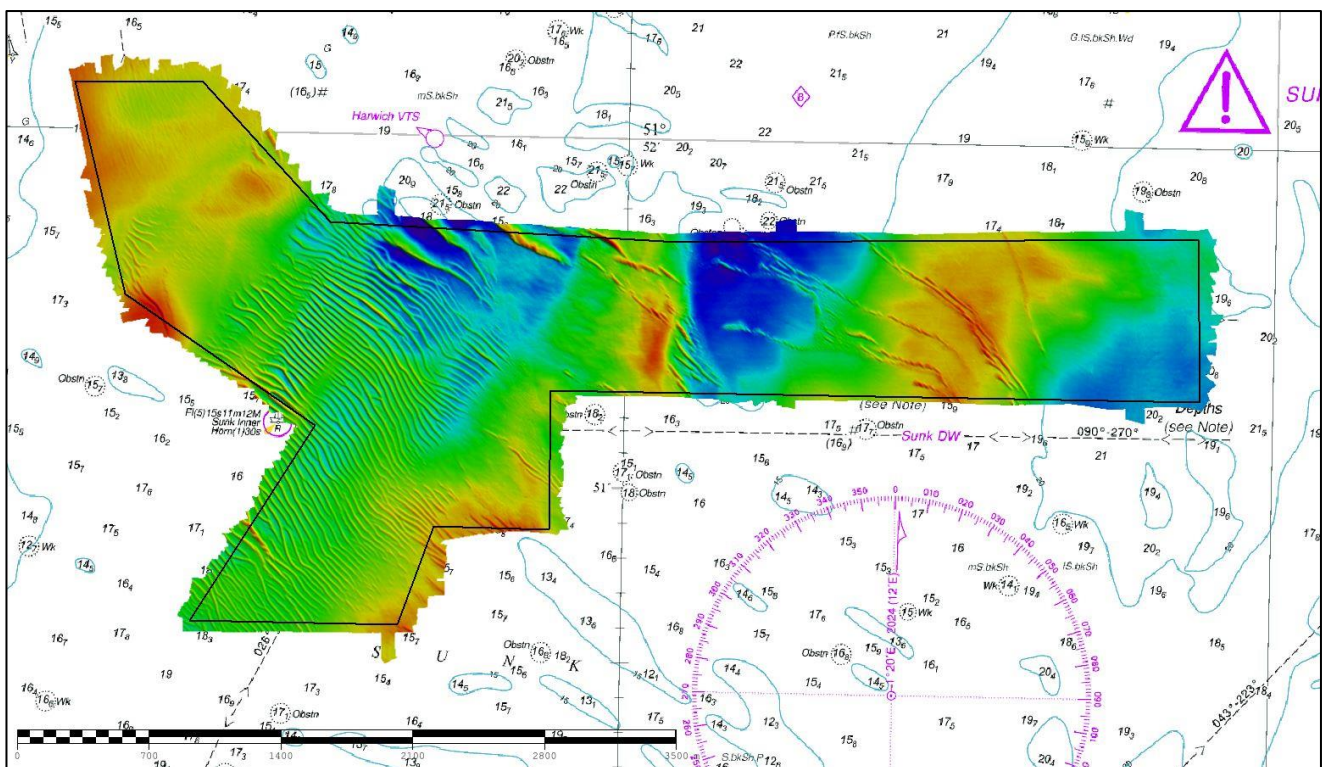




UK Hydrographic
Office

THAMES ESTUARY SUNK FOCUSED (TE3A) 2024 ASSESSMENT

An assessment of the 2024 hydrographic survey of the area TE3A: to monitor recent seabed movement; to identify any implications for shipping; and to make recommendations for future surveys.



CONTENTS

1. SUMMARY	1
2. LOCATION	1
3. REFERENCE SURVEY DETAIL	3
4. NEW SURVEY DETAIL	4
5. DESCRIPTION OF RECENT BATHYMETRIC CHANGE	4
6. RECOMMENDATIONS FOR FUTURE SURVEYS	8

Notes

This Assessment is produced by the UK Hydrographic Office (UKHO) for the Maritime and Coastguard Agency (MCA). Analysis of the Routine Resurvey Areas forms part of the Civil Hydrography Programme and the reports are made available through the UKHO website and are presented to the Civil Hydrography Working Group. When approved, the recommendations are incorporated into the Routine Resurvey Programme. The report is governed by a Memorandum of Understanding between the DfT (including the MCA) and the MOD (including the UKHO).

The Admiralty Chart extracts, other graphics and tables in this Report are included for illustrative purposes only and are NOT TO BE USED FOR NAVIGATION.

This material is protected by Crown Copyright. It may be downloaded from the UK Hydrographic Office's (UKHO) web site and printed in full for personal or non-commercial internal business use. Extracts may also be reproduced for personal or non-commercial internal business use on the condition that the UK Hydrographic Office is acknowledged as the publisher and the Crown is acknowledged as the copyright owner.

Applications for permission to reproduce the material for any other purpose (including any distribution of the material or extracts to third parties) can be made interactively on the UKHO's web site (www.ukho.gov.uk), by e-mail to intellectualproperty@ukho.gov.uk or in writing to Intellectual Property, UK Hydrographic Office, Admiralty Way, Taunton, Somerset, TA1 2DN.

All depths are to Chart Datum, defined using the UKHO Vertical Offshore Reference Frame (VORF) Model.

