White Cross Offshore Wind Farm:
Outline Cable Specification and Installation Plan

WHX001-FLO-CON-ENV-PLN-0007

Document Code:	WHX001-FLO-CON-ENV-PLN-0007	
Version Number:	00	
Date:	*Issue Date*	June 2024
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Version Number	Reason for Issue / Major Changes	Date of Change
0	For Issue	

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Glossary of Acronyms

Acronym	Definition
AOD	Above Ordnance Datum
CBRA	Cable Burial Risk Assessment
Cefas	Centre for Environment Fisheries and Aquaculture Science
CPA	Cable Protection Analysis
CSIP	Cable Specification and Installation Plan
ECT	Environment and Consents Team
EMODnet	European Marine Observation and Data Network
ES	Environmental Statement
HDD	Horizontal Directional Drill
MHWS	Mean High Water Spring
MMO	Marine Management Organisation
MPAs	Marine Protected Areas
OECC	Offshore Export Cable Corridor
OCSIP	Outline Cable Specification and Installation Plan
RIAA	Report to Inform Appropriate Assessment
SNCBs	Statutory Nature Conservation Bodies
TJB	Transition Joint Bay
WCOW	White Cross Offshore Windfarm
WCOWL	White Cross Offshore Windfarm Ltd
WTGs	Wind Turbine Generators

1. Introduction

1. This Outline Cable Specification and Installation Plan (OCSIP) has been produced in response to a request made by the Marine Management Organisation (MMO) following the statutory consultation on Marine Licence application MLA/2023/00113 for White Cross Offshore Windfarm (WCOW). This document also includes a summary of the **Outline Cable Landfall Plan** (WHX001-FLO-CON-DES-PDE-0001) which is provided as **Appendix Y** of the **ES Addendum**.

2. The MMO have advised that if MLA/2023/00113 is approved, there will be conditions attached to the subsequent Marine Licence that will formally outline the requirement for a Cable Specification and Installation Plan (CSIP). This will be further developed and presented during the pre-construction phase of WCOW to provide greater confidence in the assumptions made by White Cross Offshore Windfarm Ltd (WCOWL) relating to cable installation. **Appendix A** will provide the Marine Licence conditions that the CSIP will seek to discharge.

3. This document serves as an outline of the final CSIP and confirms the proposed structure of the final CSIP. The final CSIP will provide information to support assumptions made in the **Offshore ES**. Specifically, this is regarding site preparation, cable burial and deployment of cable protection measures; and it will set out the proposed monitoring of the recovery of the areas where cables are buried, as well as any proposed remediation if impacts do occur.

1.1 Purpose and scope of the OCSIP

4. The purpose of the OCSIP is to: firstly, present currently known information regarding the cable specification and installation process (including the appropriate assessments of environmental impact of cable burial), secondly, the OCSIP provides as much clarity as possible on how and when further information will be available.

5. The OCSIP collates pertinent information from the Environmental Statement (ES) as well as the Environmental Statement Addendum (ES Addendum). It should be specifically read in conjunction with **White Cross Offshore Windfarm Outline Cable Landfall Plan** (WHX001-FLO-CON-DES-PDE-0001), and **Appendix Y** of the **ES Addendum**, which presents detailed information regarding the proposed landfall installation process. For the purposes of the OCSIP, information regarding the proposed landfall installation process is summarised within this document (**Section 6**).

6. This document presents outline detail on:

   - The proposed structure of the final CSIP (**Section 2**).
   - Planned consultation following updates (**Section 3.1**).
   - Impact parameters of offshore cable installation (**Section 4**).

  - This includes identifying the required environmental assessments of the impacts associated with seabed preparation (**Section 4.1**) and burying and/or protecting the Project export cable(s) and inter-array cables (**Section 4.2**). This requires identifying areas of likely suboptimal cable burial, the risk of cable exposure, and the impacts of remedial action in an event of cable exposure.
- The proposed offshore cable installation process (**Section 5**).
- Summary of the proposed landfall cable installation process (**Section 6**).
- Commitments made by the Project related to cable installation (**Section 8**).
- WCOWL's cable burial and protection decision making process (**Section 9**).
- Proposed Sandwave Clearance Plan (**Section 10**).
- Proposed Cable Protection Plan (**Section 11**).
- WCOWL's commitment to monitor intertidal sediment level recovery and carry out remediation following cable installation, if it is required (**Section 12**).

7. In addition, an updated **Cable Burial Risk Assessment** (**CBRA**) (WHX001-FLO-CON-ENG-RSA-0001) is provided in **Appendix U** of the **ES Addendum**.

2. Final CSIP structure

8. It is proposed that the final CSIP will be developed in line with standard industry best practice (including full compliance with the Natural England and the Joint Nature Conservation Committee's '*Nature conservation considerations and environmental best practice for subsea cables for English Inshore and UK offshore waters'* (published in September, 2022).

9. The final CSIP will therefore eventually adopt the following structure as a minimum:

- Introduction
- Project Context
- Scope and Objectives of the CSIP
- Updates and Amendments to the CSIP
- Technical Specifications of Cables
- CBRA
- Sandwave Clearance Plan
- Cable Burial Plan and Installation Methodology
- Cable Protection Plan
- Monitoring of Cables Plan

3. Approach to updating the OCSIP

10. The OCSIP will be revised and updated as the project progresses to construction and operation, and as further information becomes available following decisions on final project design. For example, updates to the OCSIP may be required due to:

- changes to the proposed construction methodology that require additional management measures.
- changes to management measures already proposed.
- emergence of novel data collection technologies (i.e. autonomous data collection).
- identification of new environmental sensitivities
- emerging guidance.
- new legislative requirements.

11. Updates are also likely to be required following reviews by the relevant statutory nature conservation bodies (SNCBs), in consultation with the MMO. Initially, these updates are expected to be required at regular intervals during the 'outline' plan phase (i.e., during the consenting and pre-construction phases). Beyond this phase, the approach to updating the OCSIP will revert to the Change Management Process, as outlined in **Figure 3-1**.

