) to north, although well screened by planting along the route. May affect very short section of these routes.

263. Amber constraint: Minor reroute of onshore cable corridor required at Zone 3.

264. Amber constraint: Moderate potential for buried archaeology due to the proximity to the Medieval Field System in the Parish of Fremington.

## 7.5 Onshore Substation Conclusions

265. Following the conclusion of the BRAG, Zones 4, 5, 6, 7, 9, 10, and 11 have been discounted. This is due to the black constraints relating to a narrow highway network requiring significant widening physical suitability of the Zones for a substation and mitigation in relation to landscape and visual impacts. As described, the existing environment in these zones would prohibit the potential for widening without significant environmental effects. Additionally, these zones would require extensive retaining structures to create necessary, large, almost level platforms as insufficient land is available to create reasonably graded earthworks. The elevated locations means that the zones would be seen above the nearby receptors, but also from properties on higher ground and therefore difficult to mitigate views of it through landform / planting. Black constraints were also identified in relation to landscape and visual sensitivity to development.

266. Zones, 1, 2, 3 and 8 did not identify contain any black constraints. Table 7.1 provides a summary of red constraints (and the corresponding constraints) for Zones 1, 2, 3 and 8. There are potential environmental and engineering constraints associated with all of the four remaining zones, however, Zone 8 would require significant reassessment and resurveying required in order to reroute onshore cable corridor. This would include the requirement to selection an onshore cable corridor making landfall in the Southern Zone (SZ-10, SZ-11, SZ-12). This would result in a significantly longer onshore cable corridor route and the associated constraints described in Section 6.

267. There are red constraints identified for Zone 1 which will be very difficult to mitigate. These include the close proximity to the Taw-Torridge SSSI and location in an area of Coastal and Floodplain Grazing Marsh Priority Habitat. This may result in potentially significant effects and the need for compensatory mitigation measures. Development in Zone 1 at Yelland Marsh will further alter this section of the Estuary and modify its undeveloped character. Some risk that this Zone extends influence of development further west, together with intervisibility with / proximity to AONB raises the potential for significant landscape and visual effects.

268. Zone 3 is considerably smaller than other options and therefore it is considered to have less potential for the siting and landscape mitigation. The small scale of the Zone, which might limit opportunities for landscape mitigation. Therefore, the presumption is that it is possible to adequately protect the existing landscape features found along the boundaries of this Zone, which provide some visual screening. A minor re-route of the onshore cable corridor is required in order to utilise Zone 3. Additional geophysical survey would be required if this Zone is chosen.

269. Zone 3 is located on a major previous development (Yelland Depot) which may contain contaminated land. Additionally, the land is owned by Golden Bay Homes Limited & Waterfront Homes (1998) Limited and may be subject to further development associated with the Yelland Quay development. Discussions with the landowner are required to determine whether this is a viable option.

270. A small area of the Zone 2 is within Coastal and Floodplain Grazing Marsh Priority Habitat. However there is sufficient space within zone to avoid Priority Habitat. The Zone is not within the North Devon Coast AONB but its proximity and the open character of the landscape risk potential effects on the AONB setting. The slight separation from the estuary edge means that the rating for potential effects on AONB setting is amber as opposed to red. However, if the substation were to be located at the northern extent of the Zone, it is considered that the woodland adjacent to the existing substation would screen the substation from the AONB. There are other challenges associated with landscape and visual, however again, it is considered that there is the potential for mitigation within this zone.

271. In conclusion, it is considered that Zones 2 and 3 are the preferred onshore substation zones. Both are within Flood Zone 2 and 3. However, they are benefitting from coastal flood defences. A significant amount of consultation with National Grid is required in order to gain agreement to site a new substation is this location. Additionally, the local planning authority may be in opposition to this location although as outlined there is a lack of alternatives in close proximity to the existing substation. Finally Zones 2 and 3 will be subject to discussions with the landowners.

*Table 7.1 Summary of Onshore Substation Red Constraints (and corresponding constraints) for Zone 1, 2, 3 and 8*

| Constraint | Zone 1 | Zone 2 | Zone 3 | Zone 8 |
|---|---|---|---|---|
| Ecology | Within Coastal and floodplain grazing marsh Priority Habitat | Small area of zone within Coastal and floodplain grazing marsh Priority Habitat. However there is sufficient space within zone to avoid Priority Habitat | Not within or in close proximity to Priority Habitat | Not within or in close proximity to Priority Habitat |
| Traffic and Transport - sensitive receptors | Access via B3233 could impact upon the communities at Yelland and Instow. | Access via B3233 could impact upon the communities at Yelland and Instow. | Access via B3233 could impact upon the communities at Yelland and Instow. | Vehicle routeing would be south towards the existing landfill site and then north east towards Barnstaple. There are low concentrations of sensitive receptors along this route. |
| Traffic and Transport - Highway network constraints | The zone can be accessed from the road to Yelland Quay and B3233. Few highway constraints are identified along these routes. | The zone can be accessed from the road to Yelland Quay and B3233. Few highway constraints are identified along these routes. | The zone can be accessed from the road to Yelland Quay and B3233. Few highway constraints are identified along these routes. | The unnamed road south is a narrow single lane road and is not wide enough for two vehicles to pass and would therefore require localised widening for a distance of approximately 1.3km. There is potential for passing places to be installed along the road within highway verges. |

