The Great Grid Upgrade

Sea Link

Sea Link

Volume 9: Examination Submissions

Document 9.74 Shipping and Navigation Under-Keel Clearance Marine Engineering Technical Note

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nationalgrid

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Stakeholder Engagement on Under-keel Clearance

Ex1.0.1 This section presents a written response to Agenda item 5.2 at Issue Specific Hearing 1 for the Applicant and provides a summary of engagement and collaboration undertaken to date with ports and harbour authorities on the topic of under keel clearance within the Sunk region.

Ex1.0.2 The Applicant agrees in principle with the need to safeguard water depths, to ensure sufficient under-keel clearance for future deep draft vessels in key areas, such as within the Sunk region. This document seeks to make the Examining Authority aware of the ongoing discussions and work in this regard, and assure the Examining Authority that the Applicant is seeking to commit to safeguarding water depths within the Sunk region and capture such commitments where appropriate, including within Protective Provisions and other Development Consent Order (DCO) provisions (where necessary), and that the Applicant is working towards this goal with the Port of London Authority (PLA), Harwich Haven Authority, and London Gateway Port.

Ex1.0.3 As part of this document, the marine engineering aspects associated with the cable route design and construction with regard to under-keel clearance and preservation of water depth are outlined.

Review of Water Depth and Seabed Geology Along the Route

Ex1.1.1 The Technical Note summarises the water depths along the marine cable route and focuses on maintaining under keel clearance particularly in the Areas of Interest namely the PLA's Areas of Safeguarded Depth "Sunk Pilot Boarding Area", "North East Spit" and "Long Sand Head Two-Way Route Crossing area" and is summarised in Section 4.

Marine Cable Installation and Protection and the Safeguarding of Water Depth and Under-Keel Clearance

Ex1.2.1 As part of the ongoing marine engineering being undertaken by the Applicant, safeguarding water depth, particularly in the Areas of Interest, has been focused on. Similarly, the Maritime and Coastguard Agency (MCA) required maximum of 5% reduction in water depth as a consequence of construction and protection works is also addressed.

Ex1.2.2 The primary means of cable protection is by cable lowering into the seabed. In areas where there are cable crossings, crossing designs have been reviewed and will be engineered with asset owners and relevant stakeholders in order not to impact the required under-keel clearance, and to adhere to the MCA 5% reduction in water depth requirement. Where the latter is not feasible due to the shallow nature of the coastal and nearshore waters, in accordance with standard industry practice, agreement will be made between the MCA, the Applicant and the third-party asset owners as to the appropriate mitigation.

Cable Specification and Installation Plan (CSIP)

Ex1.3.1 A Cable Specification and Installation Plan (CSIP) will be prepared to satisfy the Deemed Marine Licence (DML) and DCO requirements. The CSIP, submitted pre-construction, will be based on the contractor's final detailed design. Section 5 provides the structure of the outline CSIP which will be submitted into the DCO process.

1. About this Document

1.1 Purpose of this Document

1.1.1 This document provides National Grid Electricity Transmission plc's (the Applicant's) response to an Agenda item addressed to the Applicant by the Examining Authority raised in advance of Issue Specific Hearing (ISH) 1 held on 11 November 2025, in respect of the Sea Link Project.

1.1.2 The agenda item was provided by the Examining Authority in their letter "Agenda for issue specific hearing 1 dealing with the scope of the development" [EN020026-000943-ISH1-Agenda].

1.1.3 The agenda item in question is under Agenda Item 5 Cumulative Impacts and is Agenda Item 5.2: "Shipping and navigation in the Sunk and the implications of cable burial depth for under-keel clearance".

1.1.4 Due to time limitations, the Applicant did not manage to speak in depth at the ISH1 on this agenda item and wishes to therefore capture a response via this submission, which will be submitted to the Planning Inspectorate at Deadline 1A, the 26 November 2025.

1.1.5 As a result of the Issue Specific Hearing on 11 November 2025, the Examining Authority (ExA) requested the following Action Point be addressed with a Technical Note (TN):

1.1.6 "*Action 10: Technical note regarding protection of under keel clearance including in relation to cable crossings on bedrock where external protection or backfilling will be required above seabed level*."

1.1.7 This document provides this detail to address Hearing Action 10.

2. Stakeholder Engagement on Under-Keel Clearance

2.1 Introduction

2.1.1 The Applicant has been engaging with shipping and navigation stakeholders since the inception of the project and throughout its evolution, full details of which will be available in the draft Statements of Common Grounds (SoCGs).

2.1.2 In relation to under-keel clearance, the Applicant has been informed of three main specific areas from port stakeholders where they wish for a minimum depth to be preserved, and where more detailed engineering assessments are ongoing.

2.1.3 Due to the technical nature of this Agenda item regarding "Shipping and navigation in the Sunk and the implications of cable burial depth for under-keel clearance" and following recent additional engagement with stakeholders, this Technical Note more fully provides the Applicant's response.

2.1.4 The following summarises the ongoing engagement with stakeholders on the matter of under-keel clearance:

- The Port of London Authority (PLA) has provided GIS data for three Areas of Safeguarded Depth (the Areas of Interest):
  - 1) "Sunk Pilot Boarding area" where PLA have requested 22 m below Chart Datum (CD) minimum water depth;
  - 2) "Long Sand Head Two-Way Route crossing area" where PLA request 12.5 m below CD to be preserved; and
  - 3) "North East (NE) Spit area" where 12.5 m below CD is to be preserved.
- The PLA also require in all areas of interest (1) to (3) to makes allowance for an 'over-dredge' tolerance of 0.5 m in addition to the stated depths attributable to standard dredging methodology.
- Harwich Haven Authority (HHA) has also requested that 22 m below CD is safeguarded within "the Sunk area". Further detail on precise geographical extent of this area was provided on 7 November 2025. Further communication has established that the area of interest for the HHA consists of two circles centred at the Sunk Pilot Boarding Station charted and actual boarding locations.
- London Gateway Port has expressed that they support the PLA in seeking safeguarding of 22 m in the PLA's "Sunk Pilot Boarding Area", and 12.5 m below CD within the "Long Sand Head Two-Way Route crossing area" and "NE Spit area". They also have interest in regards powers of dredging rights adjacent to the Sunk which need to be considered.
- The Applicant has also been in communication with the Port of Tilbury to understand their concerns including any surrounding under-keel clearance, with a meeting undertaken on 24 November 2025 where they confirmed that they have the same three Areas of Interest as the PLA.

2.1.5 The stakeholder areas of interest with regards to under-keel clearance are displayed together on Plate 2.1.

2.1.6 The Applicant understands that the PLA, HHA, Port of Tilbury and London Gateway Port are seeking to preserve these water depths in order to allow for potential future passage in these areas to accommodate deeper draft vessels routeing through these areas, and to access the ports.

2.1.7 The Applicant understands that the PLA, HHA, Port of Tilbury and London Gateway Port wish to see these commitments secured within Protective Provisions in the Sea Link Development Consent Order (DCO) and possibly standalone DCO requirements as necessary.

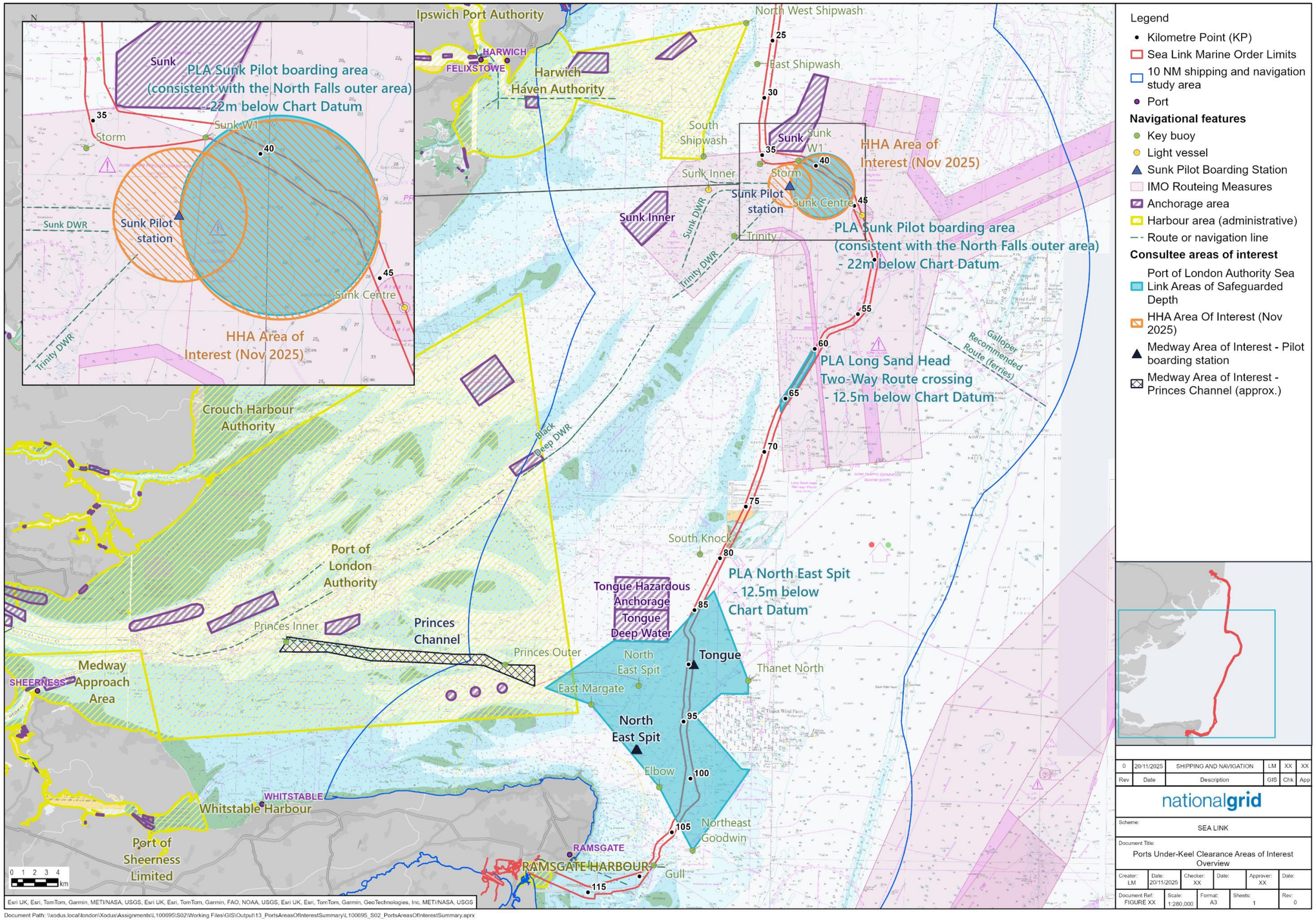


Plate 2.1 Stakeholder areas of interest with regard to under-keel clearance

2.2 Vessel Traffic Volumes

2.2.1 Vessel traffic has been assessed for all three of the water depth Areas of Interest, however the area of highest concern is the Sunk region as it has the highest levels of vessel traffic. Following meetings with the HHA on 07 November 2025 and the PLA on 17 October 2025, the area of concern within the Sunk region were identified as from kilometre point (KP) 38.7 to KP 44.4 along the proposed Sea Link cable route, which is where the Sea Link cable route is within their “Sunk Pilot Boarding Area”, as outlined in Plate 2.2.

