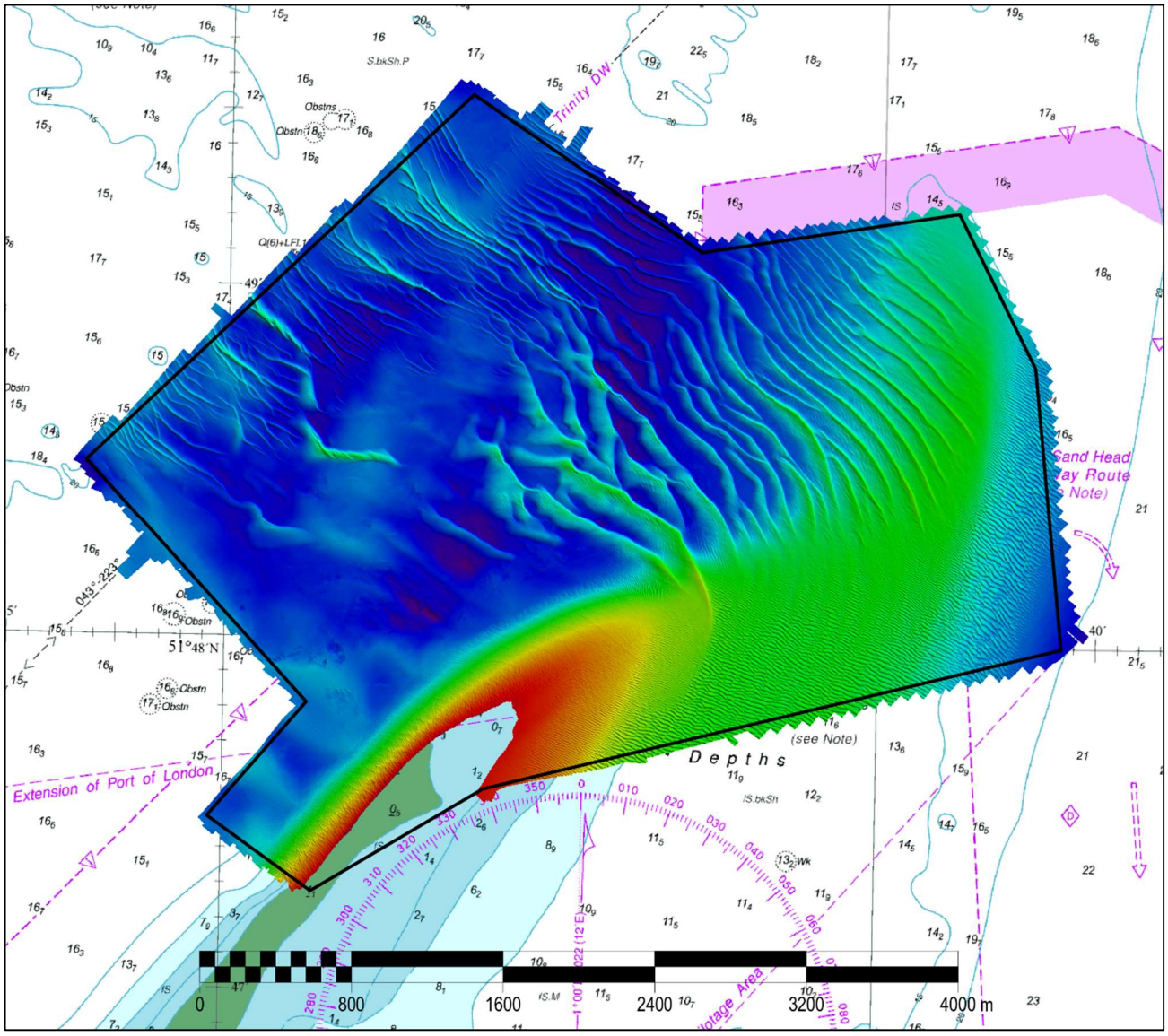
UK Hydrographic Office

THAMES ESTUARY
LONG SAND HEAD FOCUSED (TE5A)
2022 ASSESSMENT

An assessment of the 2022 hydrographic survey of the area TE5A: to monitor recent seabed movement; to identify any implications for shipping; and to make recommendations for future surveys.