TE3A SUNK FOCUSED, 2024

1. SUMMARY

Changes Detected

- 1.1 The controlling depth for the Harwich Deep Water Route (DWR) in the TE3A area has shallowed to 15.5m in the 2024 survey.
- 1.2 The most significant depth for the Sunk DWR in the TE3A area has deepened to 16.7m.
- 1.3 The region southeast of the survey area has been covered in the recent Port of London Authority (PLA) survey, typically carried out every 8 months. The most recent PLA survey was undertaken on 30th July 2024. The least depth was 14.4m.
- 1.4 Sand wave migration is abundant, and as in previous years, it is the primary cause of bathymetric change. There is a general converging trend, where the northernmost sand waves shift south, and southernmost sand waves shift north; there are exceptions to this generalisation. Observed sand wave movement varied between 10-100m.

Reasons for Continuing to Resurvey the Area

- 1.5 The controlling depth for the Harwich DW Route is currently the shallowest depth observed over the past few years (15.5m in 2024); considering the north segment of the route is dredged to 16m, and the east of the route only increases in depth on approach to the Sunk Outer TSS, this is currently the controlling depth for the whole Harwich DW Route and should continue to be monitored regularly.
- 1.6 Sand wave migration has continued from previous years, leaving depths within the area changeable and hazardous. With sand waves converging into the Harwich DW route and changing morphology around the Sunk DW Route, continued monitoring is advised.
- 1.7 The Sunk DW Route's navigational significance in relation to vessels with a deep draught transiting towards London warrants continued survey, see Figure 7.

Recommendations

- 1.8 Due to the observed bathymetric variability and sand wave mobility the current annual focused survey interval, and 3-year full survey interval, should be maintained.
- 1.9 The focused survey area should be maintained to account for the wide area of sand wave mobility.

2. LOCATION

- 2.1 Survey interval at time of resurvey: 1-year Focused survey, 3 years for the Full survey area.
- 2.2 Area Covered: 7.93 km²

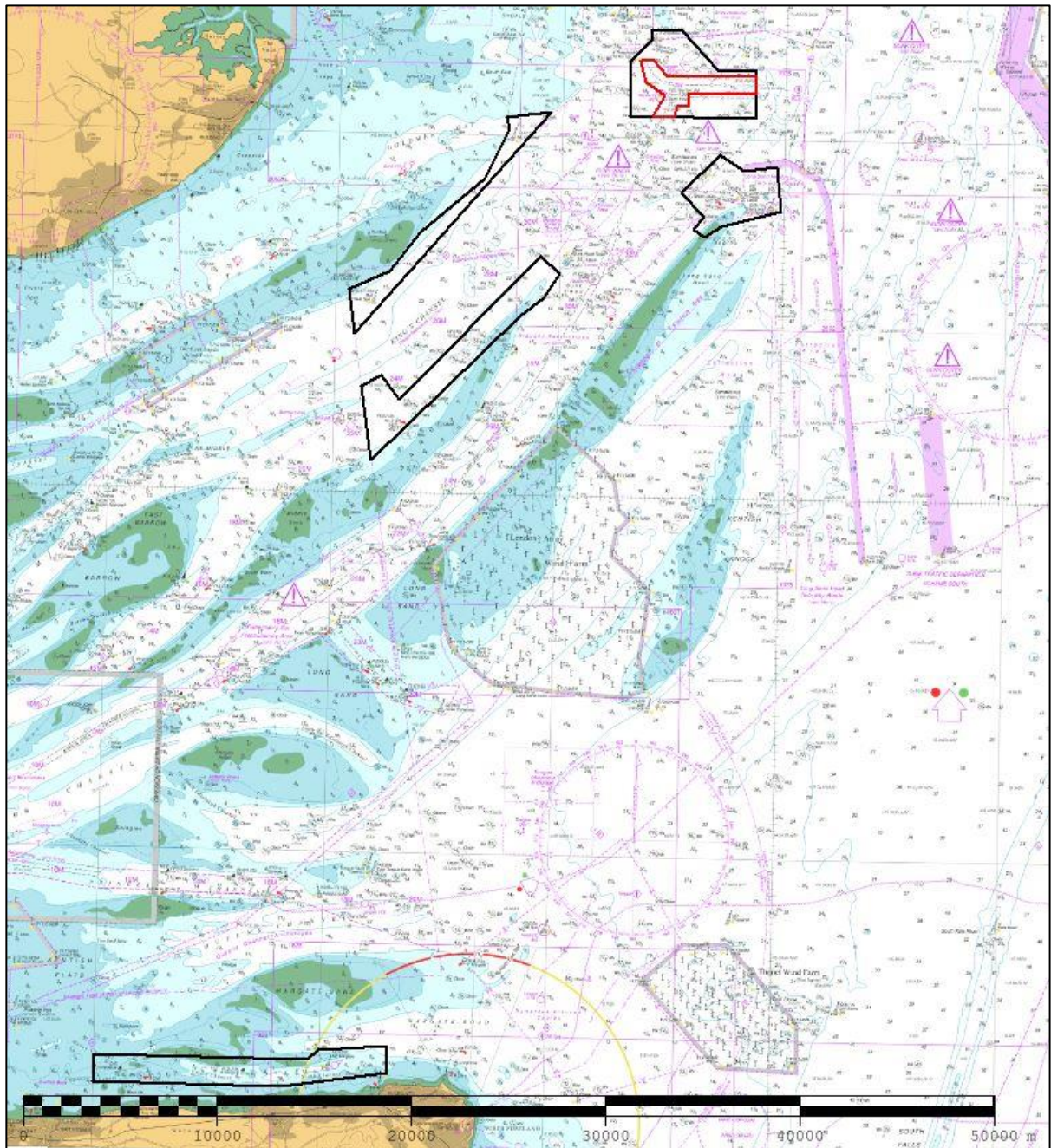


Figure 1: 2024 Thames Estuary Routine Resurvey areas overlaid on BA Chart 1183 with TE3A Sunk Focused area in red.