| Constraint | Zone 1 | Zone 2 | Zone 3 | Zone 8 |
|---|---|---|---|---|
| Landscape - national designations | The Zone is not within the AONB but its proximity and the open character of the landscape risk potential effects on the AONB setting. | The Zone is not within the AONB but its proximity and the open character of the landscape risk potential effects on the AONB setting. The slight separation from the estuary edge the rating is amber. | The site is not within the AONB. The rating is green on account of the separation from the estuary edge, the immediate context of existing substation to the north and sewage works to the south, and screening provided by existing woodland around the Yelland Substation / Yelland Quay and within the wider landscape. | The North Devon Coast AONB is located to the north and west of the Taw & Torridge estuary. The substation zone is sufficiently distant, with a context that includes intervening built form, such that it is considered unlikely to have significant impacts on the AONB setting. |
| Landscape character sensitivity to development | Relatively open landscape with some localised industrial influences. The existing substation is well screened by woodland. Its influence is noticeable through the presence of OHL and very limited visibility of some taller parts of the electrical infrastructure. The appearance of these features somewhat contradicts the 'undeveloped character' described in published assessments. Development at Yelland Marsh will further alter this section of the Estuary and modify its undeveloped character. Some risk that this Zone extends influence of development further west, together with intervisibility with / proximity to AONB raises rating to red. | Relatively open landscape with some localised industrial influences. The existing substation is well screened by woodland. Its influence is noticeable through the presence of OHL and very limited visibility of some taller parts of the electrical infrastructure. The appearance of these features somewhat contradicts the 'undeveloped character' described in published assessments. Development at Yelland Marsh will further alter this section of the Estuary and modify its undeveloped character. Some risk that this Zone extends influence of development further west, together with intervisibility with / proximity to AONB raises rating to red. | Closest residential properties are found to the north of the B3233 West Yelland Road. The closest of these groups are to the north at range of approximately 340m are also largely screened by intervening trees, settlement expansion to the north of the B3233 introduces properties approximately 340m to SE also screened by woodland blocks. More open properties are located around 888m to the SW of this Zone, adjacent to the North Devon Cricket Club. Views from these properties include visibility of OHLs, although the existing substation at which they terminate is largely screened by intervening trees. Views of such development would be extended around a further | Predominantly rural, agricultural landscape. Influenced locally by OHL to the west. Sits on ridgeline within the elevated plateau and would therefore be contrary to landscape strategy to protect open skylines; although this is somewhat moderated by presence of OHL. |

| Constraint | Zone 1 | Zone 2 | Zone 3 | Zone 8 |
|---|---|---|---|---|
| | | | part of any views in the vicinity of these properties, including their approaches. Properties south of B3233 and Instow Town more distant but increasingly elevated with open views to site at min range of approx. 610m. Close proximity to Tarka Trail (also NCN route 3) to north, although well screened by planting along the route. May affect very short section of these routes. | |
| Visual sensitivity to development | Development at Yelland Marsh will further alter this section of the Estuary and modify its undeveloped character. Some risk that this Zone extends influence of development further west, together with intervisibility with / proximity to AONB raises rating to red. | Will affect views from stretch of this to east and south, and from stretches of recreational routes and PRoW to the north of the River Taw. PRoW runs through the central portion of the Zone and would have very close proximity views. Recreational watercraft use River Taw to west and north and would have open views. Cricket Club and Instow Picnic Spot at close range to the west. Potential for close-range visibility, c.80 m, from short section B3233 to south. | Properties south of B3233 and Instow Town more distant but increasingly elevated with open views to zone. Close proximity to Tarka Trail (also NCN route 3) to north, although well screened by planting along the route. May affect very short section of these routes. | Locating the substation in this Zone is likely to increase the extent of landscape/visual impacts owing to the additional cable routeing from the existing Yelland substation. |

| Constraint | Zone 1 | Zone 2 | Zone 3 | Zone 8 |
|---|---|---|---|---|
| Physical suitability of site for substation and mitigation | Zone is relatively flat but sits immediately adjacent to the River Taw estuary. The Zone is within a flood zone area and would potentially require a substantial increase in the elevation of the platform level and consequently the overall height over the substation; resulting in wider visual impacts. The Zone includes grazing marsh and rough grassland and would result in hedge/field tree losses. Field boundaries are formed by field drains and hedgerows. This Zone falls within an area identified by Devon County Council as an LCT 'Sensitive to Woodland Creation' which may affect the extent to which certain landscape mitigation planting would be appropriate to the underlying landscape character. | Zone is relatively flat, lying in close proximity to the River Taw estuary. The Zone is within a flood zone area and would potentially require a substantial increase in the elevation of the platform level and consequently the overall height over the substation; resulting in wider visual impacts. The Zone includes grazing marsh and rough grassland and would result in hedge/field tree losses. This Zone falls within an area identified by Devon County Council as an LCT 'Sensitive to Woodland Creation' which may affect the extent to which certain landscape mitigation planting would be appropriate to the underlying landscape character. The substation should be sited to the north/north east of this Zone, where it would be located in closer proximity to the existing substation, and as far away from residential properties as possible. | Zone 3 is considerably smaller than other options and therefore it is considered to have less potential for the siting and landscape mitigation. Red on account of the small scale of the Zone, which might limit opportunities for landscape mitigation. Therefore, the presumption is that it is possible to adequately protect the existing landscape features found along the boundaries of this Zone, which provide some visual screening. | As a sloping site it will require extensive retaining structures to create necessary, large, almost level platform as insufficient land to create reasonably graded earthworks. The location means that the site will be seen from receptors at a range of elevations, and therefore difficult to mitigate views of it through landform / planting. This Zone comprises fields under agricultural use, and would result in hedgerows/field tree losses. Potential to link to Devon Nature Recovery Network woodland site (Core Nature Area) to west. Red on account on slightly less steeply sloping site than others to south of area of search. |