CONTENTS

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.

No analysis of shipping traffic has been included within this report due to no AIS data being supplied by MCA.

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

LONG SAND HEAD FOCUSED (TE5A), 2022

1. SUMMARY

Changes Detected

1.1 Area TE5A has seen the continued northeast sediment migration seen in previous years. Sand waves in the Trinity Deep Water Route continue to migrate to the northeast at approximately 10 m annually. The sand wave field in the centre of the area is migrating northeast at speeds of up to 35 m annually. The movement of sediment within Long Sand Head is causing shoaling to the northeast and east of the sand bank, and additional shoaling in the northeast of the survey area. Additionally, the migration of Long Sand Head is causing deepening to the southwest of the sandbank.

1.2 Shoalest depths have moved slightly with small decreases in depth in some areas since the 2021 focused survey (Figure 3).

Reasons for Continuing to Resurvey the Area

1.3 Due to the proximity of the Trinity Deep Water Route (DWR) and the dynamic nature of the seabed, in addition to the continued north-east migration of Long Sand Head in the direction of the Long Sand Head Two Way Route, the survey area should continue to be resurveyed.

Recommendations

1.4 The focused survey intervals for TE5A should be continued at an annual interval. The full survey (TE5) interval should also be continued at a 3-yearly interval.

1.5 The survey limits for area TE5A should be extended to the northeast to cover the migration of the sandbank into the Long Sand Head Two Way Route in future.