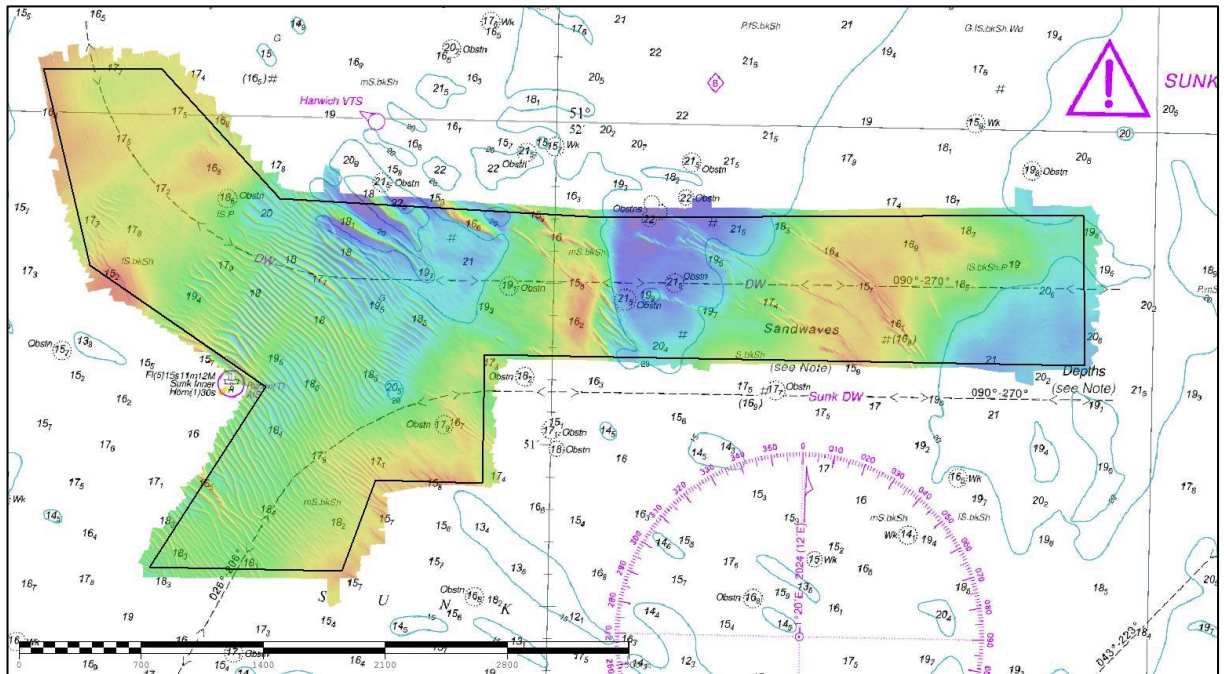


Figure 2a: 2024 survey data overlaid on BA Chart 2692

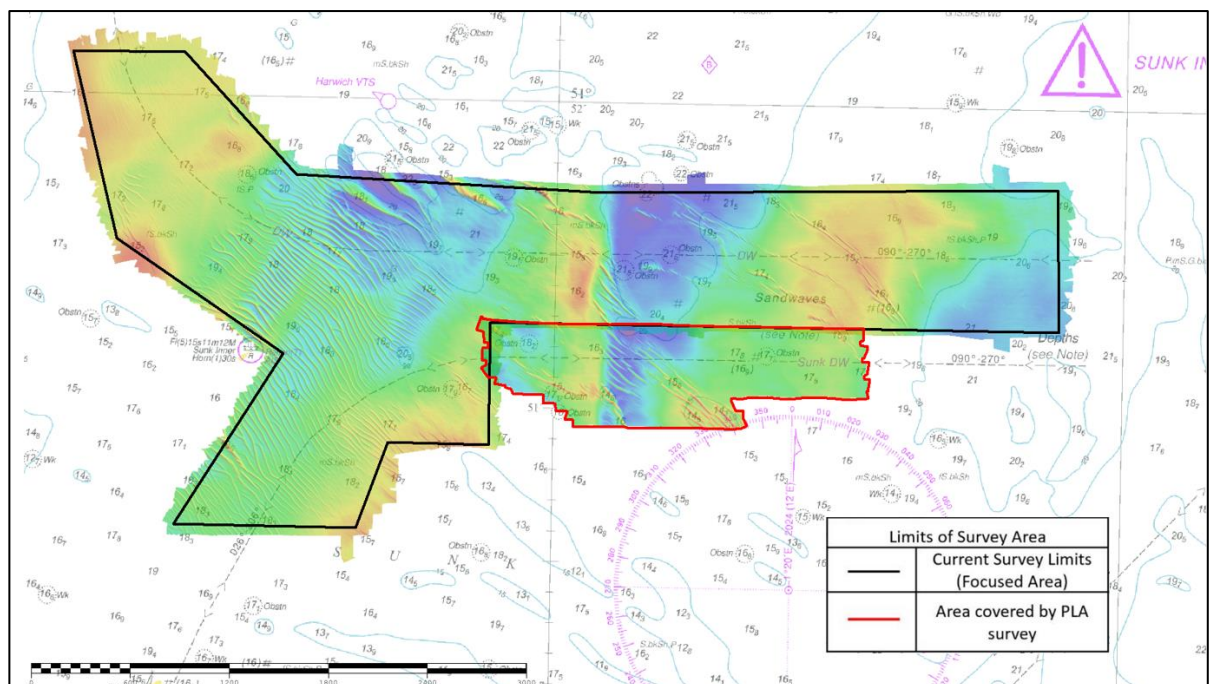


Figure 2b: 2024 TE3A survey data with HI polygon (black) and most recent 2024 Port of London Authority (PLA) survey data (outlined in red) overlaid on BA Chart 2692

3. REFERENCE SURVEY DETAIL

- 3.1 The previous focused surveys HI1831, HI1739, HI1691 and HI1641 were conducted annually as part of the Routine Resurvey Programme between 2023 and 2019. The latest full survey HI1763 was conducted in June 2022.
- 3.2 The Report of Survey for this survey is available upon request and the validated bathymetric surfaces are available to download from the Admiralty Marine Data Portal.

4. NEW SURVEY DETAIL

- 4.1 The latest focused survey, HI1861, was surveyed in July 2024 as part of the 2024 Routine Resurvey Programme.
- 4.2 The Report of Survey for this survey is available upon request and the validated bathymetric surfaces are available to download from the Admiralty Marine Data Portal.

5. DESCRIPTION OF RECENT BATHYMETRIC CHANGE

- 5.1 Figure 3 shows that the Harwich DW route controlling depth in the 2024 survey is 15.5m, which has shallowed by 0.3m since the 2023 survey and 1.5m since the 2019 survey. This is approximately 1.7km west of the 2023 controlling depth of 15.7m. The Sunk DW route significant depth has maintained the same depth of 16.7m across the 2024 and 2023 surveys, however it has shallowed from 17.4m in 2019.