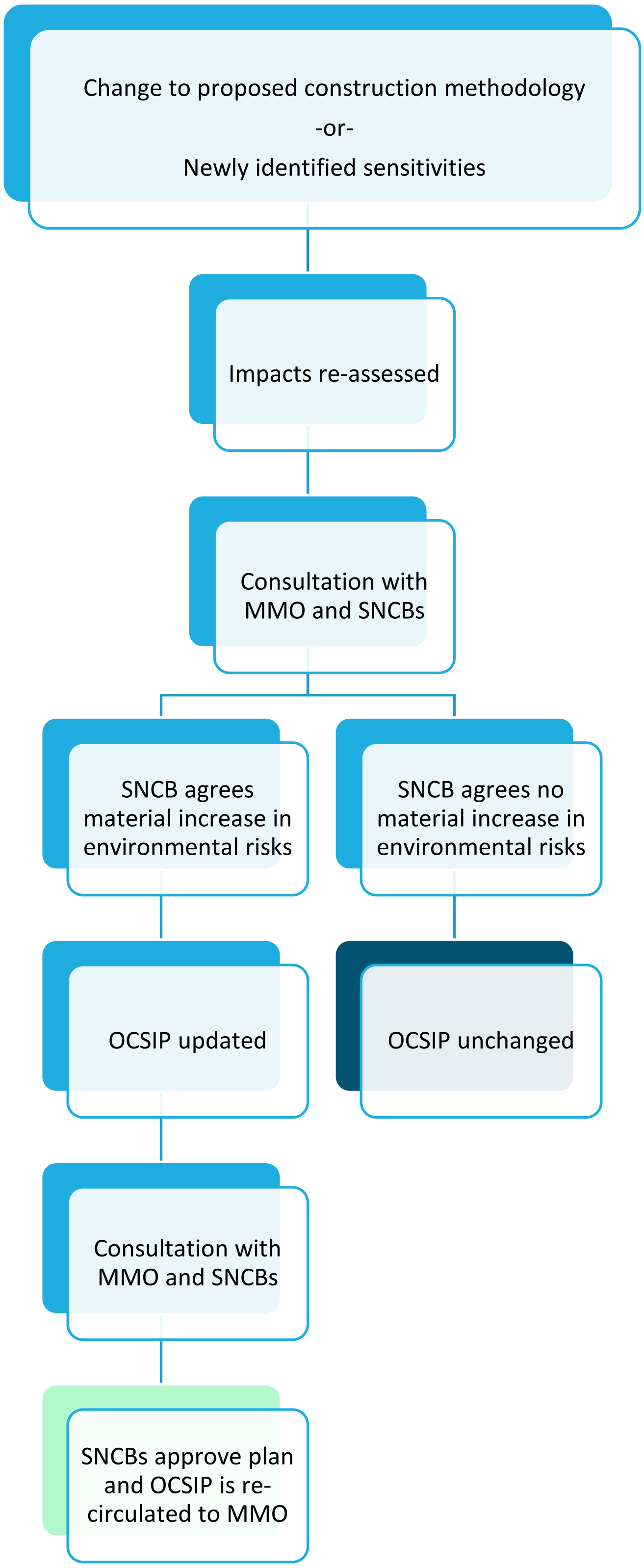

Figure 3-1 OCSIP Change Management Process

3.1 Consultation

12. The off-site Environment and Consents Team (ECT) are responsible for:

- Managing consultation on the OCSIP with the relevant consultees.
- Maintaining and updating the OCSIP.
- Supporting the contractor tendering process to ensure commitments and monitoring requirements are efficiently communicated to suppliers.
- Ensuring that the final Sandwave Clearance Plan and Cable Burial Plan are followed at all times during construction.
- Ensuring that all environmental monitoring is undertaken at the appropriate intervals.
- Ensuring that remedial measures are undertaken, where appropriate.
- Timely review and submission of monitoring reports.

13. This section will be further updated to summarise comments on this document as consultation progresses.

4. Impact parameters of offshore cable installation

4.1 Sandwaves

14. Sand (greater than a diameter of 0.063 mm) is the dominant sediment type in the Offshore Development Area. Mud (less than 0.063 mm diameter) content is highest closer to landfall; however, sediment transport within these shallower inshore areas is regularly driven by wave and current activity causing resuspension and dispersion of fines that may be deposited.

15. On average, about 85% of the sediment fraction in the Offshore Development Area consists of sand, with gravel (greater than 2 mm diameter), and mud comprising approximately 9% and 6%, respectively.

16. Cumulative particle size distributions show that 75% of the sand is fine to medium (0.125-0.5 mm) and 23% is coarse (greater than 0.5 mm) and only 2% is very fine (0.063-0.125 mm).

17. Assuming 3 m wide, 3 m deep excavations (93.6 km length for each cable), it is expected that up to 1,952,640 m^3 of total sediment will be levelled during seabed preparation works within the whole Offshore Development Area. Only 872,160 m^3 of this volume, however, is made up of sandwave sediment (842,400 m^3 for export cable seabed preparation works and 29,760 m^3 for inter-array cable seabed preparation works).

18. Sandwaves and megaripples are transverse bedforms made up of sand, with their crest generally oriented perpendicular to the flow of bottom currents (Bellec et al., 2019). Locations of affected sandwave and megaripple areas are identified in Figures

5-4 and 5-12 of the CBRA (**Appendix U** of the **ES Addendum**). Neither the proposed offshore export cable corridor (OECC) nor the Windfarm Site for WCOW intersect sandwaves or megaripples that are designated as features of marine protected areas (MPAs). There is therefore no potential for direct habitat loss, habitat change, or disturbance of sandwaves or megaripples protected under The Conservation of Habitats and Species Regulations 2017[1] or the Marine and Coastal Access Act 2009[2].

19. The sediment will be likely moved by mechanical methods (ploughing, cutting or trenching) followed by immediate backfilling. This means that sediment will not be removed from the location that it originated, and there will be no need for sediment disposal.

20. During seabed preparation and construction activities (cable burial and sand wave levelling) less than 7% on average of all sediment will be subject to suspension. This is because the total sediment fraction consists of this percentage of fines (mud) which constitute the suspended sediment load. Due to the localised nature of construction activities, any dispersion of suspended sediment that may occur would have a small spatial scale and would be for a limited time (hours to a few days) before returning to ambient concentrations (5 to 15 mg/l, Cefas, 2016). The minimal sediment suspended into plumes is expected to be rapidly disposed back to the seabed locally to its extraction area, resulting in no net loss of sediment within the area. Furthermore, deposition from these limited sediment plumes would be minimal and the process of continued resuspension on recurring tidal cycles would mean that final deposition on the seabed would be near zero, and effectively immeasurable.

4.1.1 Evidence of Sandwave/Bedform Recovery

21. Evidence for sandwave recovery has been published for Race Bank Offshore Wind Farm which is located inside the boundary of Haisborough, Hammond and Winterton SAC[3]. Evidence presented suggests that the direct changes to the seabed associated with sandwave levelling recovered within 13 months, due to natural sand transport pathways. The results showed that the seabed had completely or nearly completely recovered to pre-construction levels (greater than 75% recovery of sand waves in all areas). At Haisborough, Hammond and Winterton SAC sand bank system, it was therefore concluded that the overall form and functioning of any sandwave is not disrupted by levelling or cable installation methods.