1.6 The Survey Limits for Full Area TE5 should be extended to cover the extents of the focused TE5A survey.

2. LOCATION

2.1 Survey interval at time of resurvey: 1 year (3 years for full area – TE5).

2.2 Area Covered: 13.3 km^2

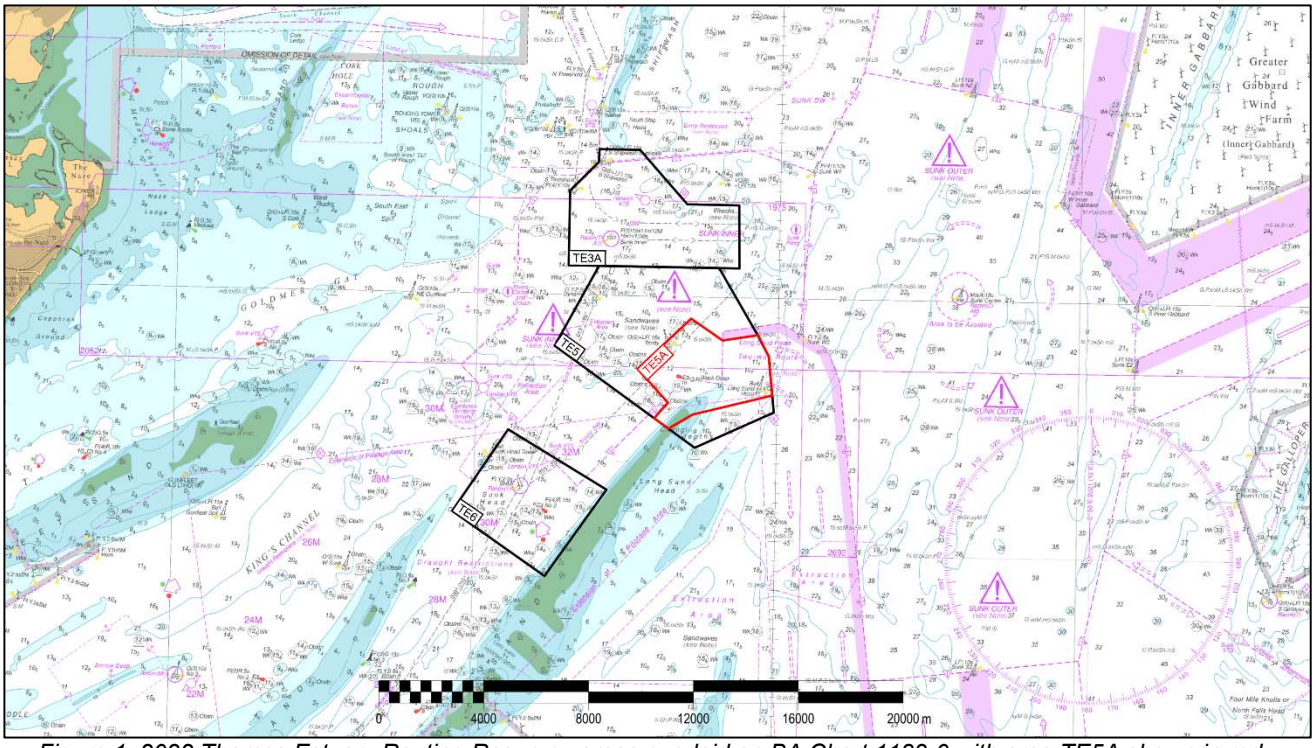


Figure 1: 2022 Thames Estuary Routine Resurvey areas overlaid on BA Chart 1183-0 with area TE5A shown in red.