2.2.2 The Sunk region is of particular focus due to the high level of traffic here which route through the Sunk Traffic Separation Scheme and utilise the Sunk Pilot Boarding Station which HHA and PLA manage. PLA, HHA and London Gateway stated that their requirements have been consistent with previous Five Estuaries and North Falls Projects.

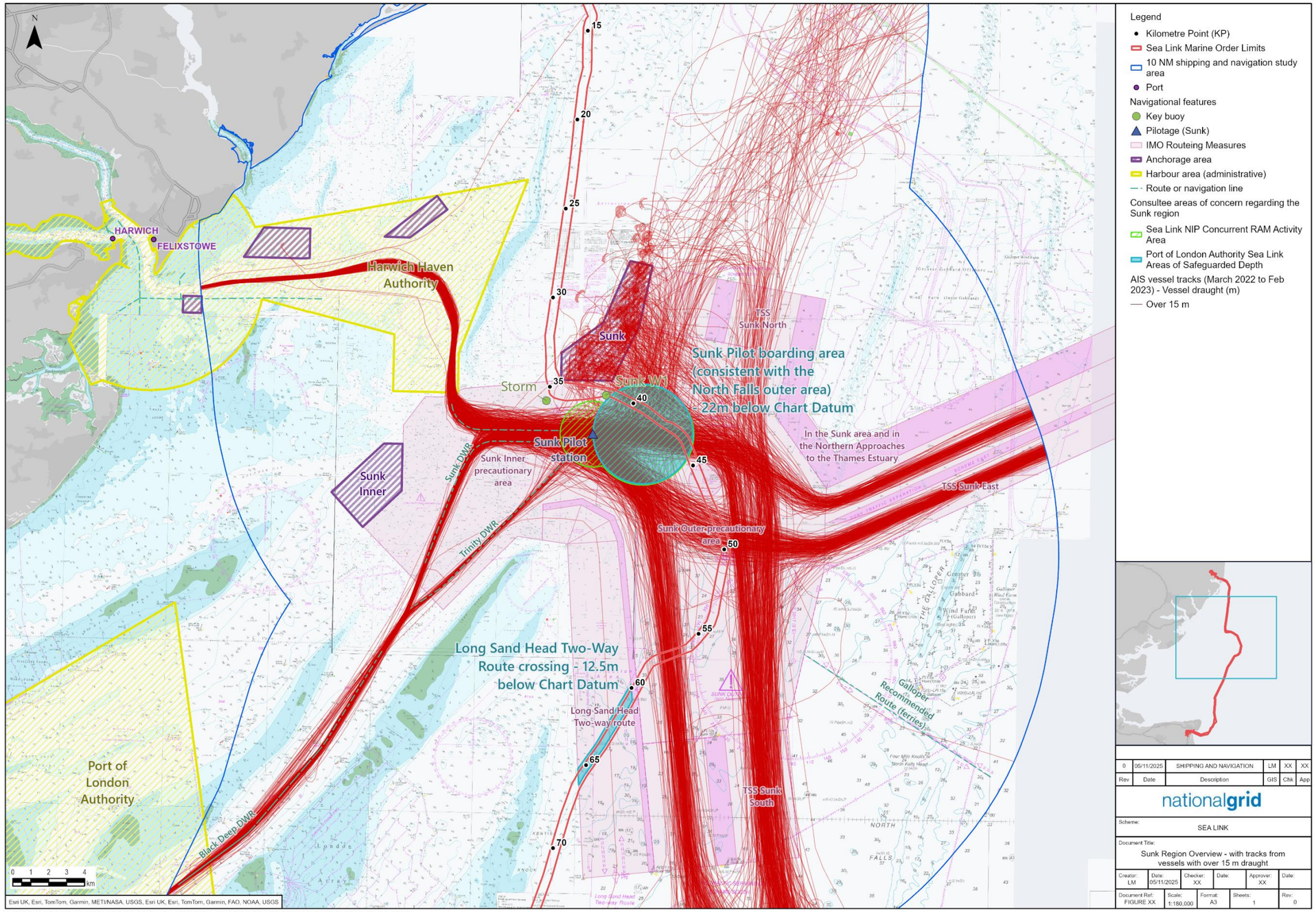


Plate 2.2 AIS Vessel Tracks in the Sunk region and routes into the PLA and HHA port areas

2.3 The Applicant's Current Position on Safeguarding Water Depth & Under-Keel Clearance

General Position

2.3.1 In line with Maritime and Coastguard Agency (MCA) guidance, it is not planned to reduce the existing navigable water depth by more than 5% along any section of the cable (with respect to CD) (as stated in **Application Document 6.3.4.7.A (B) Navigational Risk Assessment [REP1-063]**).

2.3.2 Key stakeholders have further requirements which differ from the 5% MCA requirement, in respect of the three known areas of interest described above. Everywhere else along the Sea Link route, the Applicant agrees in principle to meeting the 5% water depth requirement and will discuss with the MCA any areas where this may not be met, as needed.

2.3.3 The Applicant is actively consulting with all relevant stakeholders to ensure a common understanding of their specific requirements in the other geographic areas and the recent requirement for over-dredge tolerances. Technical assessments are ongoing to facilitate final agreement and the wording of the proposed protective provisions.

PLA's Long Sand Head Two-Way Route Crossing area

2.3.4 The Applicant can commit to PLA's request to preserve 12.5 m below Chart Datum in their "Long Sand Head Two-Way Route crossing area". This has been secured in proposed Protective Provisions text for inclusion in the DCO.

PLA's Sunk Pilot Boarding Area

2.3.5 The Applicant has been engaging with the Port of London Authority and Harwich Haven Authority on the matter of under-keel clearance, and has been working collaboratively with them throughout, which has already led to substantial changes to the project's initial proposed routeing, to avoid key areas of the Sunk Traffic Separation Scheme and the Deep Water Routes in the Sunk region where larger vessels transit, as well as avoiding navigational buoys and pilot stations.

2.3.6 Prior to the DCO submission in March 2025, the Applicant was aware that 22 m below CD was of interest to the PLA, however the Applicant officially received the specific area of the PLA's Areas of Safeguarded Depth "Sunk Pilot boarding area" from the PLA on 1 August 2025.

2.3.7 Analysis of the seabed morphology within the PLA's "Sunk Pilot Boarding area" indicates that the seabed is in the main greater than 22 m CD, however in the northwest of the area there are linear seabed features trending SSW to NNE. The seabed features comprise of London Clay ridges with local accumulations of sands and granular material. The baseline depth along the corridor which passes through the low point in the ridge, is shallower than the PLA's requested 22 m below CD.

2.3.8 The Applicant's main protection strategy for Sea Link is cable lowering, with the intention to lower the cable bundle between 2 m to-2.5 m deep within identified "High Risk Areas", of which the Sunk region is one (**Application Document 9.21 Sea Link Cable Burial Risk Assessment [PDA-039]**). The trench containing the lowered cable bundle will be backfilled with up to 2 m of protective rock, to 80% (maximum

2 m backfill) of the lowered depth, to provide additional protection against anchor strike or drag interactions.

2.3.9 The Applicant is currently assessing the engineering implications of the additional cable Depth of Lowering (DoL) that may be required in areas of the "Sunk Pilot Boarding area" that are already shallower than the 22 m CD safeguard level. In the worse case, the cable DoL required may increase from 2.5 m to approximately 4.5m in the shallowest sections of the route. These changes require further investigation in terms of cable burial methodology and cable system design. The Applicant is undertaking the necessary technical assessments in order to reach agreement on wording of Protective Provisions on this matter.

2.3.10 To note, the PLA and HHA have informed the Applicant that the current Sunk Pilot Boarding Station charted diamond is located to the west of the previously described shallow seabed feature within the Sunk region and therefore is not an area where large ships can receive pilots.

2.3.11 Pilot boarding does not take place at the Sunk Pilot Boarding Station charted diamond, but currently takes place up to approximately 1.5 km to the east of the charted diamond i.e. in the vicinity of the large ridge where water depths are considerably shallower than 22 m CD.

2.3.12 In discussions with PLA and HHA, they currently have been no detailed applications or provision of confirmed development plans for dredging of the natural features in question within the Sunk area, which the Applicant could incorporate into detailed cable design plans, other than the intention to require 22 m in the future throughout the PLA's "Sunk Pilot Boarding area".

2.3.13 There are no known cable crossings planned within the PLA's "Sunk Pilot Boarding area."

PLA's NE Spit Area

2.3.14 The Applicant has been engaging with the Port of London Authority in respect of under-keel clearance within the PLA's "NE Spit area". Of particular consideration is the GridLink planned cable crossing, which is expected to be located within this area at approximately KP 101.

2.3.15 The Applicant has engaged with GridLink to understand the development's plans for installation in this area, and with the goal of co-engineering and collaborating as required in order to ensure that the PLA's requirement for 12.5 m depth below CD can be met within the "NE Spit area", which is an area with shallow sections.