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[1] https://www.legislation.gov.uk/uksi/2017/1012/contents/made
[2] https://www.legislation.gov.uk/ukpga/2009/23/contents
[3] Appendix 2 of https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010087/EN010087-002841-The%20Applicant's%20Response%20to%20Request%20for%20Further%20Information.pdf

22. The primary driver of future cable exposure is seabed migration (i.e., accretion and erosion of subtidal sandbanks). Early geophysical investigations for WCOW have indicated there are no features of seabed migration (subtidal sandbanks) in either the WCOW Site or the offshore OECC. It is expected that where sandwaves and megaripples are present (see **Figure 4-1** and **Figures 5-4 and 5-12** of the CBRA (**Appendix U** of the **ES Addendum**)) these will recover within similar timescales as those seen at Haisborough, Hammond and Winterton SAC sand bank system. This is because, as discussed in **Appendix F: Coastal Geomorphology Technical Note** (WHX001-FLO-CON-CAG-ASS-0002) of the **ES Addendum**, these seabed features are driven by tidal processes and are typically in equilibrium with the prevailing tidal and sediment transport regime. The megaripples have steep sides and are broadly symmetrical in cross profile suggesting there isn’t a dominant net sediment transport direction and that sediment transport during a flood tide is predominantly equal to transport in the opposite direction during the ebb tide. Sediment transport therefore likely results in no net loss or gain, and sediment is recycled over each tidal cycle, enabling seabed recovery to take place quickly.

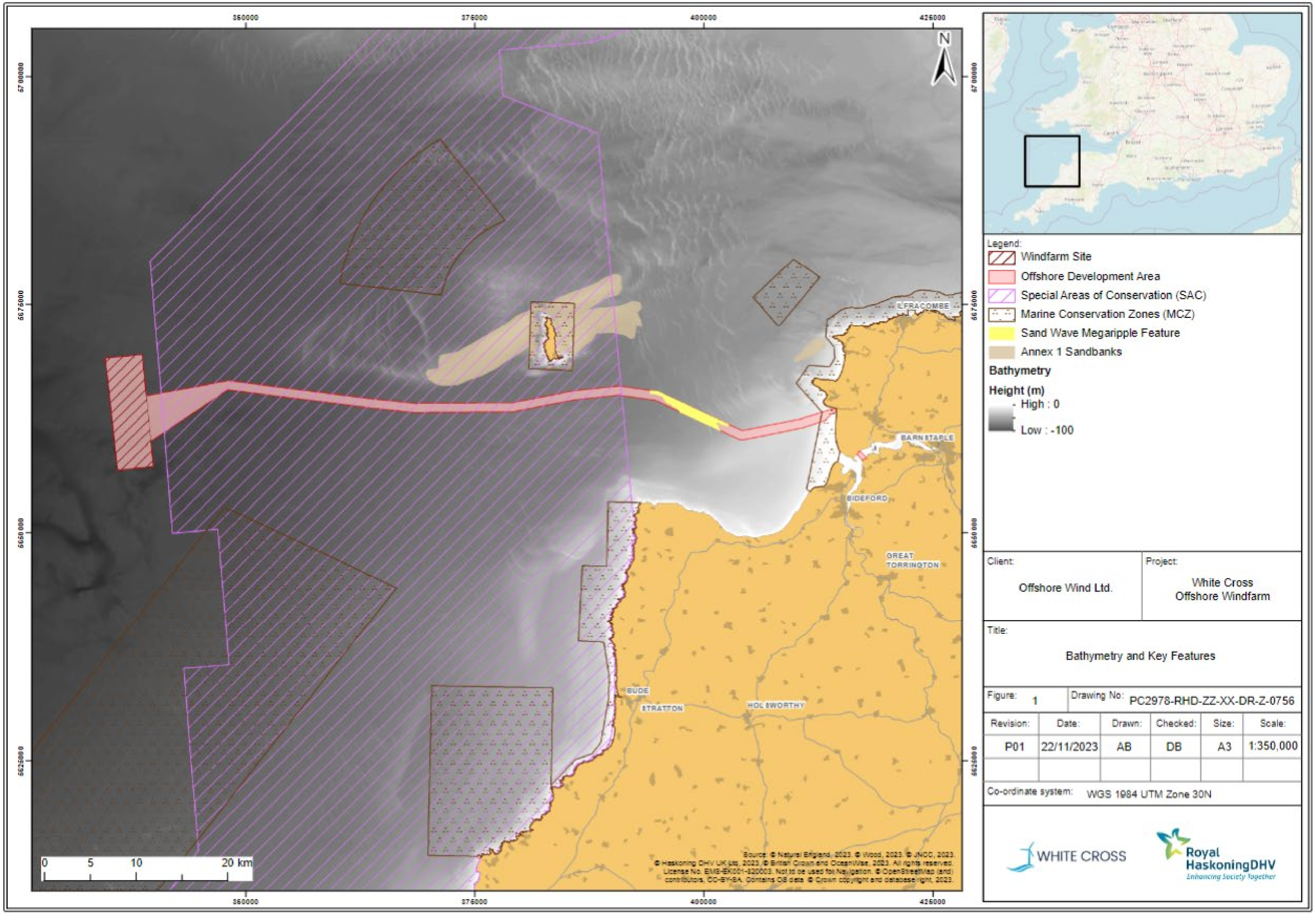

Figure 4-1 Showing bathymetry and the key features within the Project Offshore Development Area

4.2 Cable Protection

23. Where cable burial is not possible, either due to seabed conditions, third party infrastructure or for other reasons, and/or where additional protection is needed, there are several techniques that can be utilised to provide cable protection. These include tubular products, concrete mattresses, and rock placement as shown in **Figure 4-2**. The final choice and design of any cable protection will be determined as part of the detailed design.

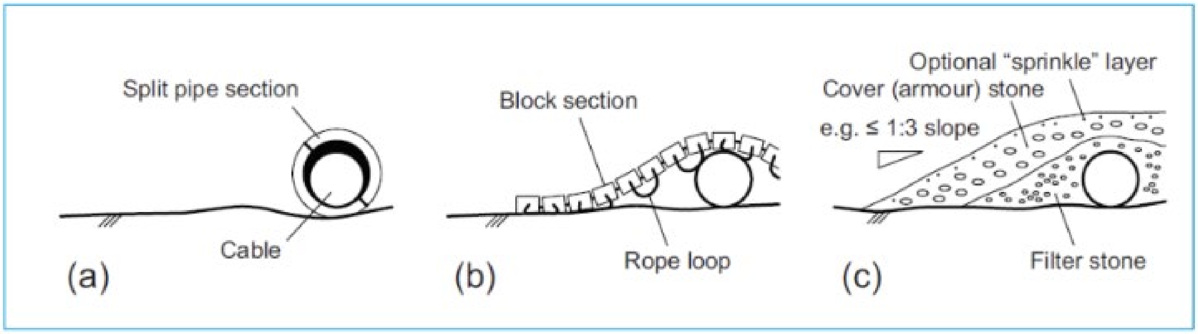

Figure 4-2 Cable protection: (a) tubular product; (b) concrete mattress; (c) rock placement

24. WCOWL commit to selecting cable protection materials that have the least footprint, that match the receiving environment, and that have the most likelihood of being decommissioned, where possible.

25. The **Cable Burial Risk Assessment (CBRA)** (WHX001-FLO-CON-ENG-RSA-0001) (**Appendix U** of the **ES Addendum**) discusses the likely requirements for cable protection in the Windfarm Site and OECC. Excluding the possible requirement for stabilisation of inter-array cables in the vicinity of the wind turbine generators (WTGs) (which is expected to have a spatial footprint of 22,400 m^2), cable protection is not expected to be required in the Windfarm Site. Furthermore, the Windfarm Site does not overlap with any designated sites; the closest site to the Windfarm Site that is designated for benthic features[7] is the South West Approaches to Bristol Channel MCZ, located 8.93 km away. To date, no evidence has been found for other non-designated sensitive habitats within the Windfarm Site, e.g., the presence of reefs, either rocky or biogenic.