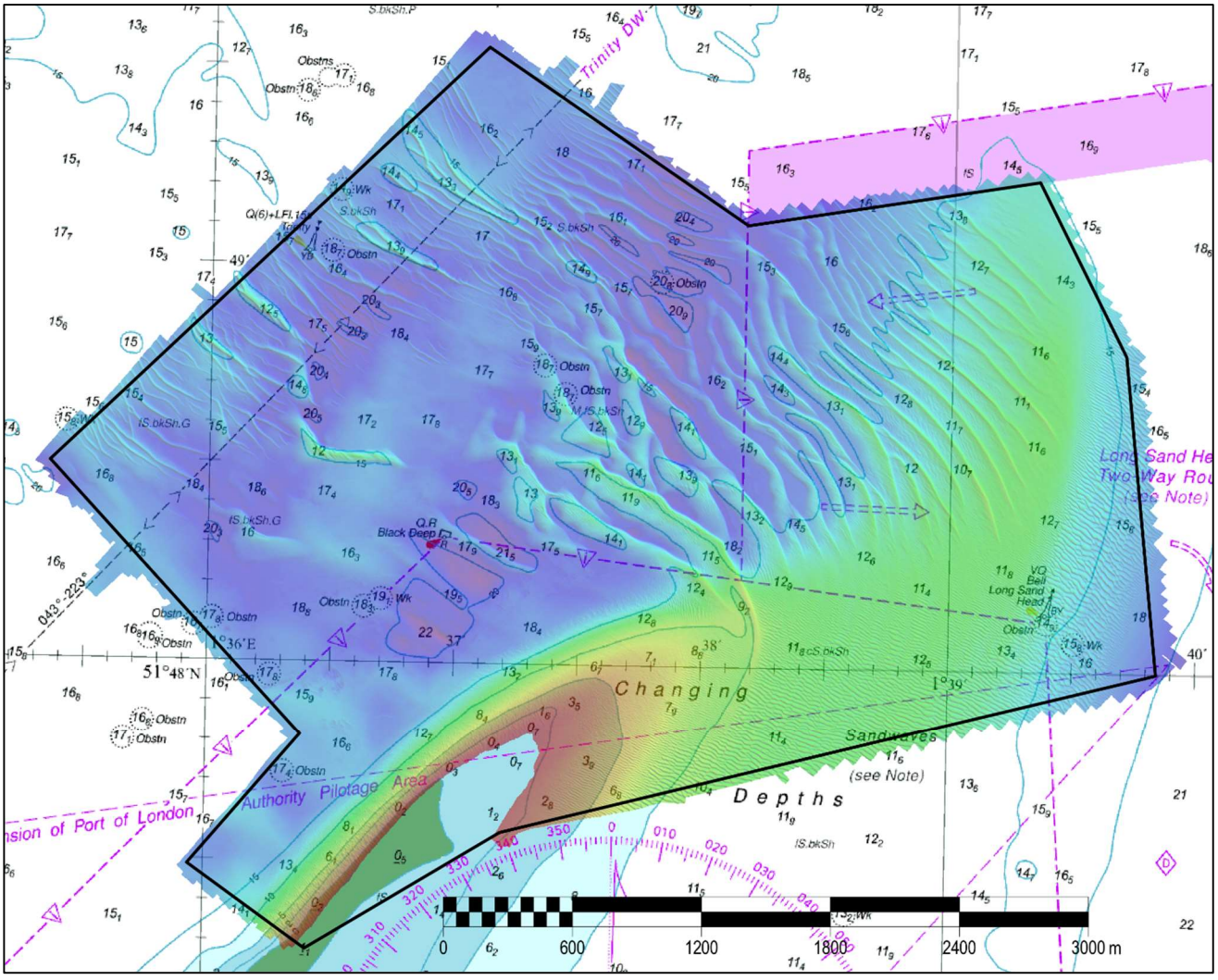


Figure 2: 2022 survey data overlaid on BA Chart 2692-0.

3. REFERENCE SURVEY DETAIL

3.1 The previous focused survey of area TE5A was conducted as part of the 2021 CHP Routine Resurvey Programme; HI1640 was surveyed in September and October 2021. The previous full surveys (TE5) were conducted in August and September 2020 as part of HI1692 and in November and December 2018 as part of HI1615. An additional focused survey of TE5A was conducted in August 2019 as part of HI1642.

3.2 The Report of Survey for this survey is available upon request from the UKHO and the validated bathymetric surfaces are available to download from the Admiralty Marine Data Portal.

4. NEW SURVEY DETAIL

4.1 HI1764 was surveyed in September and October 2022.

4.2 The Report of Survey for this survey is available upon request from the UKHO and the validated bathymetric surfaces are available to download from the Admiralty Marine Data Portal.

5. DESCRIPTION OF RECENT BATHYMETRIC CHANGE

A generalised description of bathymetric changes is provided below. These changes are also illustrated in Figures 4–9.

5.1 Figure 3 shows the controlling depths in the 2022 survey. The shoalest depth along the Trinity DWR is 14.1 m, located on a sand wave feature which is migrating slowly to the northeast. The shoalest depth within the Long Sand Head Two-Way Route is 10.3 m and sits within Area 2 (marked on Figure 3).

5.2 The difference surfaces shown in Figures 4–7 show the annual changes between 2018 and 2022. These highlight that the sand wave fields in the centre of the survey area, and along the Trinity Deep Water Route, are migrating consistently to the northeast. In some areas the seabed has both shoaled and deepened by more than 5 m since 2018 as individual sand waves have migrated. However, the general depths of both sand wave areas have remained constant, with no evidence of substantial shoaling or deepening since 2018 (Figures 4–7). This pattern continues, and there is no substantial bathymetric change between 2021 and 2022 in these areas.

However, the movement of sediment associated with Long Sand Head has caused substantial changes in depth across large areas of TE5A. The seabed to the west of Long Sand Head has deepened by more 3 m since 2021 and by more than 5 m since 2018 (Figure 7 and 9). Areas to the northeast, east, and southeast of Long Sand Head have shoaled by up to 1 m since 2021, and by more than 3 m since 2018 in some areas (Figures 4–7 and Figure 9). This general shoaling pattern also extends along the southeast border of the sand wave field and along the northeast border of the survey area (Figures 4–7 and Figure 9).

5.3 Figure 8 shows the annual migration of the 10 and 20 m contours since 2021. These highlight that there is a continued general pattern of migration of sediment to the northeast through the survey area. Both Long Sand Head and the sand wave fields in the centre of TE5A are moving to the northeast at rates of up to 50 m per year.