- 5.2 The difference surfaces in Figure 4 and Figure 5 show prevalent sand wave migration, the main cause of the changeable depths across the survey area. The arrows demonstrate sand waves exhibiting a convergent migration trend, with sand waves to the north of the survey area shifting southwest and sand waves to the south shifting northeast. Eastern sand waves move more independently, with each sand wave movement varying. Movement typically is around 10-20m per year although some sand waves show movement up to 100m. This movement magnitude and direction is consistent with previous years.
- 5.3 Figures 4a, 4b show that most sand waves generally maintained their height within 1m across areas with the largest bathymetric changes in Figure 4, although a smaller proportion of sand waves show more significant shallowing or deepening of their crests.
- 5.4 Figure 6 shows a colour banded depth plot of the survey area, showing larger changes caused by sand wave migration along the central survey region across the Harwich DW route, with greater stability across the Sunk DW route. The bathymetry east and west of the survey area remain very stable.
- 5.5 Consistent with previous years surveys at this location, the primary cause of bathymetric variation is sand wave migration. The largest change as shown in Figure 6 is the shoaling of a sand wave north of the Harwich DW route by 1.0m from 16.7m to 15.7m. However, the most significant changes, as shown in Figure 3, are the shoaling of the Harwich DW route controlling depth (see section 5.1), and the shoaling of a sand wave 300m north of the Harwich DW Route to 15.1m from 15.9m (2023) and 16.9m (2019).