2.3.16 The Applicant is satisfied that it has a solution to ensure that the 12.5 m depth is preserved even at the GridLink crossing location, by moving the planned Sea Link cable route at this point into deeper waters to the east (while still within the Order Limits) ensuring sufficient water depth above the expected crossing location. The Applicant had kept the Order Limits wide here to enable such solutions to be possible.

2.3.17 The Applicant is undertaking the necessary technical assessments in order to reach agreement on wording of Protective Provisions on this matter.

Other Documents

2.3.18 The Applicant has also been working to understand in more detail HHA, PLA, and London Gateway Port's wider requirements in addition to under keel clearance and reach agreement on wording of Protective Provisions associated with the supply of additional supporting documents, such as **Application Document Outline Navigation Installation Plan [AS-104]**, and forthcoming Outline Cable Specification and Installation Plan.

2.3.19 **Application Document 6.2.4.7 (B) Part 4 Marine Chapter 7 Shipping and Navigation [REP1-059]** assesses the potential impacts to shipping and navigation of under keel clearance, and concludes that with the proposed appropriate mitigation measures applied (regardless of how far the Applicant achieves meeting the 22 m water depth requirements), there are no likely significant impacts foreseen.

Next Steps and Status Update

2.3.20 There is ongoing discussion with the PLA, HHA and London Gateway Port regarding the safeguarding depths that can be achieved within the PLA's "Sunk Pilot boarding area" and the Applicant is collaborating further with the PLA, London Gateway Port, HHA, Port of Tilbury and MCA to reach agreement on this matter. An interface meeting was undertaken on 19th November 2025 and will be scheduled at monthly intervals in the future to provide a regular forum for these discussions.

2.3.21 The Applicant agrees with the port stakeholders that the aim is to secure these commitments within appropriate mechanisms, such as Protective Provisions and DCO provisions as necessary and is working collaboratively with the port stakeholders to establish appropriate wording. The first draft of Protective Provisions has been sent by the Applicant to the PLA for initial review, and drafts are in progress for HHA and London Gateway.

3. Review of Water Depth and Seabed Geology Along the Route

3.1 The Integrated Geophysical & Geotechnical Survey Report

3.1.1 The Applicant commissioned work to inform marine engineering, titled The Sea Link Integrated Geophysical and Geotechnical Report (the 'Integrated Survey Report'). The integrated survey report combines geophysical survey data with geotechnical investigations to offer a unified view of surface and subsurface seabed conditions, whilst also consolidating and integrating the results of geophysical data acquired during the NEXTGEO survey conducted in 2023 and the earlier MMT survey conducted in 2021.

3.1.2 The marine survey depths use LAT (Lowest Astronomical Tide) as the vertical datum. Chart Datum is a reference point used by the United Kingdom Hydrographic Office which is approximately equal to LAT. Depths within this TN are provided in LAT and can be read as equivalent to metres below Chart Datum for the purpose of this note.

3.1.3 Appendix A summarizes bathymetry and shallow geology along the route, based on data from the above work.

3.1.4 The Integrated Geophysical and Geotechnical Report will be provided at Deadline 2.

4. Marine Cable Installation and Protection & the Safeguarding of Water Depth & Under Keel Clearance

4.1 Overview of Cable Installation and Protection

4.1.1 The proposed marine cable installation and protection works are described in **Application Document 6.2.1.4 (C) Part 1 Introduction Chapter 4 Description of the Proposed Project [AS-093]**.

4.1.2 This section is supported by,

- **Application Document 2.5.3 Work Plans – Offshore [APP-023]**;
- **Application Document 2.13.4 Design Drawings – Offshore [APP-037]**; and
- **Application Document 2.14.3 General Arrangements Plans – Marine [APP-040]**.

4.1.3 The proposed marine HVDC cable installation and protection activities include pre-lay seabed preparation (including crossings), cable lay, lowering, burial and post lay cable protection. The following sections describe how these works interact with the available water depth along the route corridor and safeguard under keel clearance in the areas of interest.

4.1.4 Pre-lay seabed preparation will include clearance activities to ensure the installation corridor is clear of boulders, dropped object debris, out of service cables, sand waves (pre-sweeping) and Unexploded Ordnance (UXO). Any micro-routing to ensure the cable is installed in deeper water in the Sunk will be undertaken during the final route engineering phase. Any removal or relocation of objects would need to consider the requirements of other marine users and stakeholders and would need to include any committed requirements to not reduce water depth below the stakeholders' requirements. Any items that are repositioned, for example boulders, would be repositioned within the Order Limits in appropriate water depths (**Application Document 2.13 Design and Layout Plans [APP-037]**.

4.1.5 The primary methodology for protecting the cable is by lowering the cable below the seabed to the proposed Target Depth of Lowering (TDOL) within a cable trench. The TDOL along the Offshore Scheme and a representative trench profile are presented in **Application Document 6.2.1.4 (B) Part 1 Introduction Chapter 4 Description of the Proposed Project [AS-018]** at Table 4.15 and Plate 4.5 respectively. The TDOL was derived by the methodology described in **Application Document 9.21 Sea Link Cable Burial Risk Assessment [PDA-039]**.

4.1.6 The minimum depth of lowering to the top of the cable is 0.5 m in areas of weak bedrock Chalk, with a TDOL for the Proposed Project approximately 1 m to 2.5 m. Section 4.2 through Section 4.4 describes how the TDOL considers the minimum under keel clearance requirements in the areas of interest.

4.1.7 The mechanism to infill the cable trench and allow the seabed to revert to natural bedforms along the route is by natural backfill which utilises the processes of

sediment circulation and deposition. In sections of the route identified as having the highest risk of cable strike due to marine traffic, a TDOL between 2.0 m to 2.5 m is proposed. The trench along these sections – specifically KP 38 to KP 58, and KP 81.5 to KP 96.5 – is proposed to be backfilled using rock to a level 20% below the original seabed level. The remaining trench depth will be allowed to naturally backfill. Section 4.2 through Section 4.4 describes how the proposed trench backfill using rock in the high risk Areas (KP 38 to KP 58, and KP 81.5 to KP 96.5) considers the minimum under keel clearance requirements in the Areas of Interest.

4.1.8 **Application Document 6.2.1.4 (B) Part 1 Introduction Chapter 4 Description of the Proposed Project [AS-018]** Table 4.18 and 4.19 list the developments likely to cross the Offshore Scheme. Crossings of cables would be undertaken using agreed crossing designs in accordance with the crossing agreements with the third-party owners and would consider the requirements to safeguard under keel clearance.

4.1.9 The proposed crossing locations within the three areas of interest, including in areas of stiff clay or chalk, provide sufficient water depth to safeguard under keel clearance. The exception is the currently proposed Grid Link crossing location, where the agreed mitigation is to cross further east in deeper water within the order limits. Table 4.2 and Table 4.3 demonstrate that the crossing designs are compliant with the safeguarding of water depth.

4.2 Sunk Pilot Boarding Area of Interest

Description of the Area of Interest

4.2.1 Section 2 of this document describes the ongoing engagement with stakeholders regarding the PLA's "Sunk Pilot Boarding area" Area of Interest and the requirement to safeguard water depth to a level of 22 m below CD. Plate 2.1 shows the location and geographical boundaries of the PLA's "Sunk Pilot Boarding area".

4.2.2 This section outlines how the Applicant's proposed marine works (Work No.6) will safeguard water depth and ensure that dredging in the relevant parts of the PLA's "Sunk Pilot Boarding area" can proceed to a depth of 22 m below CD.

4.2.3 Recent discussions with PLA and HHA have also set the requirement for an additional allowance for an 'over-dredge' tolerance of 0.5 m beyond the specified depth. Accordingly, there is a requirement to safeguard water depth to a level of 22.5 m below CD.

Description of bathymetry and shallow geology

4.2.4 Plate 4.1 shows the water depth along the route corridor in the PLA's "Sunk Pilot Boarding area" and the wider Sunk area. The Area of Interest is located between KP 38.5 to KP 41.5, with shallow water sections confined to KP 38.691 to 40.428, as shown in Plate 4.1.

4.2.5 From KP 40.428 the seabed within the "Sunk Pilot Boarding area" begins to deepen along the route corridor and does not become shallower than 22.5 m CD again within the Area of Interest.

4.2.6 The seabed within the "Sunk Pilot Boarding area" is characterised by a thin veneer of sand overlying gravelly clay and then low to very high strength clay. The seabed here is therefore largely non-mobile due to the presence of the clay.

4.2.7 The shallow geology is dominated by stiff London Clay, with localised deposits of gravelly clay. The London Clay geotechnical attributes are such that the material is expected to offer high excavation resistance (including dredging), based on the soils data collected by the Applicant's marine surveys.

4.2.8 A more detailed description of the water depth and seabed geology within the "Sunk Pilot Boarding area" Area of Interest and the wider Sunk area is found in Appendix A, Section KP 33 to KP 63.