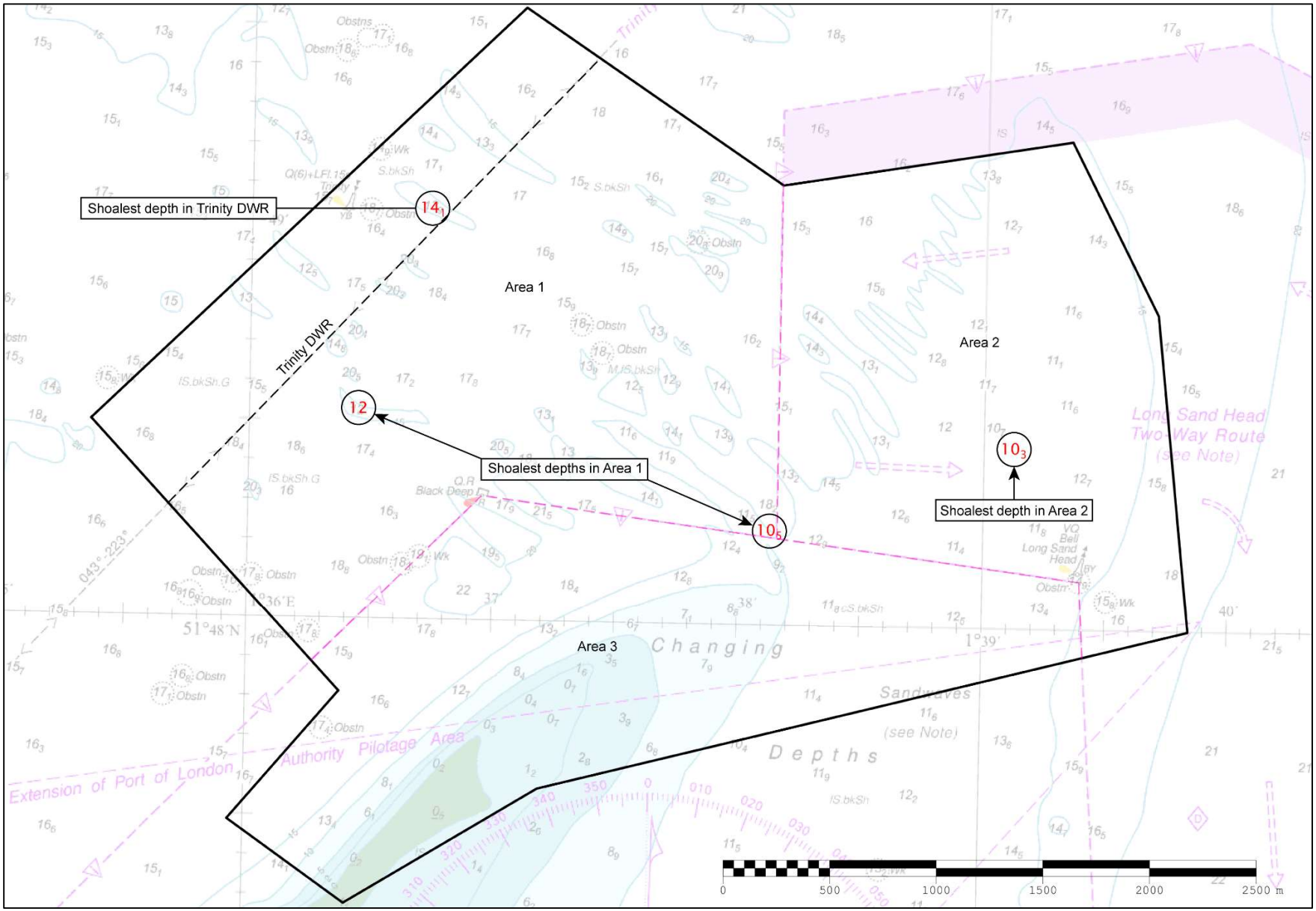


Figure 3: Controlling depth soundings highlighted, overlaid on BA Chart 2692-0. Controlling depths are not included for Area 3 as this is outside of designated shipping routes.