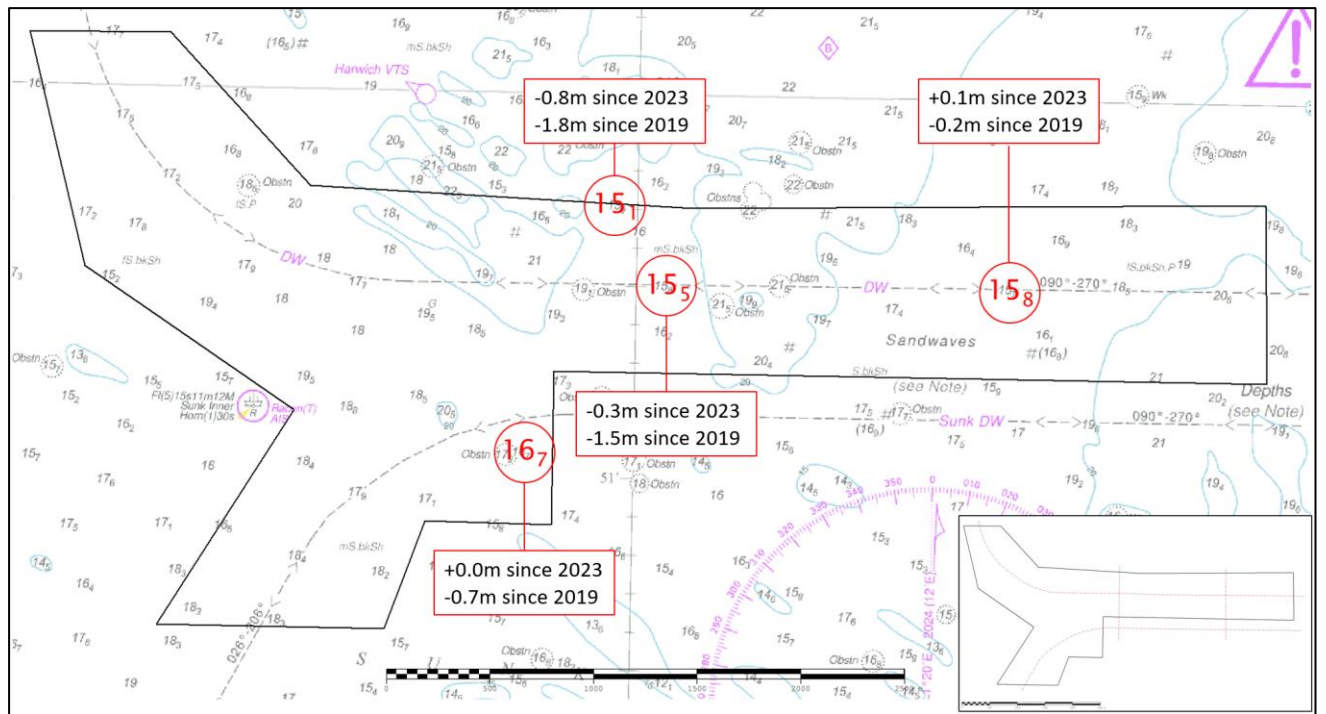


Figure 3: Controlling and significant depth soundings highlighted, overlaid on BA Chart 2692. Positive values represent deepening, negative values represent shoaling.

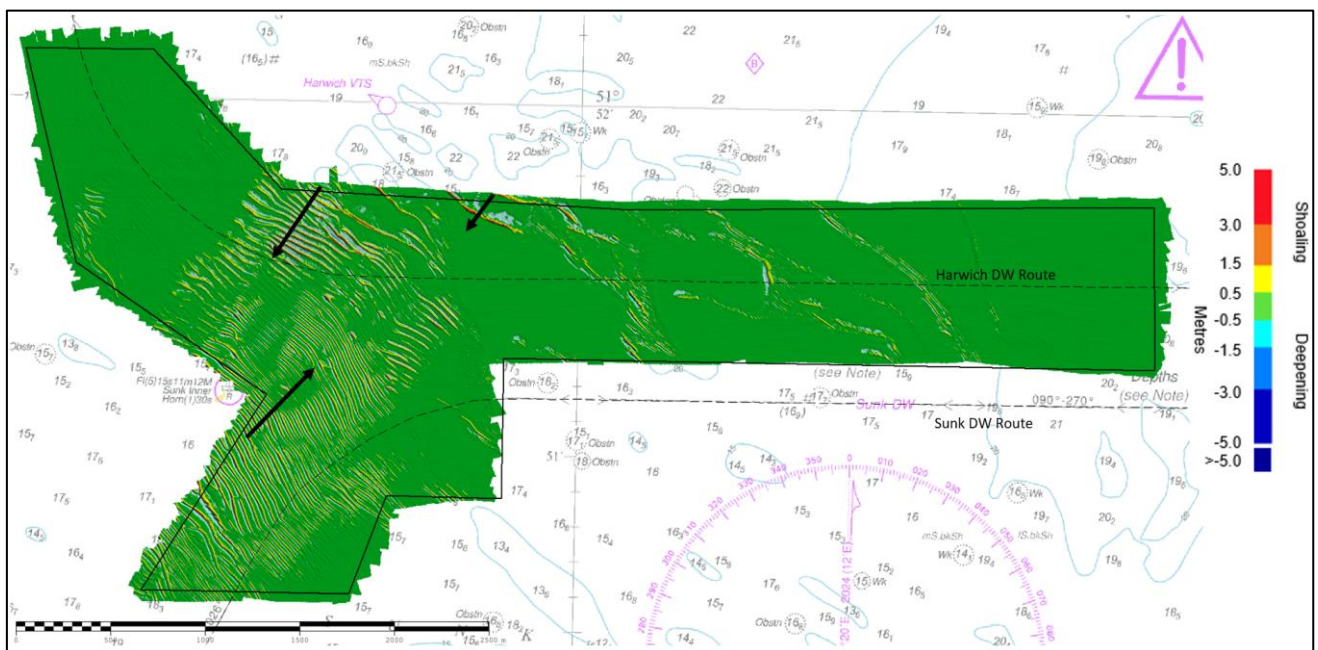


Figure 4: Difference surface showing bathymetric changes between the 2024 and 2023 surveys overlaid on BA Chart 2692 (Black arrows represent sandwave migration since 2023 survey)