26. There is an area of exposed bedrock in the OECC likely making cable burial in this location unfeasible (see **Figure 5-11** in **CBRA** (WHX001-FLO-CON-ENG-RSA-0001)) and a maximum of 4 cable crossings per export cable. Therefore, cable protection will likely be required in these locations amounting to a footprint of approx. 252,560 m^2 of material placement. The proposed OECC overlaps with two sites designated for benthic features only where it nears landfall (Bideford to Foreland Point MCZ and Braunton Burrows SAC); however,

the expected area requiring cable protection does not overlap with designated sites and the Project has made a commitment to avoid installing cable protection within the boundary of this MCZ.

27. Further geotechnical and geophysical surveys will characterise the seabed sediment features within the Windfarm Site and OECC. If any sensitive features or areas not suitable for cable burial are identified in future surveys, it should be possible for the cable to be routed to avoid these areas.

5. Proposed Offshore Cable Installation

5.1 Summary of Cable Burial Methods

28. Cable burial is the preferred installation method for the OECC. Inter-array cables will connect the WTGs to each other and to the OSP or export cable connection point (**Figure 5-1**). The dynamic section of each inter-array cable will be freely suspended in the water column below each substructure. The on-seabed section of inter-array cables will be buried where possible (typically to a depth of 1 m, but may range from 0.5 – 3 m) and can be buried via several techniques depending on the seabed conditions along the route (see **Section 5.1.1**). The cable burial depth will be determined by future refinements of the **CBRA** (**Appendix U** of the **ES Addendum**).

29. Subsea cable installation can be achieved in three main ways:

- Ploughing an open trench and subsequently laying a cable into it (separate lay and burial, e.g., pre-lay trenching) optionally followed by a backfill pass/rock placement.
- Laying the cable on the seabed and subsequently trenching it into the seabed (separate lay and (post-lay) burial, e.g. Jetting, Mechanical Trenching, Combined Tool).
- Simultaneously laying and burying a cable through the trenching tool (simultaneous lay and burial, e.g., Ploughing, Jetting, Mechanical Trenching, Combined Tool).

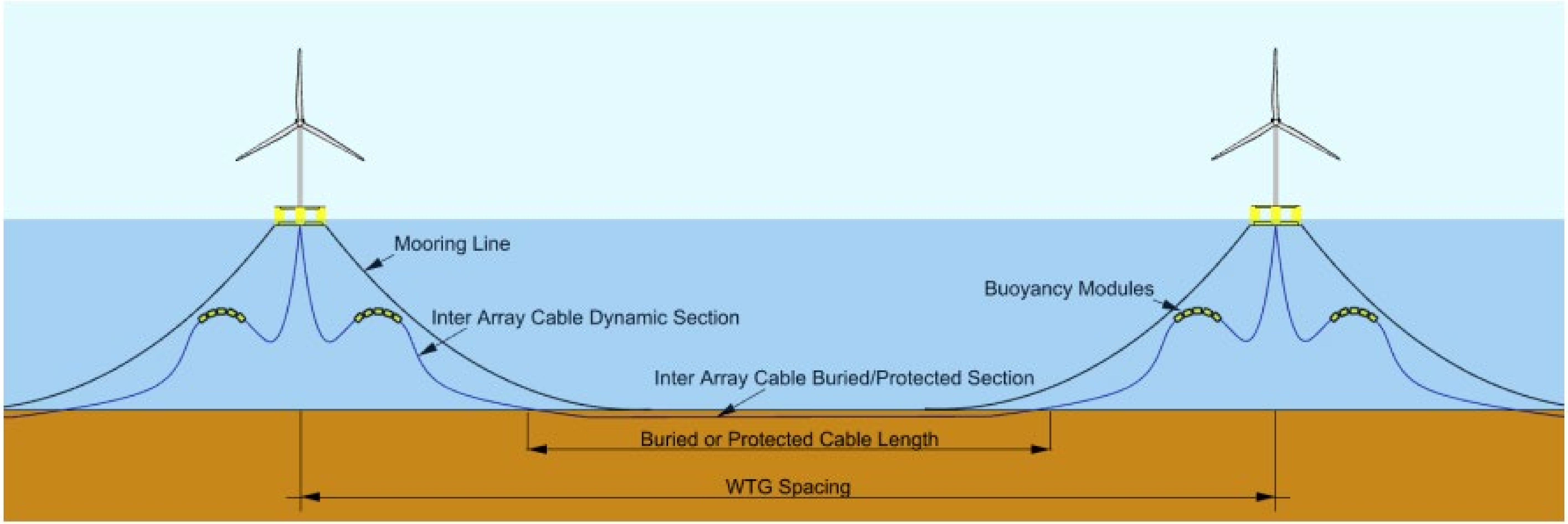

Figure 5-1 Inter-array cable and mooring line schematic

Table 5-1 Summary of main cable-laying methods

Burial method	Benefits	Drawbacks and risks
Separate lay & burial (cable laid into pre-cut ploughed trench)	• Reduced risk of cable damage by burial equipment. • Multiple passes possible. • Can be performed using cheaper vessel in advance of arrival of more expensive cable-lay vessel. • Separate lay and burial operations increase the number of available, (shorter) weather windows.	• Potential for collapse of trench sides or sediment infill before cable laying phase. • Requires accurate cable positioning during laying due to risk of cable being placed on side of trench (can be damaged if using a backfill plough). Trench backfill (if required) may be preferred over backfill plough – • Larger more powerful vessel required for ploughing (compared to jet/mechanical trencher). • Ploughing limits turn radius for micro-routing. Spoil heaps can be an issue for fishermen.
Separate lay & burial (Jet/mechanical trenching of pre-laid cable)	• Smaller, lower powered vessel sufficient (tracked ROV tool). • Multiple passes can be used to remediate in the event of areas of reduced burial or stronger soils. • Avoids contact between trencher and cable (jetting only). • Separate (shorter) lay and burial operations increase number of available weather windows.	• Risk of external damage to exposed surface-laid cable prior to trenching. • Contact with cable increases risk of damage (mechanical trenchers). • Care must be taken not to damage the cable while landing or removing the tool from the seabed. • Cable tension ahead and behind the tool requires careful control of the burial tool feed-through to avoid damage through kinks ahead of the tool or free-spans behind.
Simultaneous lay & burial (Plough, Jet or Mechanical)	• Efficient operation (single pass, single vessel). • Multiple passes can be performed if backfill pumps/ploughs not engaged on first pass.	• Contact of tools with cable increases damage risk • Typically limited to single pass - may be a problem if adequate depth of burial is not achieved. • If ploughing, limits turn radius for micro-routing. • Very highly co-ordinated operation required to ensure correct cable tension ahead in the water column and behind the tool to avoid damage.