| Constraint | Zone 1 | Zone 2 | Zone 3 | Zone 8 |
|---|---|---|---|---|
| Flood zones | Within Flood Zones 2 and 3. However, these areas benefit from flood defences. | Majority of zone within Flood Zones 2 and 3. However, these areas benefit from flood defences. | Within Flood Zones 2 and 3. However, these areas benefit from flood defences. | >100m |
| Connectivity to Onshore Cable Routes - General Comment on Major Constraints | No major constraints. Substation zone covers existing indicative cable corridor. | No major constraints. Substation zone covers existing indicative cable corridor. | Minor re-route of onshore cable corridor required | Significant reassessment and resurveying required in order to reroute onshore cable corridor. |
| Connectivity to Existing National Grid Substation - General Comment on Major Constraints | <1km | <1km | <1km | Approx 2.5km |
| Site History | Marshland/pasture land throughout the historical record | Marshland/pasture land throughout the historical record | Major previous development (Yelland Depot) | Pasture land throughout historical record |

# 8. Summary and Conclusions

## 8.1 Conclusions

272. Of the three landfall zones that were identified, the North Zone landfall was discounted due to poor access via local roads that are narrow and winding and very long distance that a specific haul road would be non-viable. Therefore, the Mid Zone and South Zone were carried forward as the Short List options. The Mid Zone is the preferred due to linkage with preferred onshore cable corridor and preferred offshore corridor.

273. Of the six offshore cable corridors that were identified following the Long List stage, the Central Offshore Corridor has not been chosen due to the potential impact on Annex 1 reef habitat and is routed through a large extent of a disused former licensed disposal area. The Southern Offshore Corridor has not been selected due to the potential impact on reef habitat, passage through an area of disused former licensed disposal as well as high physical (tidal and current) activity which would make cable burial a complexity. Therefore, the Northern Offshore Corridor (see Figure 8.1) is the preferred from either Mid Zone and South Zone landfalls.

274. Of the eleven onshore substation zones that were identified in the Long List, Zone 2 and 3 are considered to be the preferred locations (if sited in the northern most area of Zone 2). This is due to a balance of the potential to mitigate landscape impacts and the proximity to the existing substation. Zone 2 is shown in Figure 8.2 and Zone 3 is shown in Figure 8.3. The decision between either zone and a specific location within them will be made following further engagement with landowners and stakeholders.

275. Five onshore cable corridors were identified following the Long List stage and BRAG, and of these the balance between potentially significant engineering (as well as archaeological and residential) constraints present within the South Zone onshore routes (SZ-10, SZ-11, and SZ-12) versus the potential ecological impacts for the Mid Zone onshore routes (MZ-13 and MZ-14) which are believed to be manageable (either through construction method, design, and mitigation).

276. When determining between the two Mid Zone routes (MZ-13 and MZ-14), it was considered that the potential impacts that could arise from the route through Braunton Burrows SAC (MZ-13) were potentially resolvable with support from the local landowner, Natural England and Dynamic Dunescapes project team. Particularly where this route option could provide greater financial potential to support the Dynamic Dunescapes Project and enhance the condition of the SAC. These works were seen as potentially providing an approach to construction which

would interact (positively) with those and enable the project to provide significant additional betterment for the condition of the Braunton Burrows SAC.

277. Consequently, MZ-13 was seen as potentially acceptable as:

- There were no perceived long-term impacts
- Sufficient cable burial depth could be carried out (designed both through geomorphological study and in agreement with stakeholders) to avoid any long-term impacts arising from cable exposure in the beach and dunes and therefore have no impact on geomorphology of the system
- The cable route running through America Road was seen as an approach which avoided disturbance to key natural features of the SAC and avoid many potential impacts on agricultural land which was less disturbed to the east. Any impacts of disturbance were envisaged to be able to be mitigated through engagement with Natural England and the Dynamic Dunescapes team to identify appropriate mitigation and enhancement measures elsewhere within the SAC for this temporary disturbance
- Construction methods were believed to minimise disturbance impacts, and where disturbance would occur it was perceived that there was the potential to partner or work with the Dynamic Dunescapes project to develop mitigation and provide support to further enhancement of the SAC and its features
- Biodiversity Net Gain is a key requirement of the planning process in the UK and this route presented a potential opportunity to provide that Net Gain while supporting enhancement and restoration works of the dune systems at Braunton Burrows.

278. The corridor MZ-14 which runs along the eastern edge of the SAC and then northwards before turning west to cross the SAC out to sea was considered acceptable for the following reasons:

- The cable route running through America Road was seen as an approach which avoided disturbance to key natural features of the SAC and avoid many potential impacts on agricultural land which was less disturbed to the east. Any impacts of disturbance were envisaged to be able to be mitigated through engagement with Natural England and the Dynamic Dunescapes team to identify appropriate mitigation and enhancement measures elsewhere within the SAC for this temporary disturbance
- The route crossing the north end of the SAC would be drilled (HDD) to avoid surface disturbance to both the golf course and the features of the SAC in this area, with emergence occurring in Saunton Sands Car Park (a part tarmacked area)
- The corridor then would pass through the intertidal area of the SAC either through trenching out along the slipway and out to low water, or through a

minor HDD under the foredunes (from the car park to the intertidal) to avoid potential disturbance to the existing cables under the slipway (though they are to be out of use within the next 2 or 3 years). The precise route is to be defined and resolved through engagement with stakeholders and with further information on geomorphological activity (as there was anecdotal evidence for beach lowering at the slipway (which could either be due to tidal action or from human activity) as this is a focal point for accessing and egressing the beach for many users

- Overall the corridor passing through the intertidal zone of the SAC was considered feasible as there was precedence for this on many other projects (and also through the presence of the existing cables in the foreshore), and because the nature of the impact would be a very short duration and temporary. As with option MZ-13, sufficient cable burial depth could be carried out (designed both through geomorphological study and in agreement with stakeholders) to avoid any long-term impacts arising from cable exposure in the beach and dunes and therefore have no impact on geomorphology of the system.