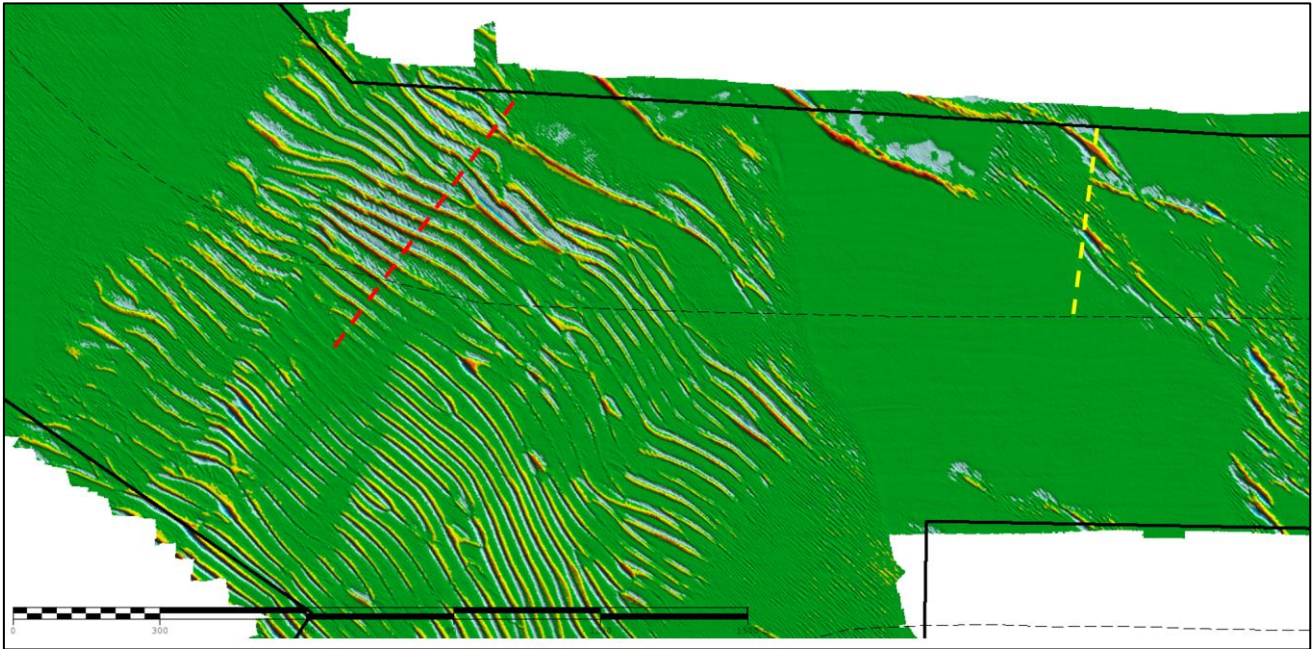


Figure 4a: Focused difference surface showing bathymetric changes between the 2024 and 2023 surveys (the red and yellow dashed lines indicate profile comparisons).

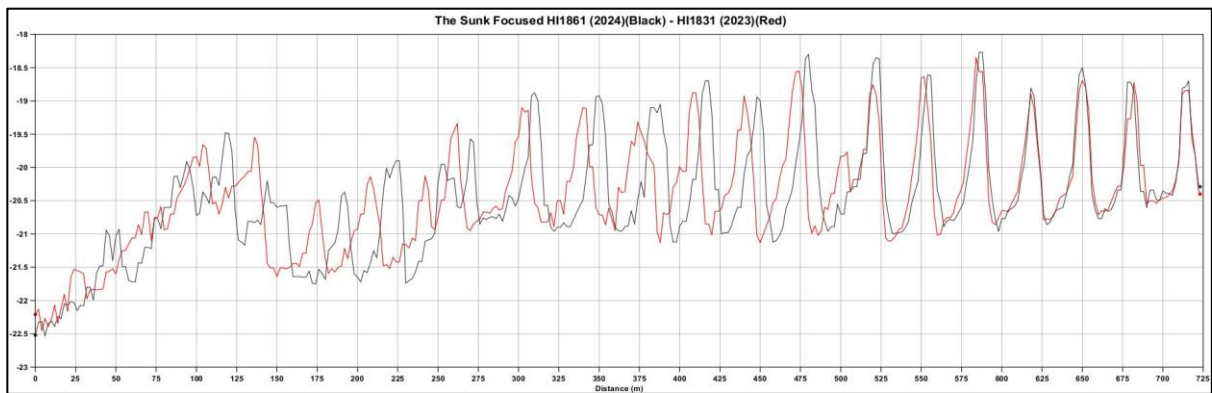


Figure 4b: Profile comparison between the 2024 and 2023 surveys. Profile location is denoted by red dashed line in Figure 4a.

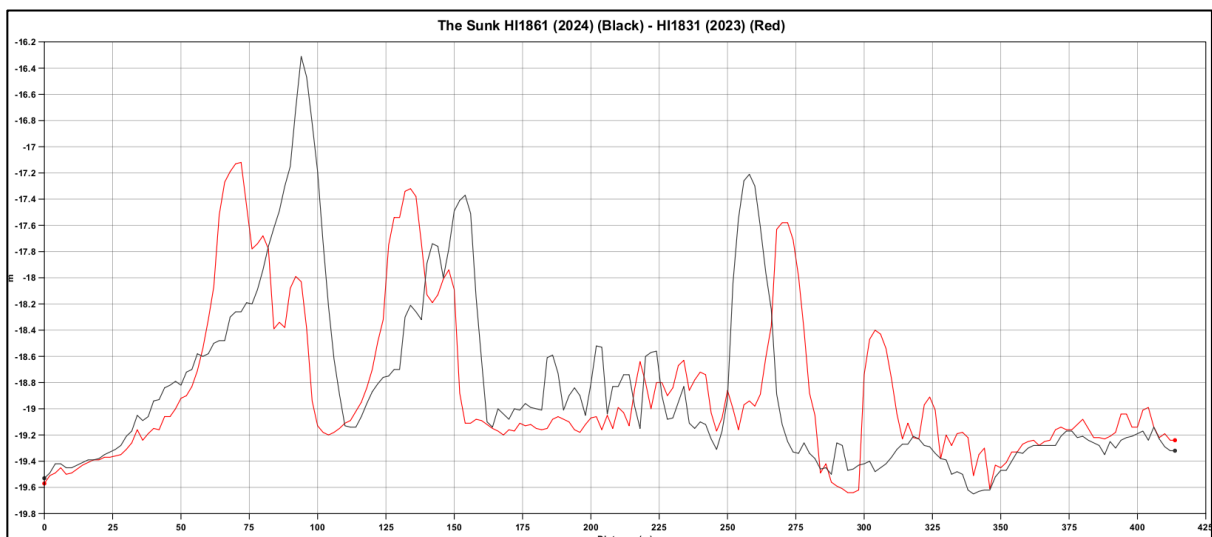


Figure 4c: Profile comparison between the 2024 and 2023 surveys. Profile location is denoted by yellow dashed line in Figure 4a.