5.1.1 Cable Burial Tools

30. There are five tool types used for burying a subsea cable, based on their ability to penetrate the seabed:

    1. **Jet Trencher:** Suitable for sands and low to medium strength clays. Coarse gravels and high strength clays are likely to limit performance; however, many high-powered tools with variable pump/jetting configurations are available to increase the envelope of suitable operating conditions. Tracked and skid (including free lying) modes also available for soils of variable bearing capacity. Multiple passes are possible to meet depth of lowering/depth of cover requirements.
    2. **Chain Cutter:** Suitable for cohesive sediments (clays) and weak/fractured rock. Numerous cutting boom and chain/pick configurations are available, with varying levels of power. Significant thicknesses of sand and gravel are likely to hinder performance as the tool relies on the action of ripping cohesive soils. Chain cutting may require a subsequent backfill pass dependent on depth of cover requirements. Requires contact with cable.
    3. **Combined Jet/Chain Cutting tool:** Combined abilities of both tools to increase envelope of suitable operating conditions. Some tools may deploy both functions simultaneously, or only one at a time. Whilst overall trenching ability is improved, the combined tooling can lead to heavy machines and slower progress rates. May require contact with cable.
    4. **Pre-lay Plough**: Suitable for variable soil conditions with multiple passes possible, although ride-out may occur in very dense sands of very high strength clays. A towed plough creates an open v-shaped trench into which the cable is subsequently laid. After the cable is laid in the trench it will be backfilled with material.
    5. **Cable Burial Plough:** Suitable for low to medium strength clays which can be sheared. Addition of fluidising jets on the plough share can assist passage in non-cohesive sediments. A towed plough opens a narrow slot in the seabed into which the cable is inserted simultaneously. Slumping of the narrow trench reduces the need for a separate backfill pass; however, contact with cable increases the risk profile during installation.

31. Cable Burial Ploughs are recommended for good burial capability across all sediment types.

32. In the case of jet trenchers, mechanical trenchers and simultaneous lay/burial systems, many tools can be equipped with the means to provide some backfill cover behind the tool to infill the trench, cover the cable and provide immediate protection. This can either be done immediately following a trenching pass or as a separate subsequent burial pass. Pre-cut trenches require a burial pass unless

natural backfill is relied upon to cover the product or rock placement is used to backfill the trench.

33. As an alternative, it is also possible to plough-in a surface-laid cable or indeed subsequently lay into a jetted open trench. The main benefits and risks of each method are summarized in Table 4 1.

5.1.2 Preliminary Burial Tool Assessment

34. Cable burial tools have been assessed against target burial requirements with consideration of the findings of the **CBRA** (**Appendix U** of the **ES Addendum**).

5.1.2.1 Tool suitability grading for conditions within survey corridor

35. The undertaking of a full suite of geotechnical and geophysical surveys will allow a full understanding of the depth of the sand veneer and seabed sediment types across all proposed cable burial areas. Currently known geotechnical information (i.e., European Marine Observation and Data Network (EMODnet) used in the **CBRA** (**Appendix U** of the **ES Addendum**) and intertidal seismic survey data presented in the Onshore Ground Investigation Interpretative Report (WHX001-FLO-CON-ENV-RPT-0001) provided as **Appendix T** of the **ES Addendum**) indicates there is sufficient depth of sand at the intertidal location (approx. 7-8m in depth) for opencut trenching to be used to bury the cable. This will enable a sufficient burial depth to avoid the cable becoming exposed at this location.

36. Following the completion of a full suite of surveys, a Cable Protection Analysis (CPA) Table will be provided (in updated versions of the **CBRA**). This will be used to determine A-C ratings of the suitability of the five trenching tool types as listed in **Section 5.1.1**. The grading system descriptions that will be used are presented in **Table 5-2**.

Table 5-2 Burial Tool Assessment Grade Descriptions

Grade	Description
A	Required burial depth should be achieved across the section within the limits of the tool.
A / B	Burial should be achieved but may be reduced in some localised areas requiring reduced speed, further tool passes or external remediation (i.e., rock placement).
B	Burial should be achieved albeit potentially at a reduced depth in significant parts of the section. Multiple passes or slower forward progress may be required to achieve desired results, otherwise external rock placement protection.
B / C	Performance is expected to be generally poor, although may improve in localised areas dependent on tool capabilities.

Grade	Description
C	Inappropriate tool for the expected soil conditions. Required burial depth is unlikely to be achieved or within reasonable timescales.

37. The rating for each tool for each section will be determined by considering only the ability of the tool to penetrate the seabed to the required depth, based upon the available information. Aspects such as cost, speed and resourcing will not be considered as part of the ranking; but it is noted that contact with the cable product in the case of cable ploughs and chain cutters is considered to increase the risk of cable damage during installation. Therefore, this risk will also be taken into account when determining rankings.

38. The CPA Table will present information on:

- Bathymetry and seabed features; including information on gradients, slope and geology in the upper 3 m within each defined section.
- Seabed sediment type and height of potential mobile sediments.
- Potential for obstructions; including surface or subsurface boulders, UXO encounter probability, cable crossings and sites of potential heritage significance.
- Designated sites and sensitive habitats.
- Indicative strength of soils at target burial depth.

39. Where areas of alternative, external cable protection requirements are identified (i.e. when the considered burial tools are not suitable, such as at cable crossings or where impenetrable rock is present) detailed information on locations, anticipated volumes required, height, slope and spatial footprint will be provided in the final version of the **CBRA**. However, preliminary information on the anticipated parameters of rock protection, at this early stage, is presented in outline **CBRA** (**Appendix U** of the **ES Addendum**).

40. At this early stage, it is anticipated that for the majority of the OECC and Windfarm Site jet-trenching or the use of a cable burial plough will be suitable and enable the target protection levels to be achieved, given the high proportion of sand present. However, chain butting or pre-lay ploughing may offer a lower risk solution with greater potential for achieving the necessary target trench depths in non-sandy areas (areas of clays and coarse surficial sediments, rocky outcrops, dense boulders or where dense subsurface boulders may be found).

6. Summary of the Outline Cable Landfall Plan

41. This section summarises the **Outline Cable Landfall Plan** (WHX001-FLO-CON-DES-PDE-0001) provided as **Appendix Y** of the **ES Addendum**, by briefly describing the process of installing the offshore cable in the region between the

offshore environment and the car park at Saunton Sands. This includes works in the intertidal, upper foreshore and the car park regions, and will be delivered in six phases over approximately 14 months.

42. These works will be undertaken simultaneously with the onshore and offshore cable installation: however, phase 6 (**Section 6.6**) will be the final overall stage, during which both cables will be joined. **Figure 6-1** presents an overall landfall and onshore cable installation programme, showing when works in the intertidal, upper foreshore and the car park regions will be in relation to other cable installation activities. **Table 6-1** summarises the timeline information.