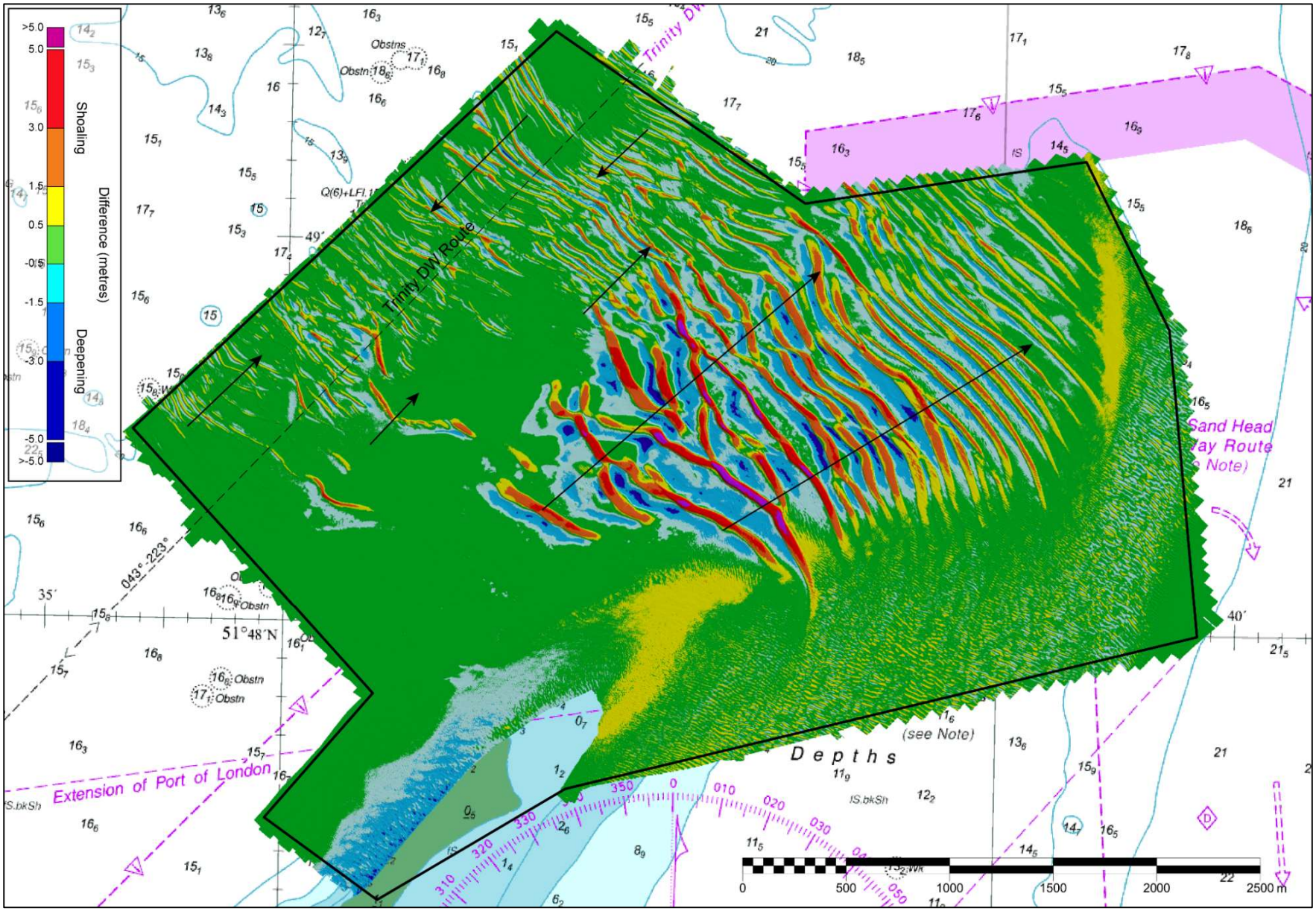


Figure 4: Difference surface showing bathymetric changes between the 2022 and 2021 surveys overlain on BA Chart 2692-0. Arrows show feature migration since 2021.