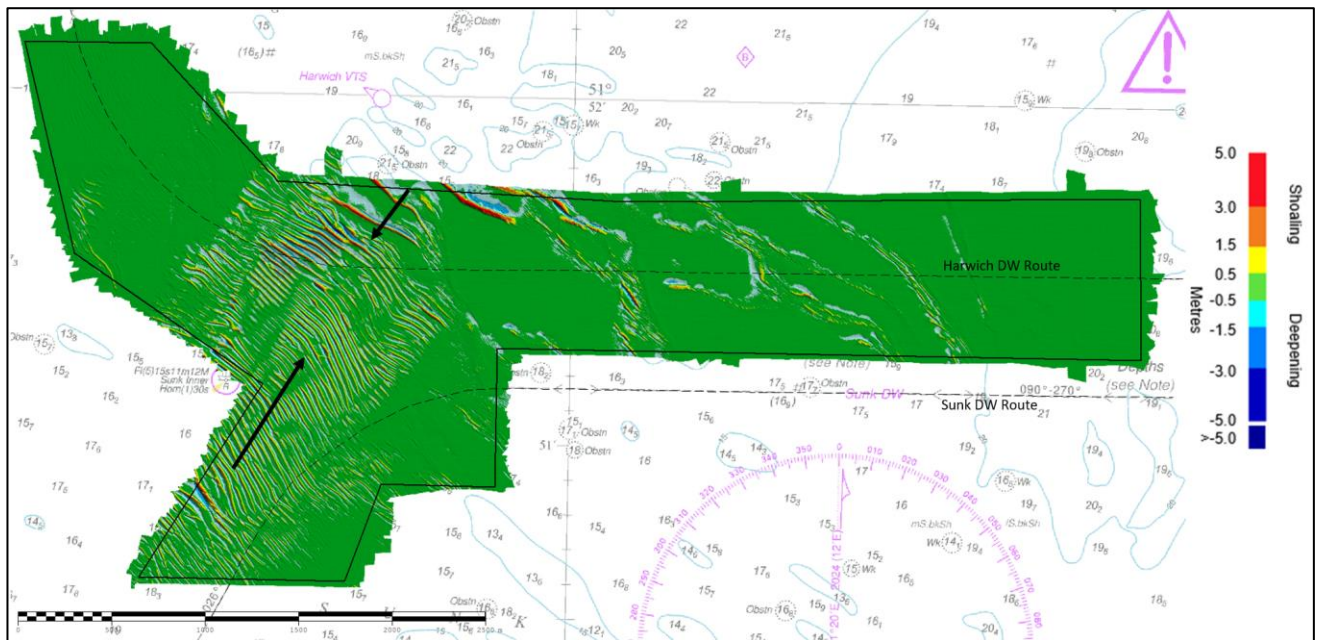


Figure 5: Difference surface showing bathymetric changes between the 2024 and 2022 surveys overlaid on BA Chart 2692 (Black arrows represent sandwave migration since 2023 survey)