Table 6-1 Phasing of Cable Landfall Works

Phase	Year and month	Duration	Further information
Phase 1: Saunton Sands Dune Crossing	Year 1: September – December	65 days	See Section 3.1
Phase 2: Car Park Transition Joint Bay and 40m Open Cut	Year 1: November – December	25 days	See Section 3.2
Phase 3: Car Park 120m Open Cut	Year 2: January – February	28 days	See Section 3.3
Phase 4: Horizontal Directional Drill under Braunton Burrows	Year 2: February – August	164 days	See Section 3.4
Phase 5: Intertidal and Upper Foreshore Cable Installation	Year 2: September – October	39 days	See Section 3.5
Phase 6: Onshore Cable Pull	Year 2: October	12 days	See Section 3.6

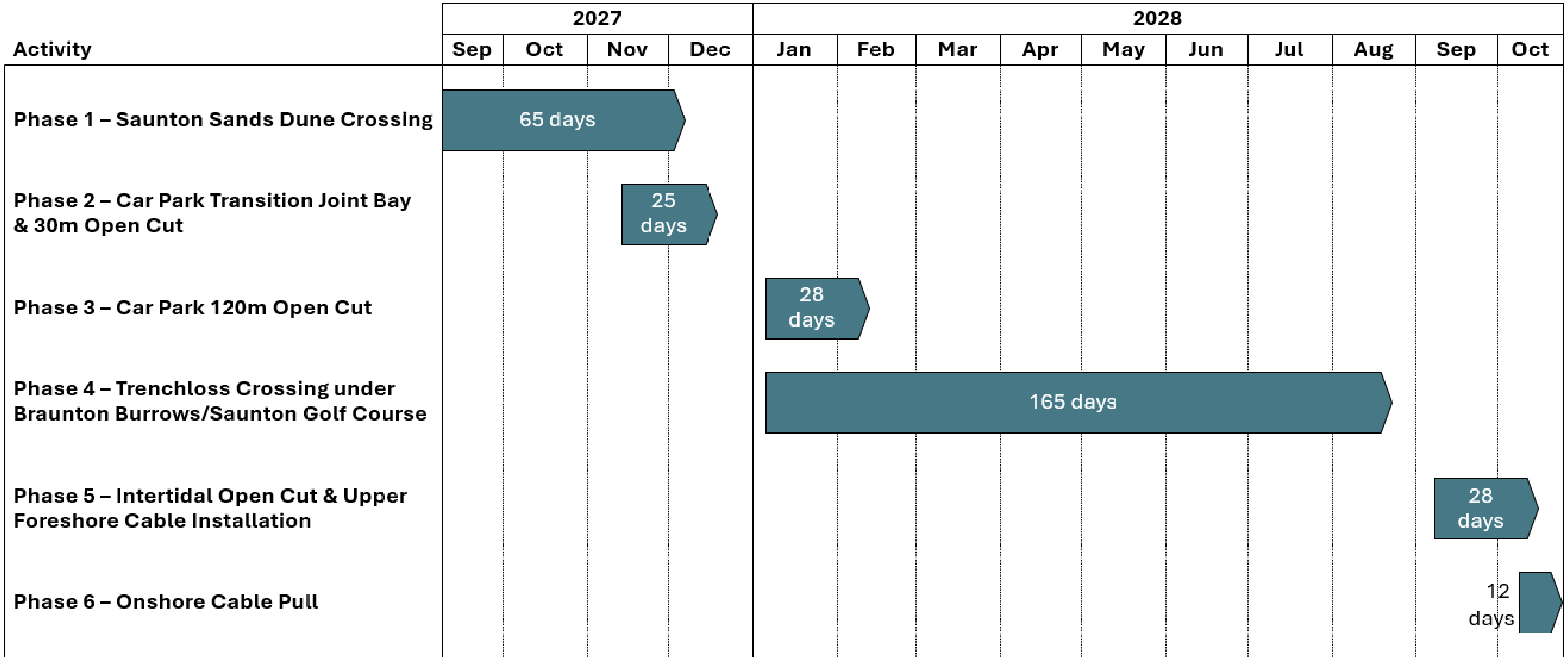

Figure 6-1 Cable landfall installation schedule

6.1 Phase 1 – Saunton Sands Dune Crossing

43. The first phase of landfall construction will consist of trenchless duct and cable installation beneath the dune system (as discussed in **Section 3.1** of **Outline Cable Landfall Plan** (WHX001-FLO-CON-DES-PDE-0001)). This will take place over 65 days between September to December during the first year.

44. It is intended that up to two cable(s) and their ducting will be driven from an east to west direction (i.e., from the drive pit in the Saunton Sands car park into the reception pit on the upper foreshore immediately west of the dune system)

6.2 Phase 2 – Car Park Transition Joint Bay and 30m Open Cut

45. The second phase of landfall construction will consist of establishing a transition joint bay (TJB) within the drive pit in Saunton Sands car park and creating a 30 m trench via open cut in a location immediately to the east (in a west to east direction). This is discussed in detail in **Section 3.2** of **Outline Cable Landfall Plan** (WHX001-FLO-CON-DES-PDE-0001)). This will take place over 25 days between November to December during the first year.

6.3 Phase 3 - Car Park 120m Open Cut

46. The third phase of landfall construction will consist of creating a 120 m trench via open cut in a location immediately to the east of the 30 m open cut trench (in a west to east direction). This is discussed in detail in **Section 3.3** of **Outline Cable Landfall Plan** (WHX001-FLO-CON-DES-PDE-0001)) and will take place over 28 days between January and February during the second year.

6.4 Phase 4 –Horizontal Directional Drill under Saunton Golf Course

47. The fourth phase of landfall construction will consist of undertaking the first of a series of horizontal directional drills (HDD), initially in a west to east direction under Saunton Golf Course. The entry for the initial drill will begin in the phase 4 car park construction compound, which is essentially a retained portion of the phase 3 car park construction compound. This is discussed in detail in **Section 3.4** of **Outline Cable Landfall Plan** (WHX001-FLO-CON-DES-PDE-0001)..

48. The entire series of HDDs will take place over 165 days between March and October during the second year.

49. Cable installation east of this point is not covered within the Outline Cable Landfall Plan.

6.5 Phase 5 – Intertidal Open Cut and Upper Foreshore Cable Installation

50. The fifth phase of landfall construction will consist of cable installation in the intertidal followed by the 'pulling' and securing of the offshore cables in the TJB via the reception pit (see **Section 3.5** of **Outline Cable Landfall Plan** (WHX001-FLO-CON-DES-PDE-0001)).

51. This will take place over 28 days between September and October during the second year.

6.6 Phase 6 – Car Park Cable Installation

52. The sixth, and final, phase of landfall construction will consist of cable installation across the car park. This will begin by establishing the final car park construction compound (essentially a reduction of the Phase 5 car park construction compound) re-opening the TJB, 'pulling' the cables from east to west (i.e. the onshore cable).

7. Proposed River Taw Estuary Crossing

53. The onshore export cable route, from landfall to the grid connection point, includes a crossing of the River Taw Estuary. The estuary is tidal at the point of crossing, and therefore consents are also required from the MMO.