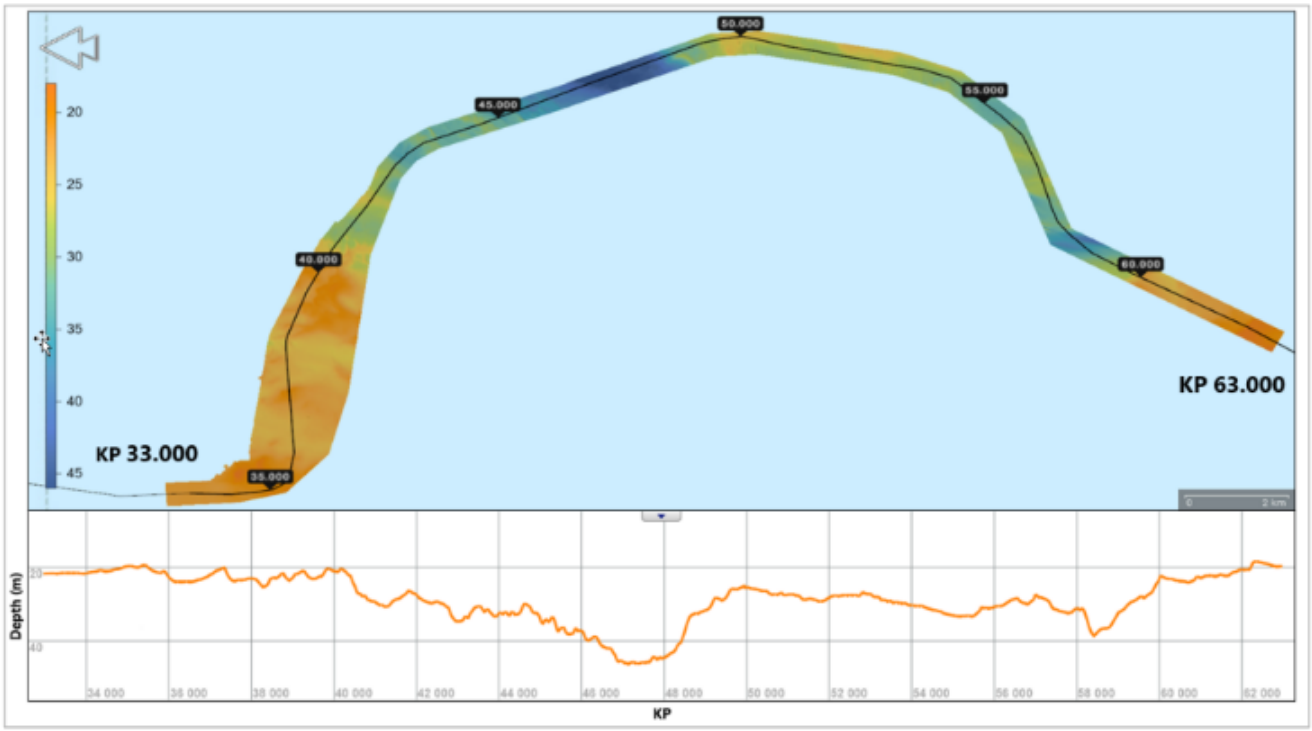


Plate 4.1 Overview of the water depths within the Area of Interest and the Sunk wider area. Extract of Figure 10:31 from the Integrated Geophysical and Geotechnical Survey Report (NEXT GEO 2025)

Table 4.1 Approximate shallow water in the "Sunk Pilot Boarding Area"

Start KP	End KP	Distance (m)	Minimum Water Depth (m CD)
38.691	38.824	130	20.0
39.041	39.385	344	21.5
39.715	40.428	713	20.5

Description of the proposed marine works and the safeguarding of water depth

4.2.9 To maintain the required 22.5 m water depth in shallow sections of the route (Table 4.1), micro-routing will be undertaken to route the cable to avoid any natural seabed high spots. Where micro-routing does not achieve the required water depth,

increased cable lowering will be required to safeguarded the water depth. An example of micro-routing through the shallow section is shown in Plate 4.2.

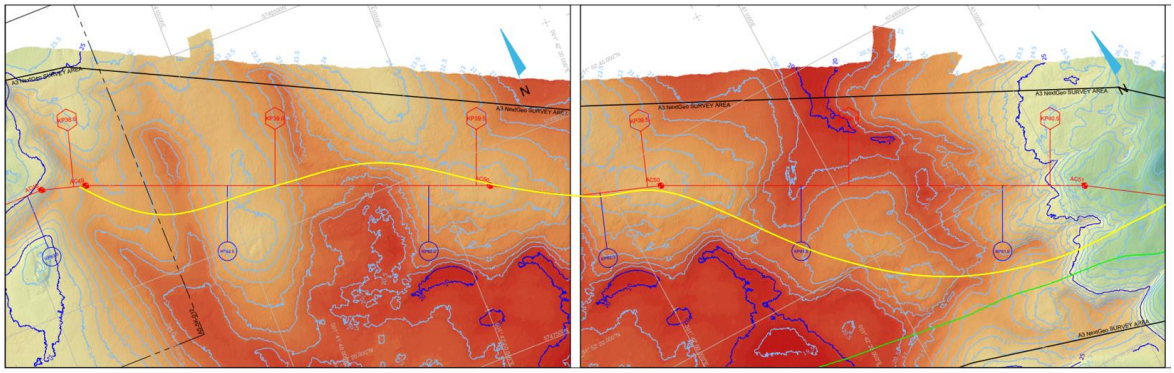


Plate 4.2 Example of micro-routing to link the deepest area of the route corridor (yellow), as opposed to the surveyed Route Position Line (RPL) shown in red with the Kilometre Posts.

4.2.10 There are no in-service cable crossings in the Area of Interest, and at present, there is no information available about future planned cables that would cross the Sea Link cable within the Area of Interest.

4.2.11 Cable crossings (Five Estuaries, NeuConnect and North Falls export cables) are planned in the wider Sunk area, however these are located in deeper water (25 m to 28.4 m CD) and are presented in Section 4.5 and are not considered further in this Section.

4.2.12 The Applicant's primary protection strategy for Sea Link is cable lowering, with the intention to lower the cable between 2 m - 2.5 m deep within the identified "high-risk areas" of the Sunk, including the Area of Interest (**Application Document 9.21 Sea Link Cable Burial Risk Assessment [PDA-039]**).

4.2.13 Post cable-lowering, low-grade gravel and/or rock will be used to backfill the trench to 80% of the trench depth (maximum 2 m backfill). The rock backfill provides additional protection in the areas of highest risk from anchor strike or drag, given the proximity to the shipping lanes and Sunk Deep Water Anchorage.

4.2.14 No rock backfill will be installed above seabed level.

4.2.15 Trench backfill using rock is typically installed using a precision rock emplacement system which are deployed along the trench. This process is commonly controlled by a fall-pipe remotely operated vehicle (ROV). Material is generally placed in controlled narrow passes directed into the trench. Progress is typically monitored by multi beam echo sounder (MBES) surveys, to ensure that the trench is backfilled with the required material to the required depth.

4.3 PLA's Long Sand Head Two–Way Route Crossing Area

Description of the bathymetry in the Area of Interest

4.3.1 The PLA depth requirement in this area is 12.5 m CD. Plate 4.3 shows the bathymetry depth profile at PLA's "Long Sand Head Two-way Route crossing area" between KP 60 to KP 65.8, which crosses two of the survey intervals. As seen from

the profiles, no areas within the “Long Sand Head Two-Way Route crossing area” are shallower than 12.5 m (LAT).

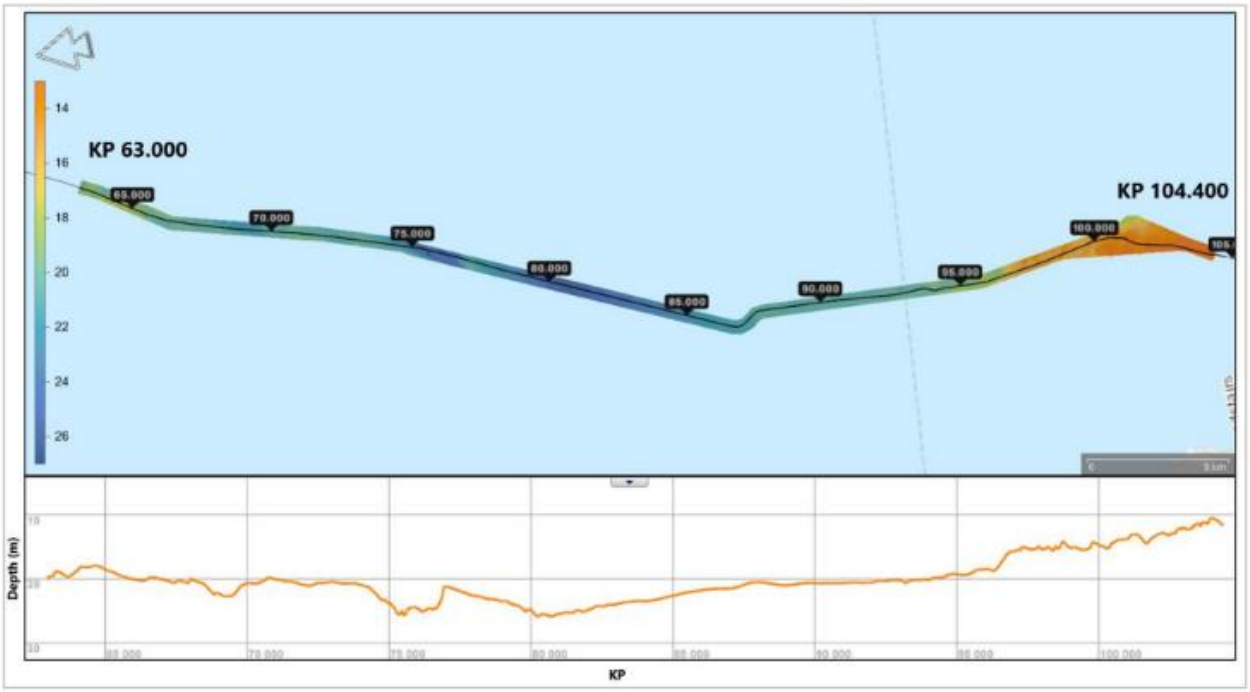


Plate 4.3 Overview of the water depths within the Area of Interest and the Long Sand Head wider area. Extract of Figure 10:45 from the Integrated Geophysical and Geotechnical Survey Report (NEXT GEO 2025)

4.3.2 No additional lowering is required in this Area of Interest to safeguard the required water depths, in addition to the recommended TDOLs indicated in **Application Document 9.21 Sea Link Cable Burial Risk Assessment [PDA-039]**.

4.4 PLA’s NE Spit Area

Description of bathymetry and shallow geology in the Area of Interest

4.4.1 The PLA charted depth requirement in this area is 12.5 m. Plate 4.4 includes the depth profile of the PLA’s “NE Spit area”, which extends from KP 85.3 to KP 103.9 where the profile runs from North to South. The profile identifies that the 12.5 m chart datum is breached at the most southerly point of the “NE Spit area”.