279. Recent engagement with stakeholders (such as Natural England) has indicated that there is opposition to a route through the centre of Braunton Burrows. Support from Natural England (and specific design and construction assumptions at the time the Short List Report was prepared) was considered essential to enable a viable consent application. Further information on the transmission requirements has indicated that it is likely that a wider (dual cable) corridor could now be needed. Consequently, greater disturbance would arise and thus greater mitigation would be required.

280. Subsequent to the additional information received, additional reports, and stakeholder engagement we have refined the preferred routes. Key factors in that decision are:

- The MoD provided information on the construction and design of the various tracks and roads within Braunton Burrows that the onshore cable route was planned to use. These highlighted significant potential infrastructure that would require greater scale of plant and activity than was assumed at the Short List stage. This has therefore provided a significant influence against both routes (MZ-13 and MZ-14) being preferred
- The MoD also indicated their frequent use of America Road and other areas, and as such the sum of our works would be seen as a significant obstruction to their day-to-day activities, and unacceptable. This has therefore resulted in a significant factor against both routes (MZ-13 and MZ-14) being preferred
- The Electrical Transmission Study indicated that there could be a need for two cables, which would require a minimum separation. At the time of the Short List

Report it was assumed that a single cable would be sufficient, and thus the construction plant, method and thus disturbance that would arise with a twin cable is significantly greater and falls outside areas of existing pathways etc and results in greater potential for disturbance of a bigger scale. This has therefore provided a significant influence against both routes (MZ-13 and MZ-14) being preferred

- The Electrical Transmission Study also indicated that there would be a need for upstanding cable jointing structures (albeit at ground level) which would add a permanent feature (and loss thereof) within the SAC boundary. The assumptions in the Short List Report were that such permanent features would not be needed or could be buried and thus avoid permanent impact on the SAC. Consequently, it is inevitable that such features would represent a loss of extent, and potentially could result in a significant adverse effect on integrity. In the instance that the project could pass the test of no alternative options and IROPI, the development of compensatory measures would be required. This alone indicates that a route through Braunton Burrows in this scenario (and specifically in relation to MZ-13) would be a very significant consenting challenge
- Our engagement with Natural England has indicated opposition to a route through the Braunton Burrows SAC. We accept that given this and the other factors listed above, MZ-13 should be discounted. However, we feel there is still reasoning to move forward with corridor MZ-14 particularly if various elements are refined (and these are discussed further)
- The Dynamic Dunescapes team indicated that they concur with Natural England's opposition with a route through the SAC.

281. Considering the above, refinement of a corridor option based on MZ-14 has been undertaken (see Figure 8.4). This option has refined the cable route to avoid the SAC all the way until it crosses under the SAC at the northern (golf course) end. This refinement keeps the corridor outside (though close to) the SAC boundary, and also avoids access areas required for MoD activities, as well as avoiding the potential greater disturbance from trenching in MoD track infrastructure that would require greater plant. The route passes between the SAC and the SSSI near Sandy Lane Car Park (which it would do by HDD under the road between them). The route would then continue northwards outside the SAC, until it turns to pass under the SAC around the golf course area. The HDD would essentially avoid any surface disturbance within the SAC. This route would then emerge within the Saunton Sands Car Park and continue out to the foreshore as defined for corridor MZ-14.