54. The method is summarised in this Section, with a full description of the cable installation methodology for the River Taw Estuary Crossing provided in **Chapter 5: Project Description** (**Section 5.7**) and **Appendix 5.A: Braunton Burrows and Taw Estuary Crossing Method Statement** of the **Onshore ES**.

55. A trenchless technique will be used to install the cables, the final choice of technique would be made following detailed design but would be either HDD or direct pipe. The final design will be selected based on a comparative assessment of environmental, commercial, and technical factors.

56. The length of the trenchless technique will be approximately 1300 m from the entry point to the exit point. Both the entry and exit points will be located above mean high water springs (MHWS) within fields a minimum of 16 m from the existing sea defence structures on either side of the estuary. A plan showing the location of the entry and exit pits in relation to MHWS is included as **Annex 3** to **Appendix B: Response to MMO and Centre for Environment Fisheries and Aquaculture Science (Cefas)** of the **ES Addendum**.

57. A preliminary profile design for the River Taw Estuary Crossing is include in **Appendix 5.D: Onshore Export Cable Corridor Alignment Sheets** (**Figure 18**) of the **Onshore ES**. A programme of onshore ground investigation was undertaken between September and October 2023, and included boreholes at either end of the River Taw Estuary Crossing. The results, which are

presented in **Appendix T: Onshore Ground Investigation Interpretative Report** of the **ES Addendum**, confirm the suitability of using a trenchless technology for the crossing.

58. The detailed design of the River Taw Estuary Crossing will be refined and finalised post-consent and will be informed by the results from further phases of onshore and offshore pre-construction site investigations.

8. Project Commitments and Compliance

59. Commitments made by the Project related to cable installation are presented in **Table 8-1** and also captured in the **Project Mitigations Register** (WHX001-FLO-CON-ENV-REG-0001) provided as **Appendix P** to the **ES Addendum**.

Table 8-1 Project commitments related to cable installation

Commitment number	Commitment detail	Reference chapters and locations
1	WCOWL will make reasonable endeavours to bury cables, minimising the requirement for cable protection measures and thus effects on sediment transport. Use of external cable protection would be minimised in all cases and no cable protection would be located in the nearshore including at the trenchless technique exit point[4].	• Table 8.10 of Chapter 8: Marine Geology, Oceanography and Physical Processes of the Offshore Environmental Statement (ES) (document reference FLO-WHI-REP-0002-08)
2	Route selection and micro-siting of the cables will be used to avoid areas of seabed that pose a significant challenge to their installation; including, for example, areas of exposed bedrock, sand waves and megaripples. This will minimise the requirement for cable protection, seabed preparation (levelling) and the associated seabed disturbance.	• Table 8.10 of Chapter 8: Marine Geology, Oceanography and Physical Processes of the Offshore Environmental Statement (ES) (document reference FLO-WHI-REP-0002-08) • Table 9.8 of Chapter 9: Marine Water and Sediment Quality of the Offshore Environmental Statement (ES) (document reference FLO-WHI-REP-0002-09)
3	Either open trenching or trenchless technique[4] will be used to install the cables at the landfall (up to MHWS). Cables will be buried at sufficient depth to have no effect on coastal processes.	• Table 8.10 of Chapter 8: Marine Geology, Oceanography and Physical Processes of the Offshore Environmental Statement (ES)

[4] Note that the proposed trenchless landfall cable installation option is no longer being progressed (see Section 6 for Outline Cable Landfall Plan). However, the wording is included here for easy cross-referencing to the assessments presented in the Offshore ES.

		(document reference FLO-WHI-REP-0002-08)
4	***Landfall cable installation:*** Trenchless technology will be used to avoid intertidal completely[4] or open trenching designed to avoid impacts. One of the main uncertainties in the Landfall construction methodology is the depth to which the cables should be buried across the beach. At the Landfall (up to MHWS), the beach sand overlies bedrock, but the depth to the bedrock is not known[5]. It is important to define the depth of burial, so that over the design lifetime of the cables (minimum 25 year), the risk of exposure is reduced if beach levels lower (potentially because of sea-level rise) into the future. The **Cable Burial Risk Assessment (CBRA)** (WHX001-FLO-CON-ENG-RSA-0001) (**Appendix U** of the **ES Addendum**) will be updated to accurately define the preferred burial depth to mitigate future exposure.	Table 10.9 of Chapter 10: Benthic and Intertidal Ecology of the Offshore Environmental Statement (ES) (document reference FLO-WHI-REP-0002-10).
5	***At Taw-Torridge Estuary crossing cable installation:*** Trenchless techniques will be used.	Table 10.9 of Chapter 10: Benthic and Intertidal Ecology of the Offshore Environmental Statement (ES) (document reference FLO-WHI-REP-0002-10).

[5]It is now known that the beach sediment thickness is 5-7m which is sufficient for cable burial (via open trenching) to a depth of between -0.5 to -3m AOD (above ordnance datum). However, the wording is included here for easy cross-referencing to the assessments presented in the Offshore ES.

9. Offshore Cable Burial and Protection Decision Making Process

60. In compliance with commitments 1 and 2 in **Table 8-1**, the use of cable protection is considered a last resort to ensuring cable asset integrity. Optimal burial of cables will always be the preferred protection solution as this provides the best protection for cables.

61. WCOWL acknowledges that it will be important for there to be ongoing dialogue with the relevant Statutory Nature Conservation Bodies (SNCBs) as the final CSIP is being developed. This consultation will be managed by the WCOW Environment and Consent Team (ECT). In addition, pre-installation consultation will be undertaken with the environmental compliance officer for the installation contractor (if appropriate) following contractor appointment and detailed design; this will be led by the WCOW engineering team and ECT. The purpose of this consultation would be to inform contractor planning of installation campaigns and ensure all environmental considerations are properly communicated to contractors. The ECT will ensure that there is SNCB input into contractor briefings.

62. Detail on the proposed consultation is outlined in **Figure 3-1**.

10. Proposed Sandwave Clearance Plan

63. The Sandwave Clearance Plan will be a live document which will relate to sandwave clearance activities. Its purpose will be to demonstrate compliance with the marine licence conditions (see **Appendix A**) with regard to the extent, nature and location of sandwave clearance.

64. It is proposed that the Sandwave Clearance Plan will contain information on:

    1. Monitoring undertaken prior to construction and following reinstatement (including remedial action if impact occurs).
    2. The maximum design scenario presented within the **Report to Inform Appropriate Assessment** (**RIAA**) (see **Appendix 6.A** of FLO-WHI-REP-0002-06 **Chapter 6 EIA Methodology** of the **Offshore ES**) and the marine licence.
    3. The location, timing and methodology of proposed sandwave clearance works.
    4. Roles, responsibilities and key contacts.
    5. Communication procedures and timescales.