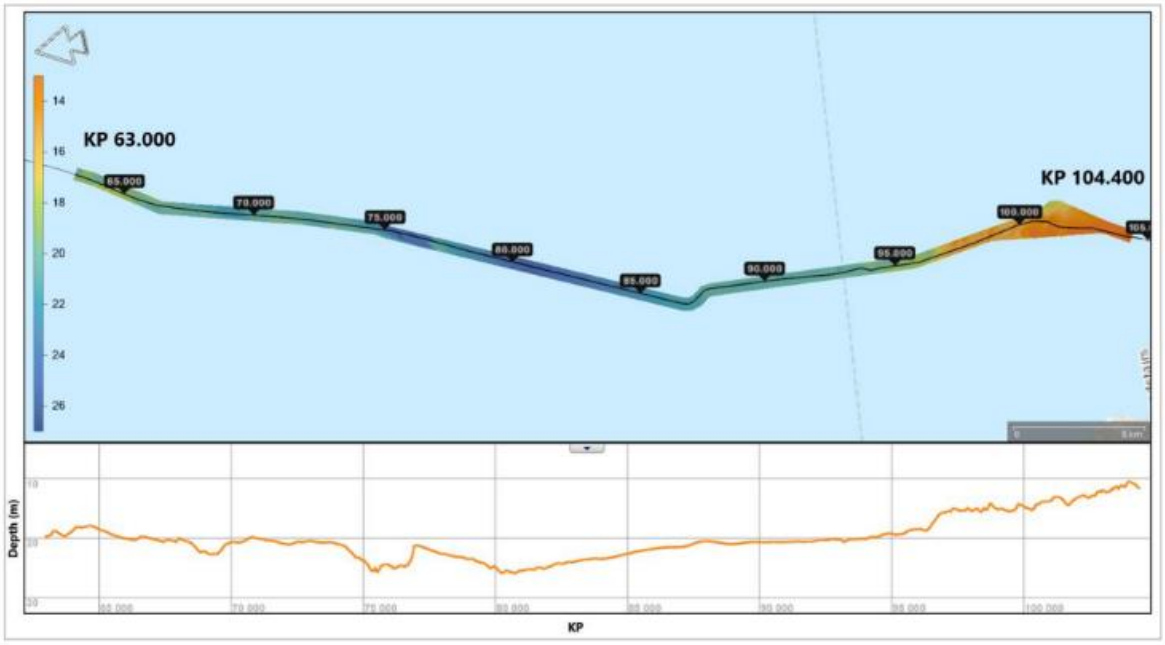


Plate 4.4 Overview of the water depths within the "NE Spit area" and the wider area. Extract of Figure 10.45 from the Integrated Geophysical and Geotechnical Survey Report (NEXT GEO 2025)

4.4.2 The seabed bathymetry is shallower than 12.5 m within the "NE Spit area" between KP102.8 to KP103.9 (extreme southern margin of the "NE Spit area" boundary). This is the onset of the shoaling seabed area as the cable corridor enters into the Outer Pegwell Bay area.

4.4.3 The interval of shoaling seabed is 1100 m in length, ranging from 12.5 m CD to 11 m CD.

4.4.4 The seabed within this "NE Spit area" KP range is largely characterised by a thin veneer of gravely sand overlying chalk. The seabed is subject to sediment movement due to localised currents and storm action, due to the shallow depth.

4.4.5 The underlying geology comprises weak to competent chalk bedrock.

4.4.6 The primary method of cable protection will be by lowering the cable below seabed level; this will be undertaken by a combination of pre-sweeping, mechanical and rockcut trenching and jetting, where appropriate.

4.4.7 Backfill in this interval will be achieved by natural processes of sedimentation, as the displaced sediment from the trench construction is redeposited within the trench. Additional sediment transport across the trench of fines and/or granular material will result in deposition of the sediment load as it passes over the trench.

4.4.8 Planned and in-service cable crossings in the area will be co-engineered to preserve the 12.5 m CD safeguarding process. The crossings which this affects are shown in Table 4.2 and Table 4.3 in Section 4.34.5 which highlight the cables within the "NE Spit area" Area of Interest.

4.4.9 The Applicant plans to move the proposed GridLink crossing location into deeper water to the east ensuring sufficient water depth to preserve the 12.5 m CD safeguarding level. Table 4.3 in Section 4.5 presents the updated location.

4.5 MCA 5% Reduction in Charted Water Depth at Crossings

4.5.1 Sections 4.2 to 4.4 describe how marine cable installation and protection works safeguard under keel clearance in the three Areas of Interest.

4.5.2 The Applicant also notes the MCA guidance outlined in MGN 654 regarding cable protection, specifically that such measures should not alter the chartered water depth by more than 5%.

4.5.3 This section outlines the Applicant's crossing locations, designs, and their adherence to MCA guidance on a 5% depth reduction with reference to CD.

4.5.4 There are several different crossing designs proposed by the Applicant, and these vary in height and profile according to type of cable being crossed, water depth, risk profile and prevailing current (scour). Indicative drawings are presented in **Application Document 2.13 Design and Layout Plans [APP-037]**.

4.5.5 Concrete mattresses are commonly used in the lowest profile crossing designs to serve as both a separation and armour layer. More typically, crossing designs include either a rock or mattress separation layer between the crossed and crossing cables with a rock armour layer above the crossing cable.

4.5.6 Table 4.2 and Table 4.3 list the in-service assets and planned developments likely to cross the Offshore Scheme and whether the crossing locations are within the identified Areas of Interest. Water depth and the MCA 5% threshold for each depth are shown as well as any specific water depth safeguard requirements. The berm height designs at each of those crossing locations would, ideally, not exceed this MCA 5% limit. The table identifies different berm height design scenarios, including the minimum design and maximum design scenarios. The indicative berm heights for Sea Link are 1–2 m for high voltage (HVAC/HVDC) cables and 0.5–0.8 m for fibre optic (FO) cables.

4.5.7 Some cable crossings within the Areas of Interest may cause a reduction in water depth which may exceed the MCA 5% threshold, depending on the final crossing design. All specific under-keel clearance requirements identified by the port authorities have been addressed in Section 4; this section pertains solely to compliance with the MCA 5% rule.

4.5.8 Cable crossings in the wider Sunk area include Five Estuaries, NeuConnect, and North Falls. These crossings are outside of the "Sunk Pilot Boarding area" Area of Interest. The proposed crossing locations are located in deep enough water to meet both the 22 m below chart datum requirement and likely the MCA 5% threshold, pending co-engineering with the third-party asset owner. Discussions are ongoing.

4.5.9 In waters outside the Areas of Interest, some cable crossings may cause a reduction in water depth which may exceed the MCA 5% threshold, depending on the final crossing design. Further engagement with MCA is required to agree any specific requirements and / or a derogation at these locations.

4.5.10 The Applicant is committed to continued consultation with stakeholders, to address their concerns. Crossings of cables would be undertaken using agreed crossing designs in accordance with the crossing agreements with the third-party owners and would be informed by the agreed requirements to safeguard under keel clearance. Technical assessments are ongoing to facilitate final agreement and the wording of the proposed protective provisions.

Table 4.2 Summary of in-service crossings

Asset	Type	KP (m)	Water Depth (m CD) [5] (a)	Area of Interest	Under Keel Clearance Safeguard Depth (m CD) (b)	Available Height (m) (c) = (a) – (b)	MCA 5% Reduction (m)	Seabed Type [4]	Min / Max Design Crossing Height (m) [2, 3]	Comment
Farland North	FO	8.365	19.2	No	n/a	n/a	1.0	SAND	0.5 – 0.8	To be agreed with MCA
EA1 North	HVAC	13.373	18.7	No	n/a	n/a	0.9	SAND over GRAVEL over CLAY	1 – 2	To be agreed with MCA
EA1 South	HVAC	13.373	18.3	No	n/a	n/a	0.9	SAND over GRAVEL over CLAY	1 – 2	To be agreed with MCA
NeuConnect [1]	HVDC	50.672	27.4	No	n/a	n/a	1.4	SAND over CLAY	1 – 2	To be agreed with MCA
BritNed	HVDC	87.306	21.3	NE Spit	12.5	8.8	1.1	SAND over SILT	1 – 2	Safeguards Under Keel Clearance
Mercator	FO	90.740	20.7	NE Spit	12.5	8.2	1.0	SAND over CLAY	0.5 – 0.8	Safeguards Under Keel Clearance
Q&E	FO	100.151	14.9	NE Spit	12.5	2.4	0.8	GRAVEL over SAND	0.5 – 0.8	Safeguards Under Keel Clearance
PEC	FO	104.591	10.3	No	n/a	n/a	0.5	Gravely SAND over CHALK	0.5 – 0.8	To be agreed with MCA
Tangerine	FO	106.747	11.6	No	n/a	n/a	0.6	SAND over CHALK	0.5 – 0.8	To be agreed with MCA
Thanet North	HVAC	107.594	9.5	No	n/a	n/a	0.5	SAND / GRAVEL over CHALK	1 – 2	To be agreed with MCA
Thanet South	HVAC	107.647	10.1	No	n/a	n/a	0.5	SAND / GRAVEL over CHALK	1 – 2	To be agreed with MCA
Nemo	HVDC	113.106	7.8	No	n/a	n/a	0.4	SAND / GRAVEL	1 – 2	To be agreed with MCA

Notes:

1 – NeuConnect is under construction

2 – Minimum and maximum design crossing Height (m) for HVDC and HVAC

3 – Minimum and maximum design crossing Height (m) for FO cables

4 – Seabed Type summarised from the Integrated Geotechnical and Geophysical Survey Report

5 – Marine survey depths in LAT can be read as equivalent to metres below Chart Datum for the purpose of this note. See section 4.1.