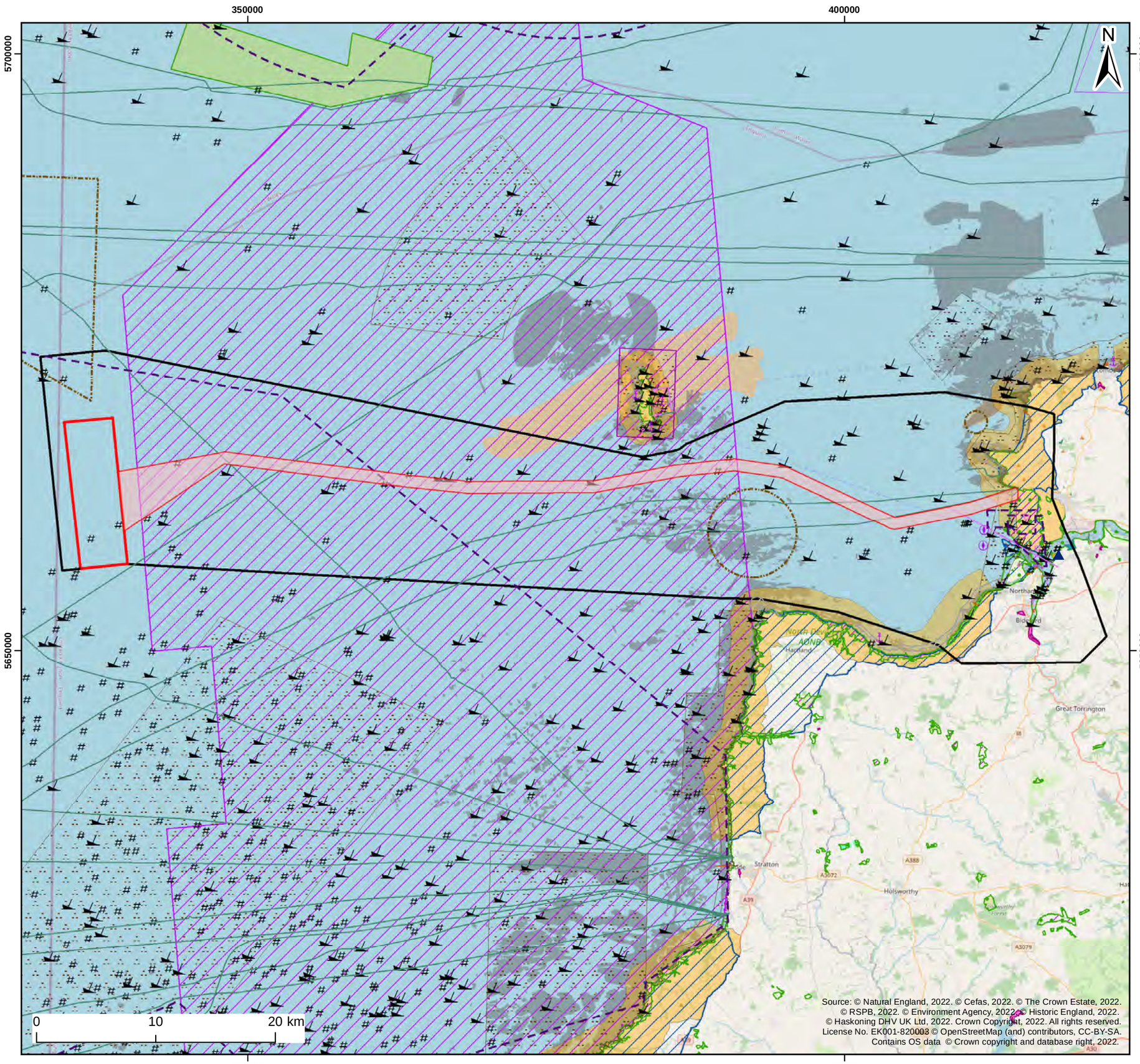
282. This corridor would avoid direct disturbance within the SAC. There would therefore be no disturbance to features of the SAC until it exits with the subtidal zone. The new route does however impact on agricultural land, and cross drains and hedgerows. Where possible minor trenchless methods would be used to cross these

obstacles but there will be a need for biodiversity net gain requirements to be identified.

283. There are a number of areas of ongoing work that we are aware of that we need to continue to engage with stakeholders on with this preferred route:

- Confirming and ensuring no potential disturbance (indirect) when works are outside but close to the SAC
- Assessing and ensuring the potential HDD under the golf course does not impact on the golf course activities and underground structures as well as the SAC features above it
- Selecting the route out of the Saunton Sands Car Park through engagement with stakeholders as well as input from geomorphological study and cable burial design
- Confirming no impact on geomorphology from buried cable in the foreshore through geomorphological study
- Discussing and agreeing mitigation measures during cable trenching work within the intertidal area of the SAC
- Identifying biodiversity net gain requirement for non-designated habitats along the preferred cable corridor, which could include net gain to features within the SAC which would have greater 'value'.

284. In summary, it is concluded that the preferred offshore export cable corridor from the Windfarm Site is along the Northern Offshore Route. It would then make landfall at the northern end of the Mid Zone landfall area. The preferred onshore cable corridor is MZ-14 (adjacent to the Braunton Burrows SAC with HDD under the northern portion of the SAC) and would connect into a new onshore substation located in Zone 2 or 3. From there a short connection into the existing East Yelland substation would be required to distribute to the grid network.




Legend:

- Project Boundary
- Preferred Offshore Cable Corridor
- Area of Search
- Potential Grid Connection Locations
- Offshore Wave Site Pre-planning Application
- Closed Disposal Sites
- Marine Conservation Zones (MCZ)
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- National Nature Reserves (NNR)
- Local Nature Reserves (LNR)
- Important Bird Areas (IBA)
- RSPB Reserve Boundary
- Annex 1 Sandbanks
- Annex 1 Reef
- Anchorage area
- Pilot boarding place
- Anchorage area
- Military practice area
- Restricted area
- Harbour area (administrative)
- Submarine Cable
- Harbour facility
- Pipeline
- Harbour facility
- Navigation line
- Route, Ferry
- Route, Recommended
- Obstruction
- Wreck
- Obstruction

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: White Cross Preferred Offshore Cable Corridor

Figure: 8.1 | Drawing No: PC2978-RHD-ZZ-XX-DR-Z-0449

| Revision: | Date: | Drawn: | Checked: | Size: | Scale: |
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| P01 | 15/12/2022 | AB | CB | A3 | 1:320,000 |
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Co-ordinate system: WGS 1984 UTM Zone 30N