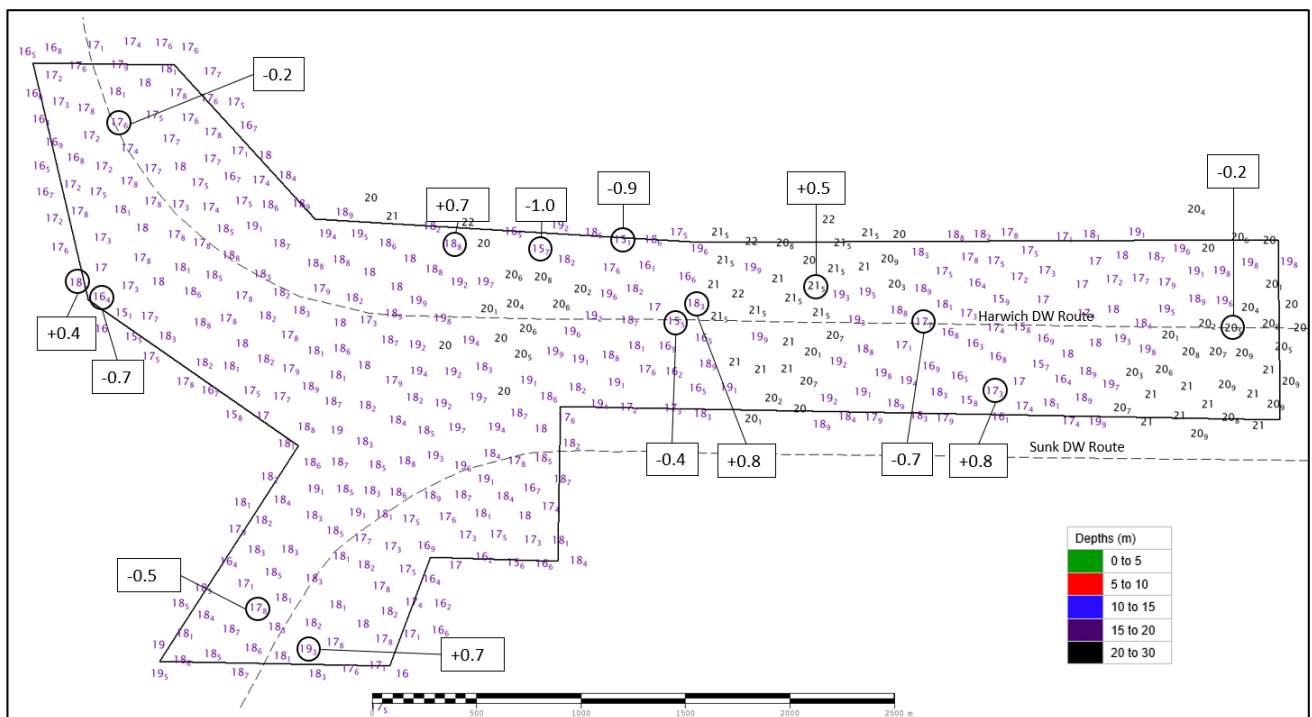


Figure 6: Colour banded depth plot from the 2024 survey with selected depth changes since the 2023 survey. Positive values (+) represent deepening. Negative values (-) represent shoaling.

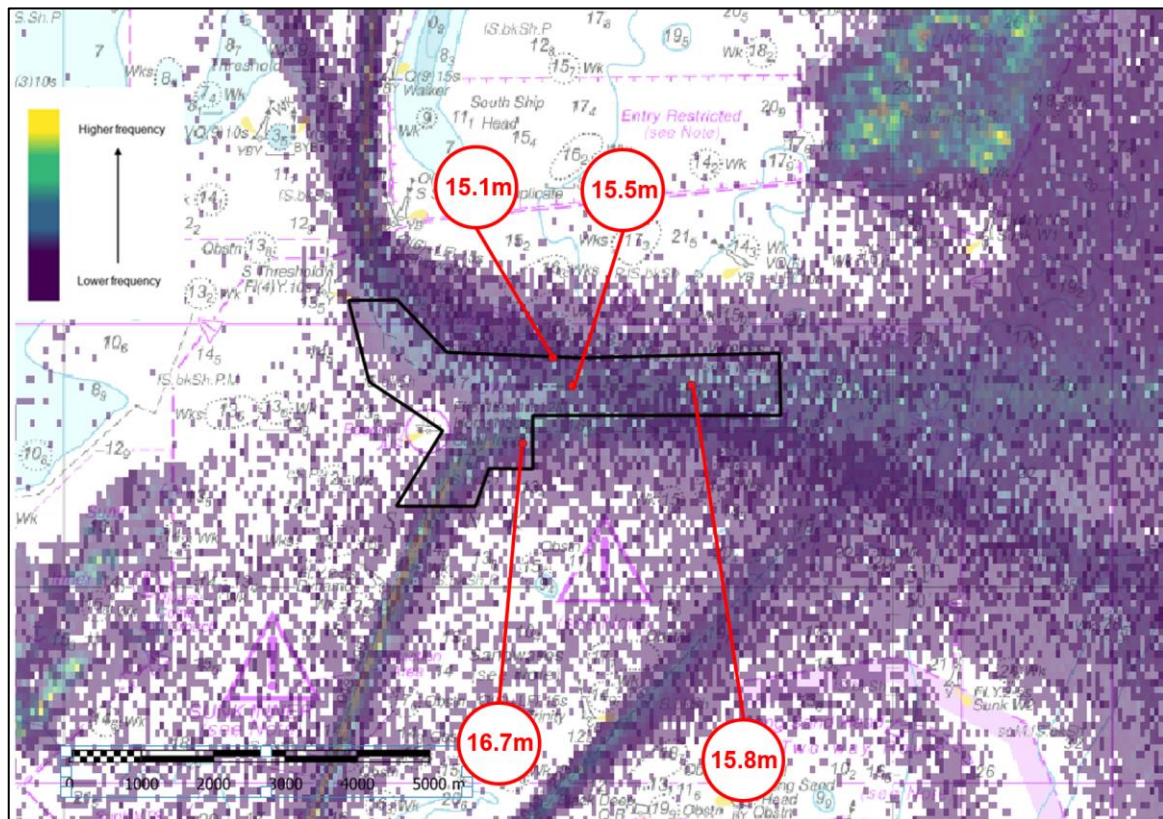


Figure 7: AIS ECDIS regulated tanker, passenger, and cargo vessel data from 2023 with Routine Resurvey TE3A 2024 and controlling depth soundings (m) overlaid.

6. RECOMMENDATIONS FOR FUTURE SURVEYS

Survey Interval

- 6.1 The prevalence of sand wave mobility and annual bathymetric variation across the Harwich DW route and Sunk DW route warrants the current interval of annual focused surveys and full surveys every 3 years to be maintained.

Survey Area

- 6.2 Due to the changeability of the seabed at this location the current full and focused limits should be retained to ensure that any sand wave movement does not threaten the navigational safety of the Harwich and Sunk DW routes. There are no further area recommendations resulting from this survey.