Table 4.3: Summary of planned crossings

Asset [6]	Type	KP (m)	Water Depth (m CD) [5] (a)	Area of Interest	Under Keel Clearance Safeguard Depth (m CD) (b)	Available Height (m) (c) = (a) – (b)	MCA 5% Reduction (m)	Seabed Type [4]	Min / Max Design Crossing Height (m) [2, 3]	Comment
EA3 North	HVAC	11.34	18.0	No	n/a	n/a	0.55	SAND over CLAY	1 – 2	To be agreed with MCA
EA3 South	HVAC	14.48	18.0	No	n/a	n/a	0.55	SAND over CLAY	1 – 2	To be agreed with MCA
Five Estuaries North	HVAC	50.18	25.0	No	n/a	n/a	1.25	SAND over CLAY	1 – 2	To be agreed with MCA
Five Estuaries South	HVAC	52.71	27.0	No	n/a	n/a	1.35	SAND over CLAY	1 – 2	To be agreed with MCA
North Falls North	HVAC	52.01	28.4	No	n/a	n/a	1.35	SAND over CLAY	1 – 2	To be agreed with MCA
North Falls South	HVAC	53.03	27.0	No	n/a	n/a	1.35	SAND over CLAY	1 – 2	To be agreed with MCA
Nautilus [1]	HVDC	88.646	20.5	NE Spit	12.5	8.0	1.05	SAND over SILT	1 – 2	Safeguards Under Keel Clearance
Grid Link	HVDC	101.27**	16.4	NE Spit	12.5	3.9	0.82	SAND over CHALK	1 – 2	Safeguards Under Keel Clearance
Cronos*	HVDC	tbc	tbc	tbc						
Tarchon*	HVDC	tbc	tbc	tbc						

Notes:

1 – Nautilus route is still in planning stages

2 – Minimum and maximum design crossing Height (m) for HVDC and HVAC

3 – Minimum and maximum design crossing Height (m) for FO cables

4 – Seabed Type summarised from the Integrated Survey Report

5 – Marine survey depths in LAT can be read as equivalent to metres below Chart Datum for the purpose of this note. See section 4.1.

6 – ‘North’ and ‘South’ refers to the proposed route corridor limits

* Cronos and Tarchon are both HVDC Interconnectors. They are planned to cross but no information currently available. Awaiting information from crossing discussions.

** Note KP to be revised after ongoing discussions with Grid Link. Note this KP is for the current Sea Link route, the depth is considered for the old DF3 route.

5. Cable Specification and Installation Plan (CSIP)

5.1 Purpose of the CSIP

5.1.1 A Cable Specification and Installation Plan (CSIP) will be produced to discharge the conditions of the Deemed Marine Licence (DML) requirement for a CSIP. The CSIP ensures that cable installation and protection works comply with the conditions of the DCO and Deemed Marine Licence. The CSIP will work in conjunction with the Navigation Installation Plan (NIP), DCO requirements and Protective Provisions to secure stakeholder requirements for vessel activity constraints and operations during construction.

5.1.2 The CSIP will be discharged in phases that align with the programme of works for the construction of the Marine Scheme, including:

- Landfall installation
- Seabed preparation (including crossings)
- Cable lay and burial
- Post-lay cable protection

5.2 Status of the Sea Link CSIP

5.2.1 The Applicant has submitted a draft DML which describes the provision of pre-construction plans and documentation including the CSIP.

5.2.2 The CSIP will be submitted pre-construction in accordance with the DML and will be informed by the Contractor's final assessment of the site data, burial assessment study and detailed design and methodologies. The Contractor's detailed design is still to be undertaken and therefore the final design and methodologies to inform the final CSIP is not currently known. The Applicant is in discussions with the relevant stakeholders on the scope of the CSIP to be submitted pre-construction. Discussions are ongoing to understand whether any further additional documents are required or whether the scope of information required can be captured in the documents proposed in the draft DML. The Applicant currently intends to submit an outline version of the CSIP once these discussions have progressed further.

5.2.3 The Applicant proposes the Sea Link CSIP is organised as follows: Section 1: Purpose and Objectives of the CSIP; Section 2: Location – details the location of the works; Section 3: Cable Specification; Section 4: Marine Scheme Program of Works; Section 5: Description of Landfall Installation; Section 6: Description of Seabed Preparation; Section 7: Description of Cable Lay and Burial; Section 8: Description of Post Lay Cable Protection.

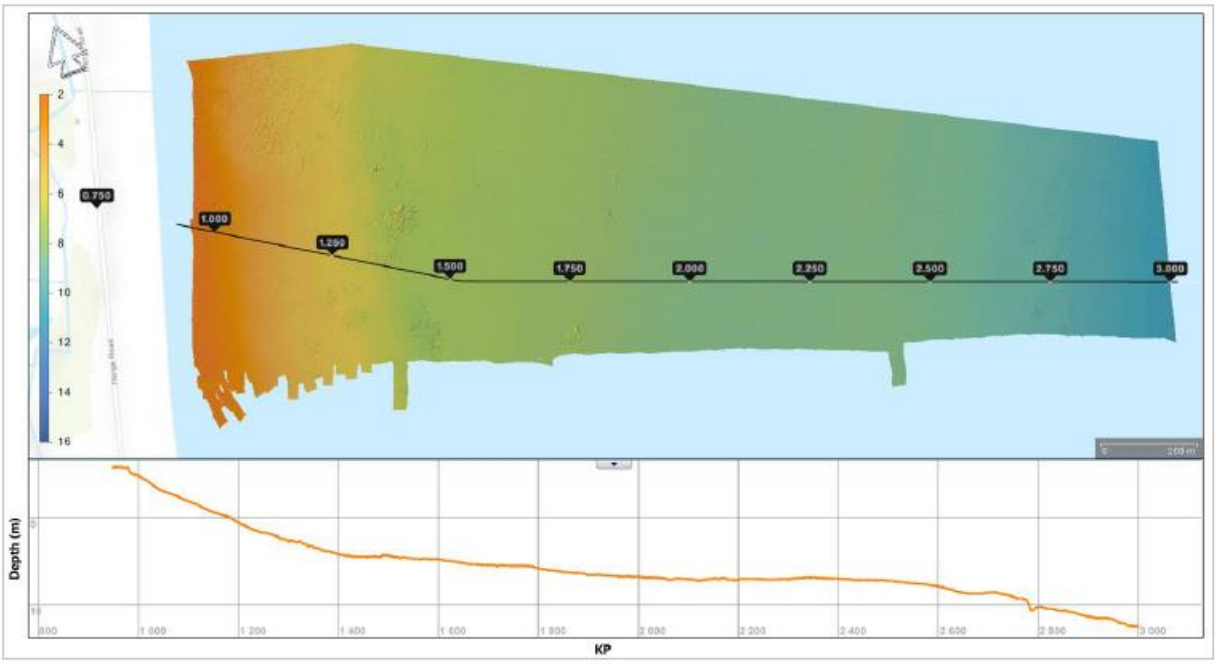
Appendix A – Review of Water Depth and Seabed Geology Along the Route

A.1 Nearshore KP1 to KP3

1A.1.1 Bathymetric (water depth) data within the surveyed area reveals gentle seabed morphology. Seabed depth increases from 2.1 m at KP 1 to 11.2 m at KP 3. Depths range between a minimum of 2.09 m and a maximum of 11.26 m. Appendix Plate 1 illustrates water depth within the surveyed nearshore area.

1A.1.2 The surficial geology consists of a mixture of CLAY and SAND, with areas of GRAVEL identified.

1A.1.3 The subsurface shallow geology is interpreted to be mixture of SAND, GRAVEL and CLAYs with possible sub-cropping or outcropping bedrock (Coralline Crag Formation).



App Plate 1 Overview of the water depth nearshore Suffolk between KP 1 and KP 3, extracted from Figure 10-8 of the Integrated Survey Report

A.2 Offshore KP 3 to KP 9

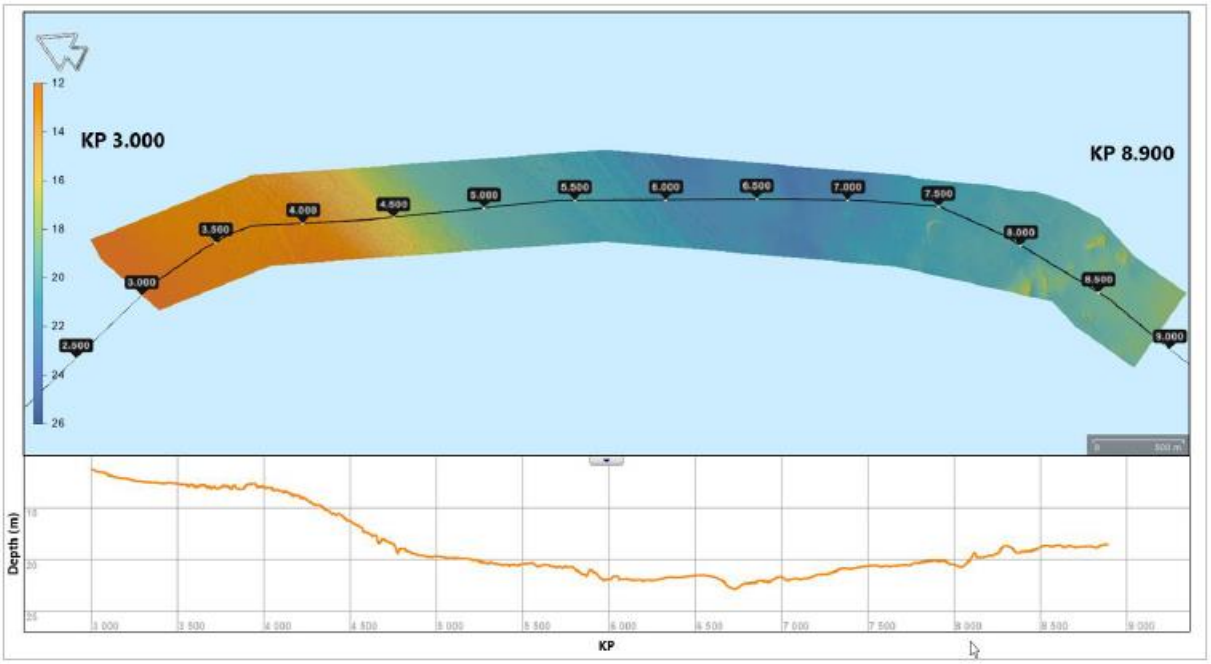
1A.2.1 This area incorporates Farland (North) crossing.

1A.2.2 The offshore route begins at a depth of 11.3 m at KP 3, descending to a maximum depth of 22.9 m at KP 6.7. The route then gradually ascends, reaching a depth of 18.5 m at KP 8.9. Appendix Plate 2 illustrates water depth within the surveyed offshore KP 3 to KP 9.

1A.2.3 The surficial geology in the northern half, between KP 3. and KP 6, is predominantly characterized by CLAY and SAND seabed. Further south, the seabed sediments comprise gravelly SAND to sandy GRAVEL from KP 6 to KP 9.