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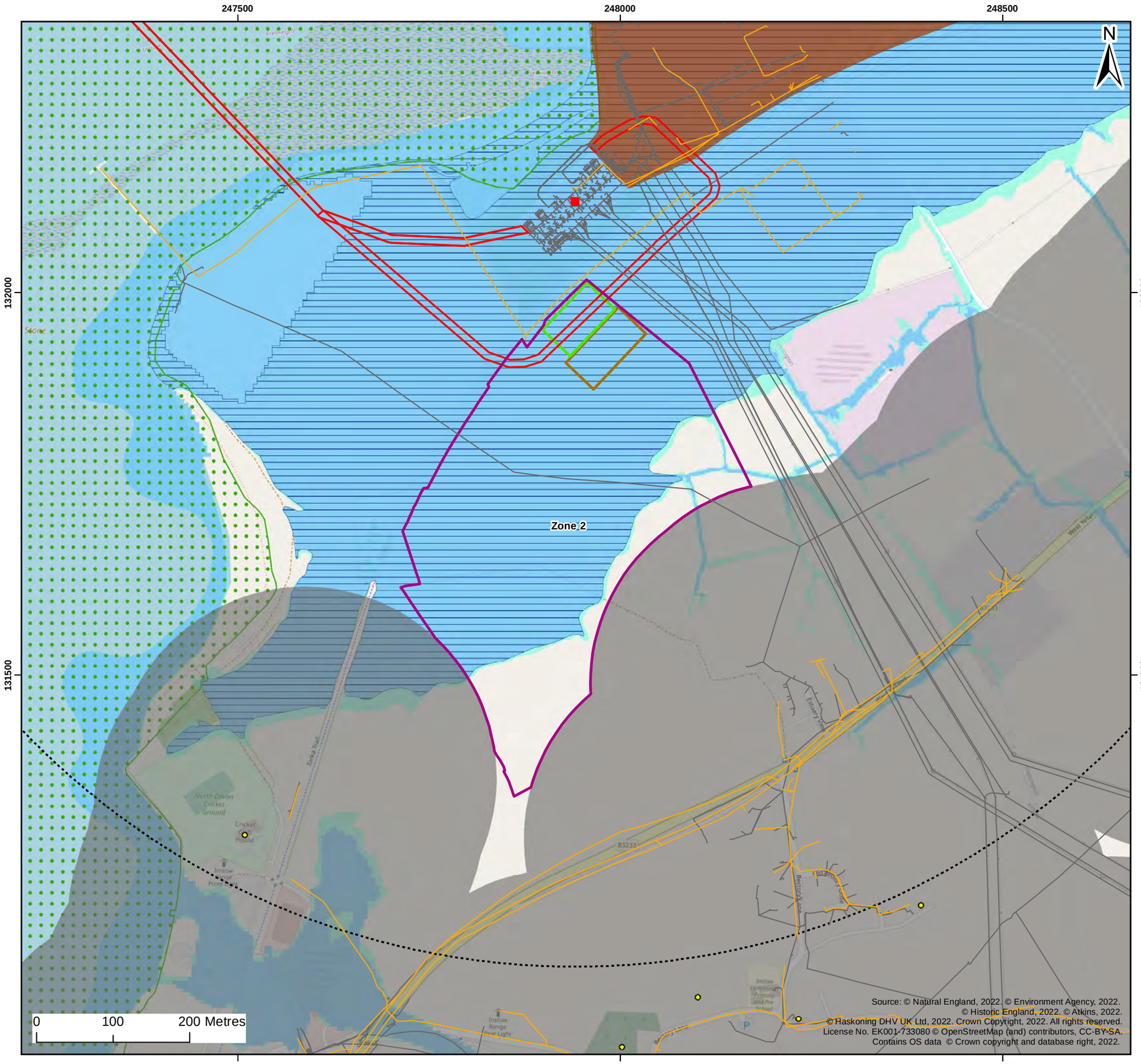




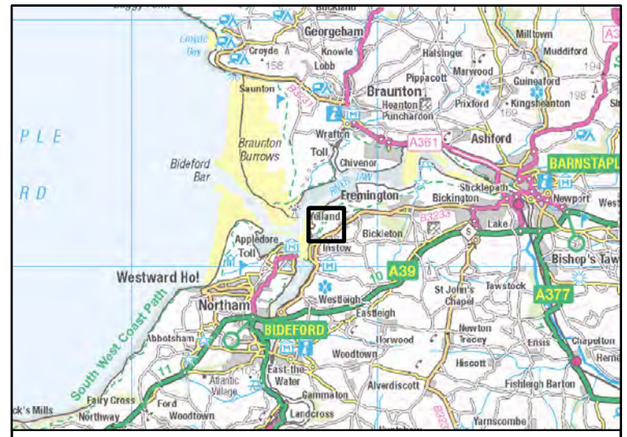


Legend:

- Existing Substation
- 1km Study area
- 3km Study Area
- Indicative Onshore Cable Route
- Substation Zone
- Indicative Operational Compound
- Indicative Construction Compound
- Sites of Special Scientific Interest (SSSI)

**Listed Buildings**

**Grade**

- II
- Electricity Line
- Telecommunication Line
- Historic Landfill Sites
- 250m Residential Buffer
- Flood Zone 2
- Flood Zone 3
- Areas Benefiting from Flood Defences

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: White Cross Onshore Substation Zone 2

| | |
|---|---|
| Figure: 8.2 | Drawing No: PC2978-RHD-ZZ-XX-DR-Z-0450 |

| Revision: | Date: | Drawn: | Checked: | Size: | Scale: |
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Co-ordinate system: British National Grid