65. The proposed timeline for consultation with SNCBs and contractors on sandwave clearance proposals is shown in **Figure 10-1**. This consultation will centre around:

1. Presentation of the final ground model based on site specific pre-construction geophysical and geotechnical data obtained from the pre-construction site investigation works.
2. Details of locations where sandwave clearance is required to install the cable/s below reference seabed level.
3. Mechanisms for communication to contractors emphasising the need to act with care and minimise seabed impacts. To include toolbox talks and provision of accurate shapefiles for key habitats (e.g. reefs).
4. Discussion of contractor briefings, which may include agreed thresholds with reference to maximum design scenarios and commitments/marine licence conditions.
5. Monitoring proposals for sandwave clearance (i.e. monitoring prior to construction and following reinstatement - including remedial action if impact occurs).

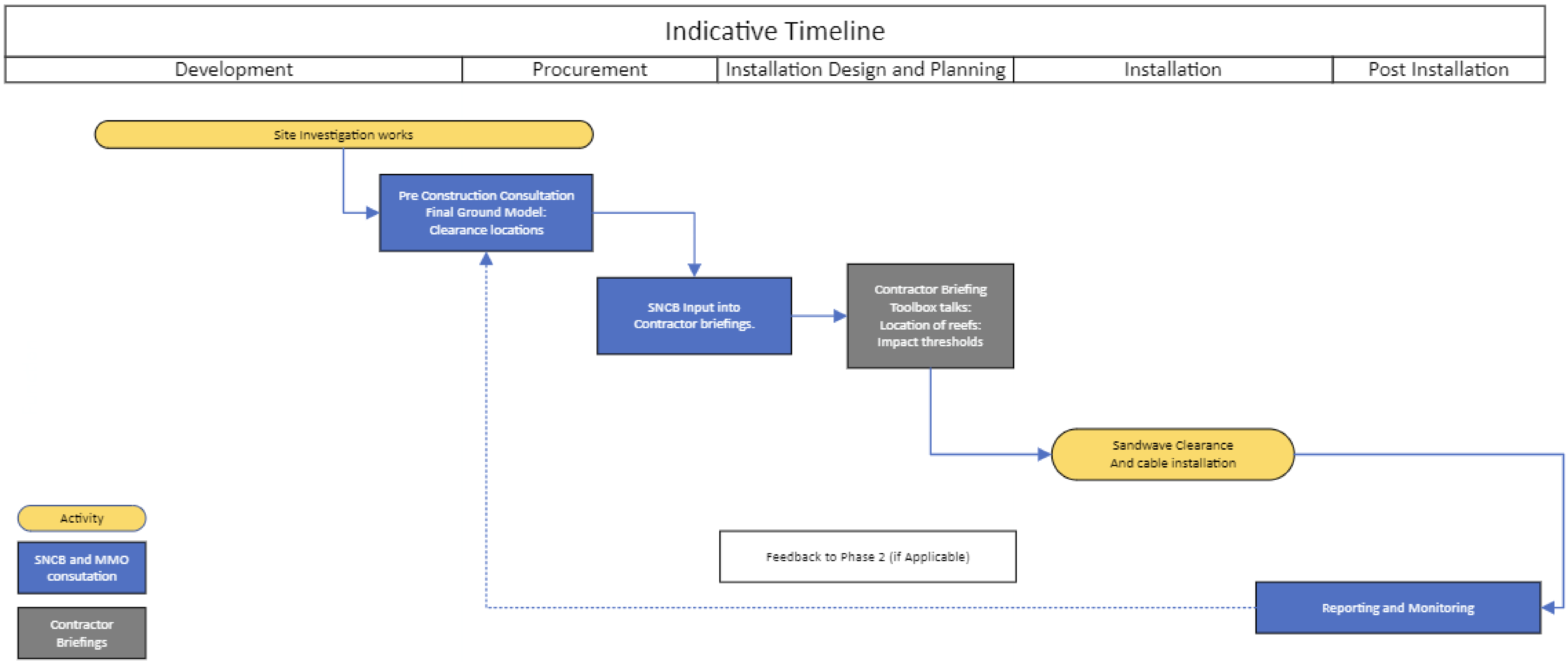

Figure 10-1 Proposed Sandwave Clearance Plan consultation

11. Proposed Cable Protection Plan

66. The Cable Protection Plan will also be a live document which will relate to installation of cable protection measures. Its purpose will be to demonstrate compliance with the marine licence conditions (see **Appendix A**) with regard to the extent, nature and location of cable protection.

67. It is proposed that the Cable Protection Plan will contain information on:

    1. The maximum design scenario presented within the **Offshore ES**, **RIAA** and the marine licence.
    2. The location and methodology of proposed cable protection.
    3. Roles, responsibilities and key contacts.
    4. Communication procedures and timescales.

68. It is proposed that the Cable Protection Plan will distinguish between any protection required for the crossing of existing assets (e.g. cables and or pipelines), and remedial cable protection requirements (i.e. if cables become exposed unexpectedly during operation of the Project).

69. The consultation process (with SNCBs and contractors) for cable protection associated with crossings and remedial action will follow the same process as that shown in **Figure 10-1** (i.e. for the consultation on sandwave clearance plans). All consultation with SNCBs and contractors will be led by the ECT.

12. Monitoring

12.1 Approach To Monitoring Intertidal Sediment Level Immediately Post Cable Installation

70. WCOWL acknowledges the MMO's request for monitoring of intertidal sediment levels both prior to, and following, cable installation. WCOWL has committed to undertaking this monitoring (see Section 2.2.1 of the **Outline Project Environmental Management & Monitoring Plan (PEMMP)** (WHX001-FLO-CON-ENV-PLN-0003). The final PEMMP will provide details of the proposed monitoring during the pre-construction phase, which will be informed by future dialogue with the MMO, North Devon Council and relevant SNCBs.

71. As with the final CSIP, consultation on the monitoring of intertidal sediment levels will be managed by the WCOWL ECT. Pre-installation consultation will be undertaken with the environmental compliance officer for the installation contractor (if appropriate) which will be led by the WCOWL engineering team and ECT. The purpose of this consultation would be to inform contractor planning of the monitoring requirements and ensure their compliance.

72. If monitoring provides evidence that the intertidal sediment level post-construction does not match that of the pre-construction level, remedial action will be taken to reinstate the levels.

13. References

Centre for Environment, Fisheries and Aquaculture Science, 2016. Suspended Sediment Climatologies around the UK. Available at CEFAS_2016_Suspended_Sediment_Climatologies_around_the_UK.pdf (publishing.service.gov.uk) *[accessed 27.6.2024]*

Natural England and Joint Nature Conservation Committee, 2022. Nature conservation considerations and environmental best practice for subsea cables for English Inshore and UK offshore waters. Available at https://defra.sharepoint.com/sites/WorkDelivery2512/Cable%20projects/Forms/AllItems.aspx?id=%2Fsites%2FWorkDelivery2512%2FCable%20projects%2FNature%20conservation%20considerations%20and%20environmental%20best%20practice%20for%20subsea%20cables%20for%20English%20Inshore%20and%20UK%20offshore%20waters%2C%20Sept%2022%2Epdf&parent=%2Fsites%2FWorkDelivery2512%2FCable%20projects *[accessed 27.6.2024]*

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Appendix A: Cable Specification and Installation Plan Marine Licence conditions