1A.2.4 The subsurface shallow geology between KP 3 and KP 6, comprises SAND (1.0 to 3.0 m in thickness) overlying very stiff CLAY. From KP 6 to KP 7.5, the overlying SAND and GRAVEL thins to between 0.2 and 1.0 m. Beyond KP 7.5 the SAND increases in thickness, reaching up to 7.6 m at KP 8.

1A.2.5



App Plate 2 Overview of the Bathymetry in Block 01 Offshore between KP 3 and KP 9, extracted from Figure 10-13 of the Integrated Survey Report

A.3 Offshore KP 9 to KP 33

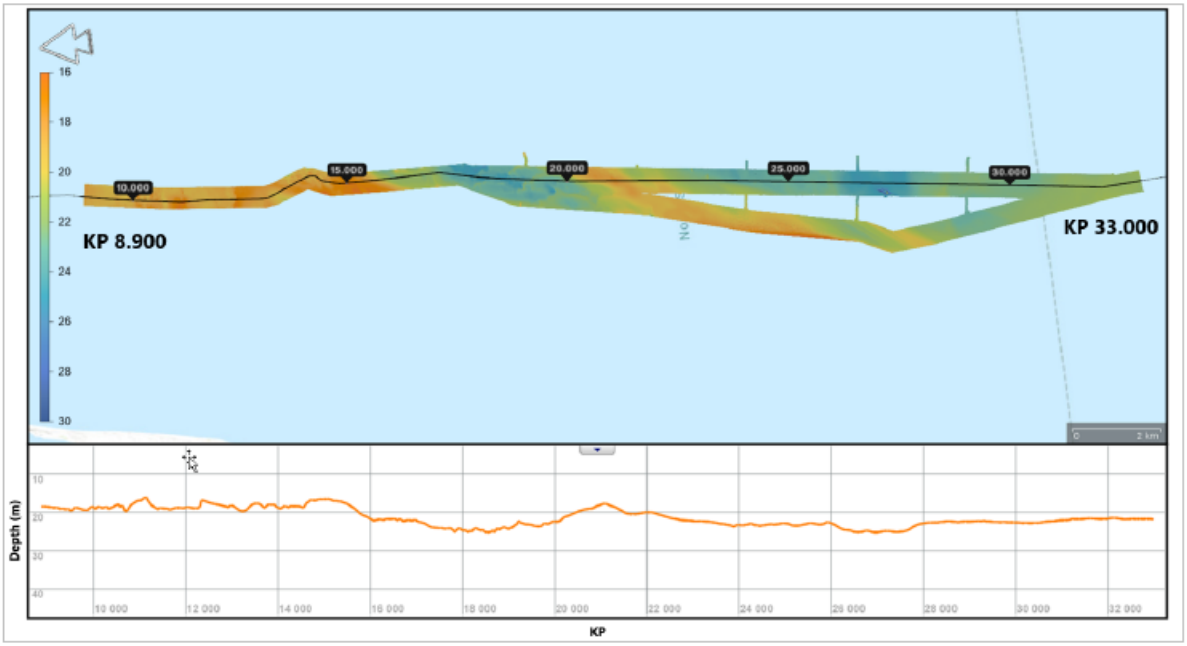
1A.3.1 This area incorporates EA1 and EA3 crossings.

1A.3.2 The offshore route begins at KP 9 with a depth of 18.5 m and remains relatively flat until it ends at a depth of 21.8 m at KP 33. The minimum and maximum depths recorded are 15.8 m and 25.4 m, respectively. Appendix Plate 3 illustrates water depth within the surveyed offshore KP 9 to KP 33.

1A.3.3 The surficial geology is composed of gravelly SAND to sandy GRAVEL, SAND, CLAY, and stiff CLAY.

1A.3.4 The subsurface shallow geology is interpreted as a mixture of gravelly SAND to sandy GRAVEL overlying very stiff CLAY. From KP 24 to KP 27, the SAND unit reaches a maximum thickness of 4 m at KP 26 but also thins to about 1 m in places.

1A.3.5



App Plate 3 Overview of the Bathymetry in Block 02 between KP 9 and KP 33, extracted from Figure 10-19 of the Integrated Survey Report

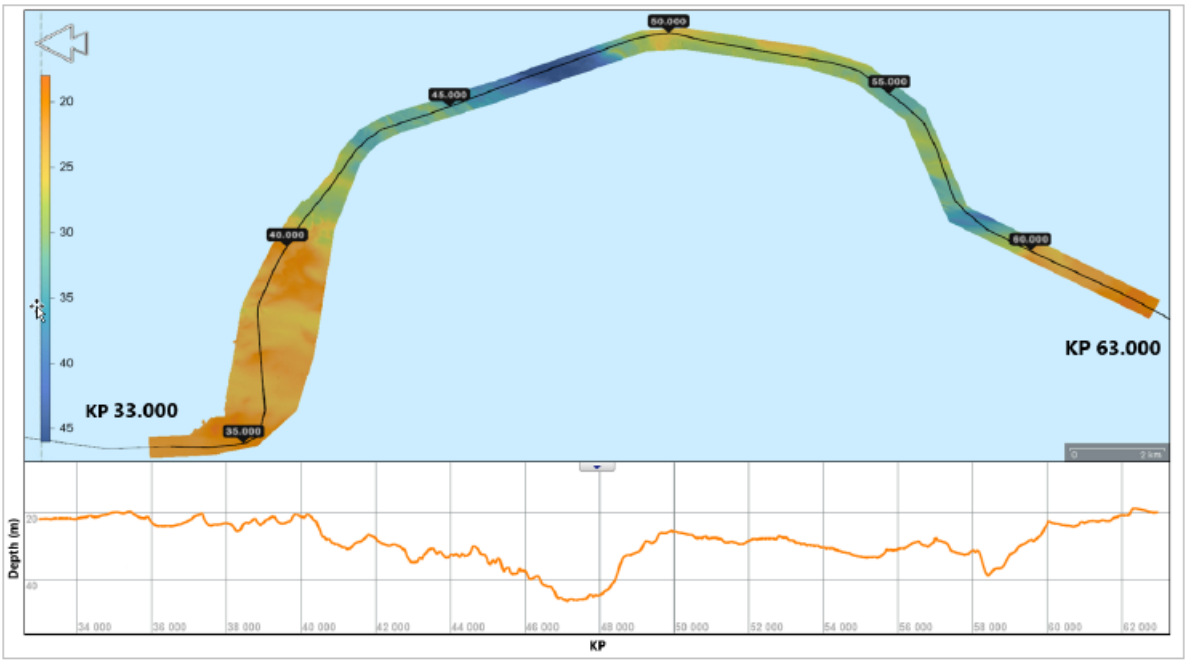
A.4 Offshore KP 33 to KP 63

1A.4.1 This section of the offshore route incorporates the “Sunk Pilot Boarding area” Area of Interest, (KP 38.5 to KP 41.5), the eastern extent of the “Long Sand Head Two-Way Route crossing area” (KP 60 to KP 63) and the planned North Falls and Five Estuaries cable crossings.

1A.4.2 The bathymetry varies from a minimum depth of 18.5 m (KP 62.344) to a maximum depth of 46.42 m (KP 47.132). From KP 33 to KP 41.5, the depths range from 18.5 m to 22 m with a relatively flat profile interspersed with shallow points due to clay ridges. From KP41. 5, the depth deepens slowly to the deepest section between KP 47.132 and KP 48.650, then the seabed rises to a final depth of 19.73 m at KP 63.000.

1A.4.3 The surficial geology comprises a mix of seabed sediments, including gravelly SAND to sandy GRAVEL, CLAY, stiff CLAY, SILT, SAND and GRAVEL.

1A.4.4 Between KP 33.000 and KP 56.892, very stiff high cohesive strength London CLAY is frequently present at or near the seabed (<0.2 m below seabed), with interspersed sections of gravelly SAND to sandy GRAVEL up to 1 m thick. Caution is advised during laying and trenching operations in areas where the hard substrate is sub-cropping or outcropping.

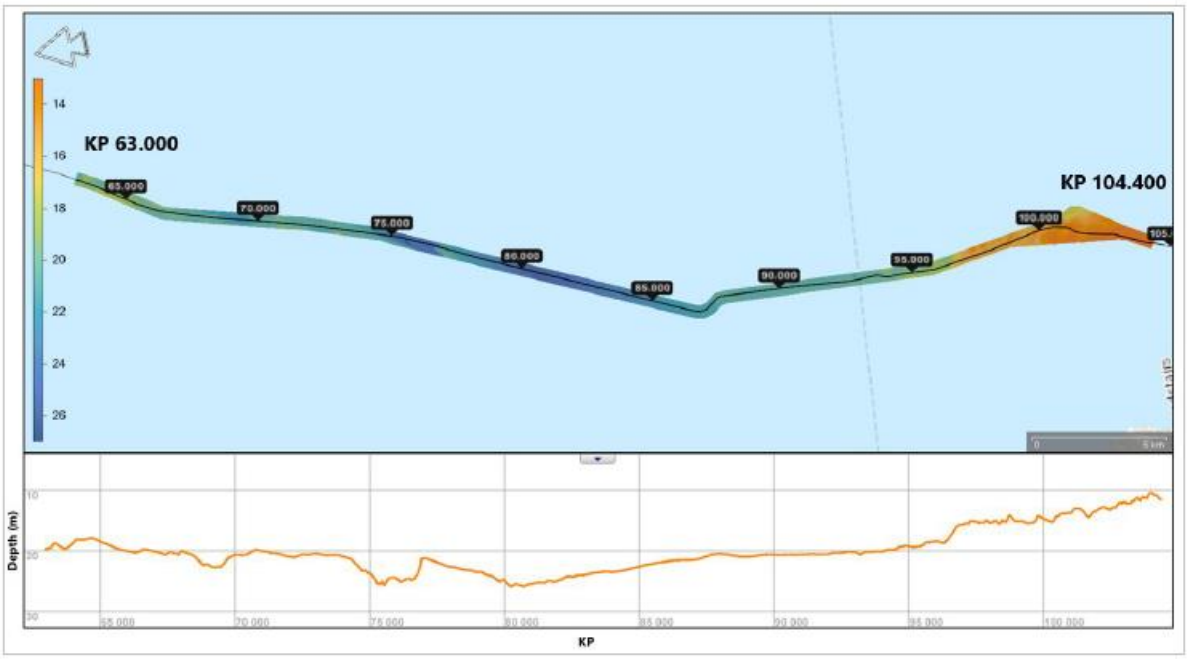


App Plate 4 Overview of the Bathymetry in Block 03 between KP 33 and KP 63, extracted from Figure 10-31 of the Integrated Survey Report

A.5 Offshore KP 63 to KP 104

1A.5.1 This section of the Offshore Route includes the western part of the “Long Sand Head Two-Way Route crossing area” Area of Interest (KP 63 to KP 65.8), The “NE Spit area” Area of Interest (KP 85.3 to KP 103.9) and incorporates BritNed, Mercator, Q & E, Nautilus Opl1(planned) crossings.