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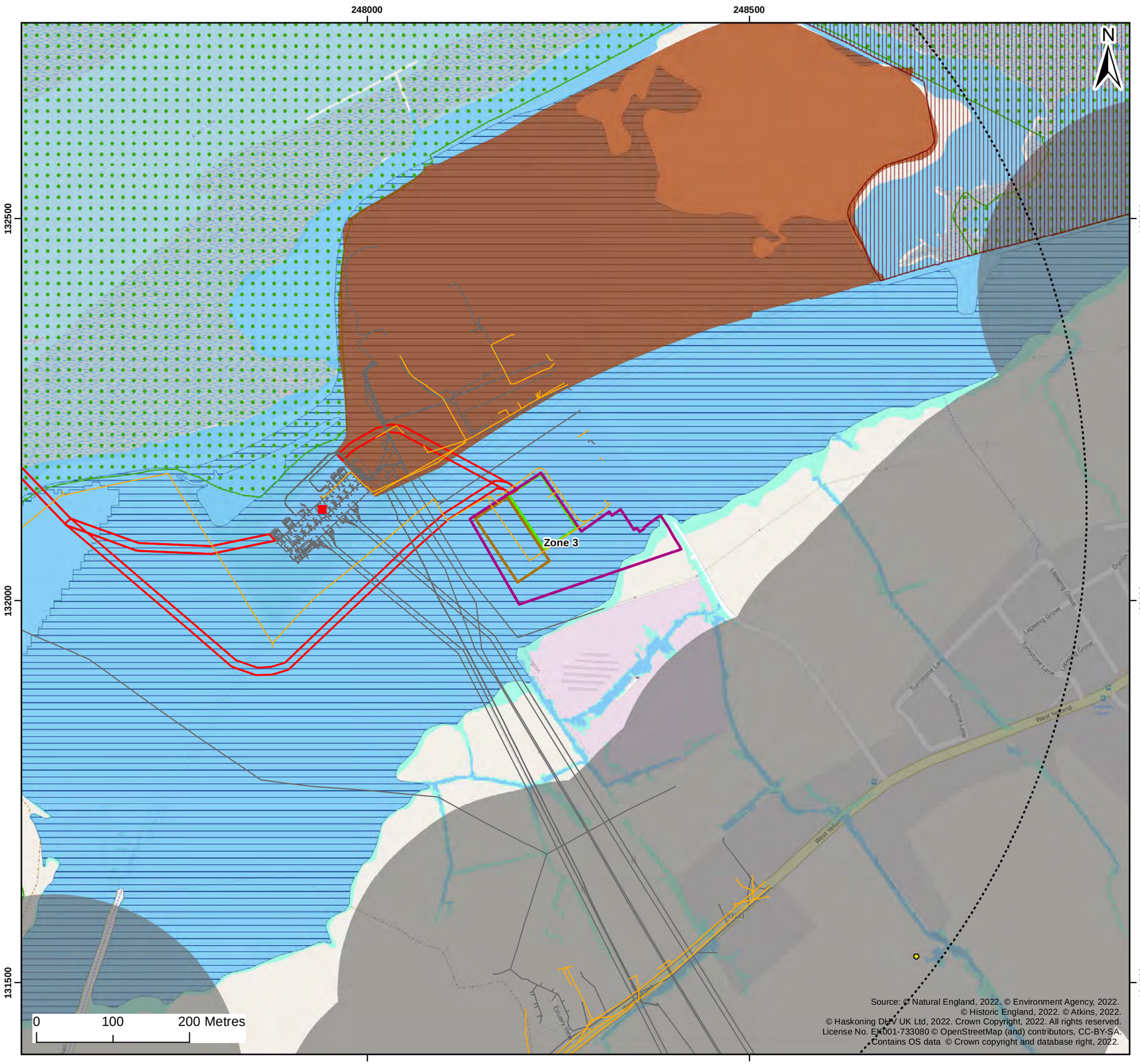


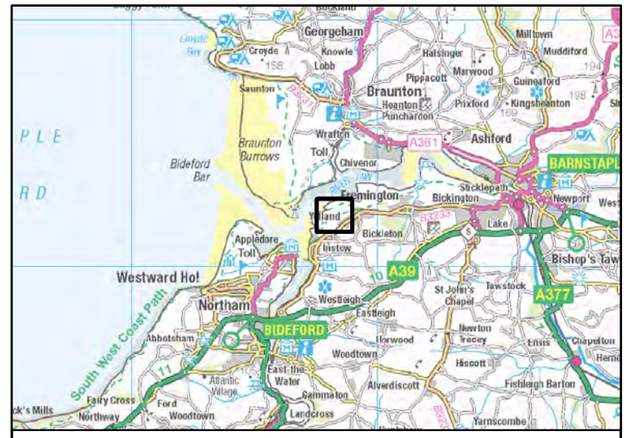


Legend:

- Existing Substation
- 1km Study area
- 3km Study Area
- Indicative Onshore Cable Route
- Substation Zone
- Indicative Operational Compound
- Indicative Construction Compound
- Sites of Special Scientific Interest (SSSI)
- RSPB Reserve Boundary

**Listed Buildings**

**Grade**

- II
- Electricity Line
- Telecommunication Line
- Historic Landfill Sites
- 250m Residential Buffer
- Flood Zone 2
- Flood Zone 3
- Areas Benefiting from Flood Defences

| Client: | Project: |
|---|---|
| Offshore Wind Ltd. | White Cross Offshore Windfarm |

Title: White Cross Onshore Substation Zone 3

Figure: 8.3 | Drawing No: PC2978-RHD-ZZ-XX-DR-Z-0451

| Revision: | Date: | Drawn: | Checked: | Size: | Scale: |
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Co-ordinate system: British National Grid