1A.5.2 The bathymetric data (water depth) reveals a gentle, relatively flat seabed surface, with depths ranging from 19.7 m at KP 63 to 11 m at KP 104. A minimum depth of 10.2 m is recorded at KP 104, and a maximum depth of 26.2 m at KP 75.5.



App Plate 5 Overview of the Bathymetry in Block 04 between KP 63 and KP 104, extracted from Figure 10-45 of the Integrated Survey Report

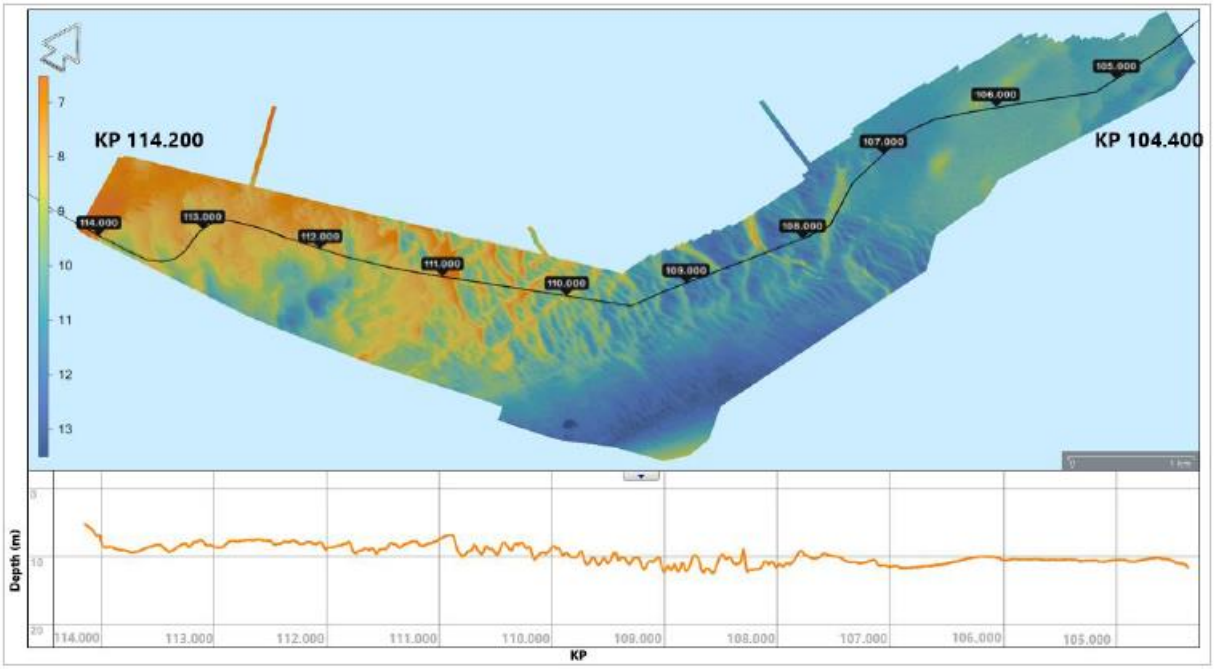
A.6 Offshore KP 104 to KP 114

1A.6.1 This section of the route incorporates crossing in-service cables PEC, Tangerine, Thanet (x2) and NEMO, as well as the planned cable GridLink.

1A.6.2 Bathymetry data indicate a gently sloping, relatively flat seabed surface, with depths ranging from 11.01 m at KP 104.400 to 4.91 m at KP 114.200. The maximum depth along the route is 12.65 m, recorded at KP 108.665, while the minimum depth along the route is 4.81 m, recorded at KP 114.185.

1A.6.3 The surficial geology within Block 05 Offshore is predominantly gravelly SAND to sandy GRAVEL, with occurrences of GRAVEL, stiff CLAY and CHALK. Very coarse sediment is recorded in the south-western section, where the corridor crosses this material between KP 113.454 and KP 113.733.

1A.6.4 From KP 104.400 to KP 108.800 SAND and GRAVEL range in thickness from approximately 0.5 to 2.2 m overlies CHALK. Between KP 108.800 and KP 114.000, CHALK is at or near the seabed (0.2 m below seabed), with only minor SAND and GRAVEL deposits, generally no more than 1 m thick.



App Plate 6 Overview of the Bathymetry in Block 05 Offshore KP 104.400 to KP 114.2, extracted from Figure 10-67 of the Integrated Survey Report

A.7 Nearshore KP 114 to KP 120.6 (Pegwell Bay Intertidal)

1A.7.1 There are no crossings in this section of the route, however the corridor does run parallel south of the NEMO cable and north of the River Stour navigable channel.

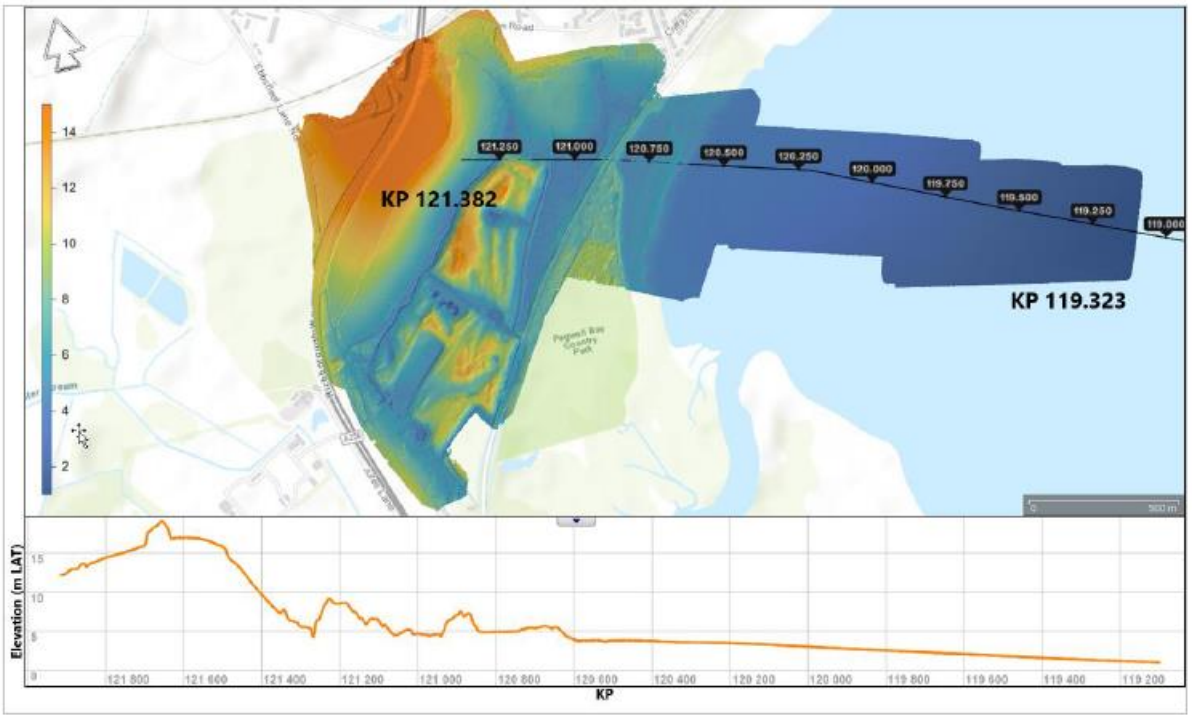
1A.7.2 Bathymetry data indicates a gently sloping, relatively flat seabed surface, ranging in depth from 4.91 m at KP 114.200 to -2.30 m at KP 119.700. The maximum depth within the block is 8.45 m, recorded at KP 114.648 and coinciding with the base of a sandwave area. Several areas of megaripples and sand waves are present within the block, crossing the corridor.

1A.7.3 The surficial geology within the Nearshore area is predominantly characterized by gravelly SAND to sandy GRAVEL. Between KP 114.000 and 114.200, SAND and GRAVEL deposits increase in thickness reaching up to 4 m thick. The route corridor passes through an area of stiff CLAY outcrops at KP 117.649 and KP 117.704, KP 117.777 to KP 117.821, and from KP 117.987 to KP 118.040. The route crosses an area of GRAVEL from KP 118.040 to KP 118.085.

1A.7.4 The Pegwell Bay Landfall is comprised primarily of gravelly SAND to sandy GRAVEL, with CLAY and SAND (a Pleistocene-age deposit). These sediments were deposited within the near-shore environment and encompass a range of sands, silty clays, and flint-rich gravels. The seabed is relatively flat, exhibiting no readily noticeable features

1A.7.5 In the intertidal zone, identifying discrete layers is more challenging due to gradual velocity transitions throughout the dataset. The data is thought to represent partially saturated sands and gravels found in the intertidal and saltmarsh regions.

App Plate 7 Overview of the Bathymetry in Block 05 Nearshore KP 114.200 to KP 119.7, extracted from Figure 10-73 of the Integrated Survey Report



App Plate 8 Overview of the Lidar Bathymetry in Pegwell Landfall KP 119.323 to KP 121.417, extracted from Figure 10-76 of the Integrated Survey Report

National Grid plc
National Grid House,
Warwick Technology Park,
Gallows Hill, Warwick.
CV34 6DA United Kingdom

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