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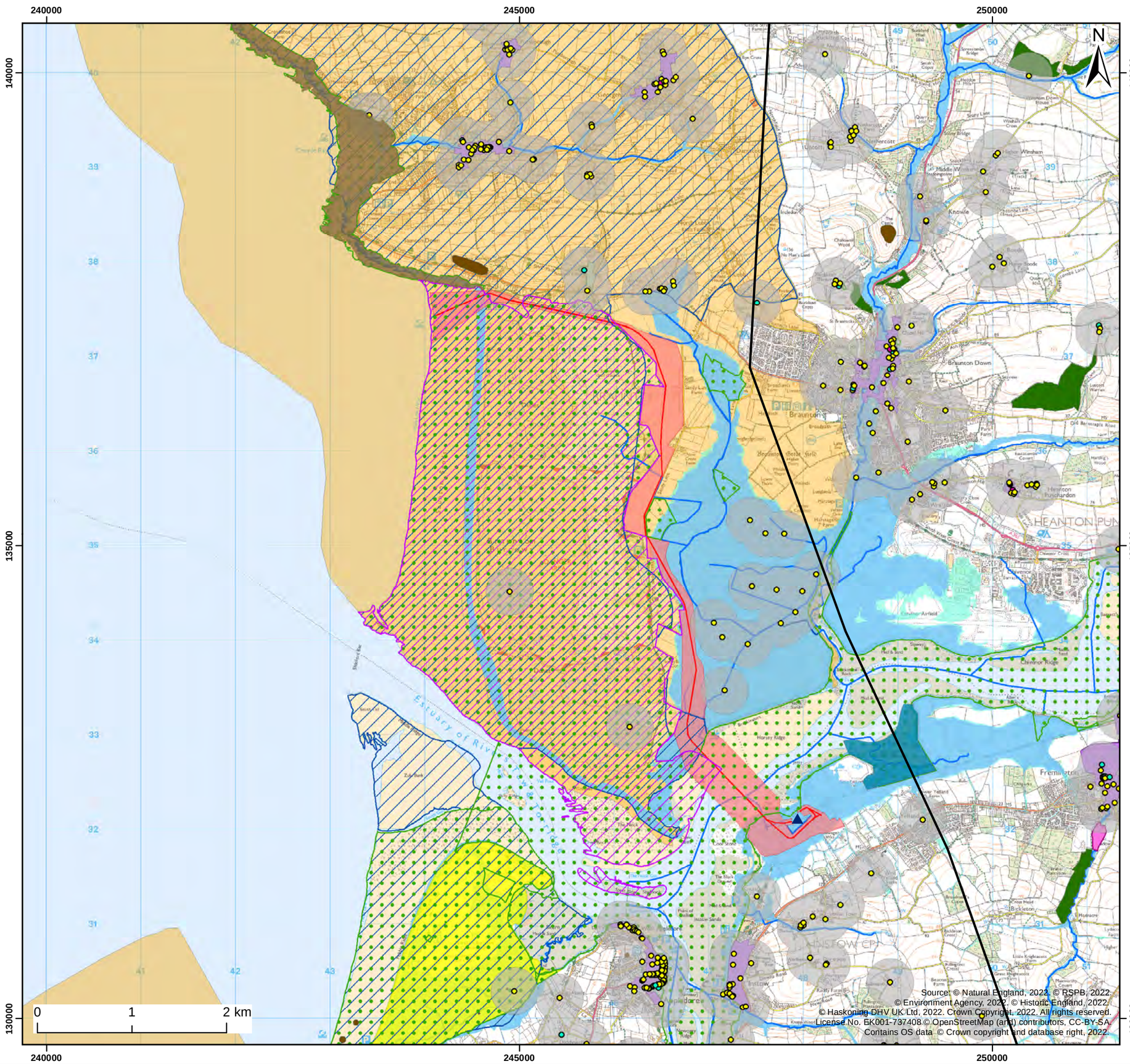


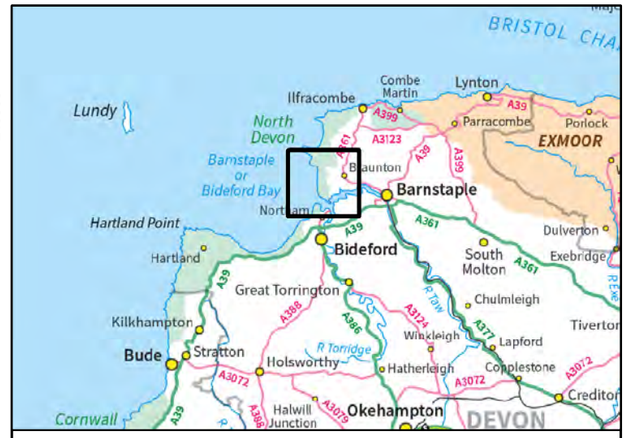


Legend:

- Area of Search
- Preferred Onshore Cable Corridor
- Preferred 10m Cable Corridor
- Potential Grid Connection Location
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- Heritage Coast
- Local Nature Reserves (LNR)
- Country Parks
- RSPB Reserve Boundary
- Important Bird Areas (IBA)
- Ancient Woodland

**Listed Buildings**

**Grade**

- I
- II
- II*

- Listed Buildings 250m Buffer
- Scheduled Monuments
- Parks And Gardens
- Conservation Areas
- Ordinary Watercourse
- Main River
- Flood Zone 2
- Flood Zone 3

| | |
|---|---|
| Client: Offshore Wind Ltd. | Project: White Cross Offshore Windfarm |

Title: White Cross Onshore Cable Corridor Refined MZ-14

| Figure: | Drawing No: |
|---|---|
| 8.4 | PC2978-RHD-ZZ-XX-DR-Z-0452 |

| Revision: | Date: | Drawn: | Checked: | Size: | Scale: |
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Co-ordinate system: British National Grid

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