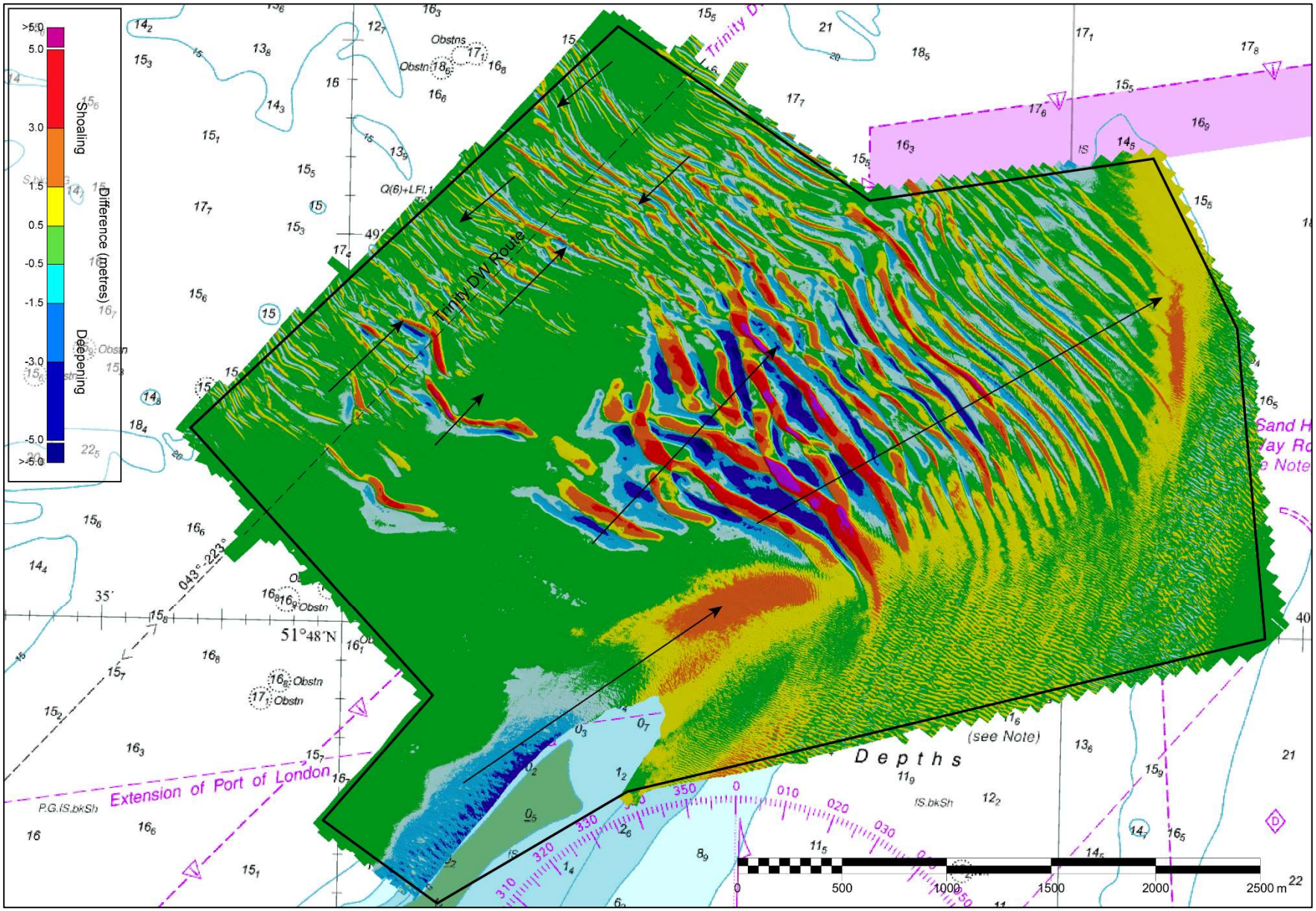


Figure 5: Difference surface showing bathymetric changes between the 2022 and 2020 surveys overlain on BA Chart 2692-0. Arrows show feature migration since 2020.

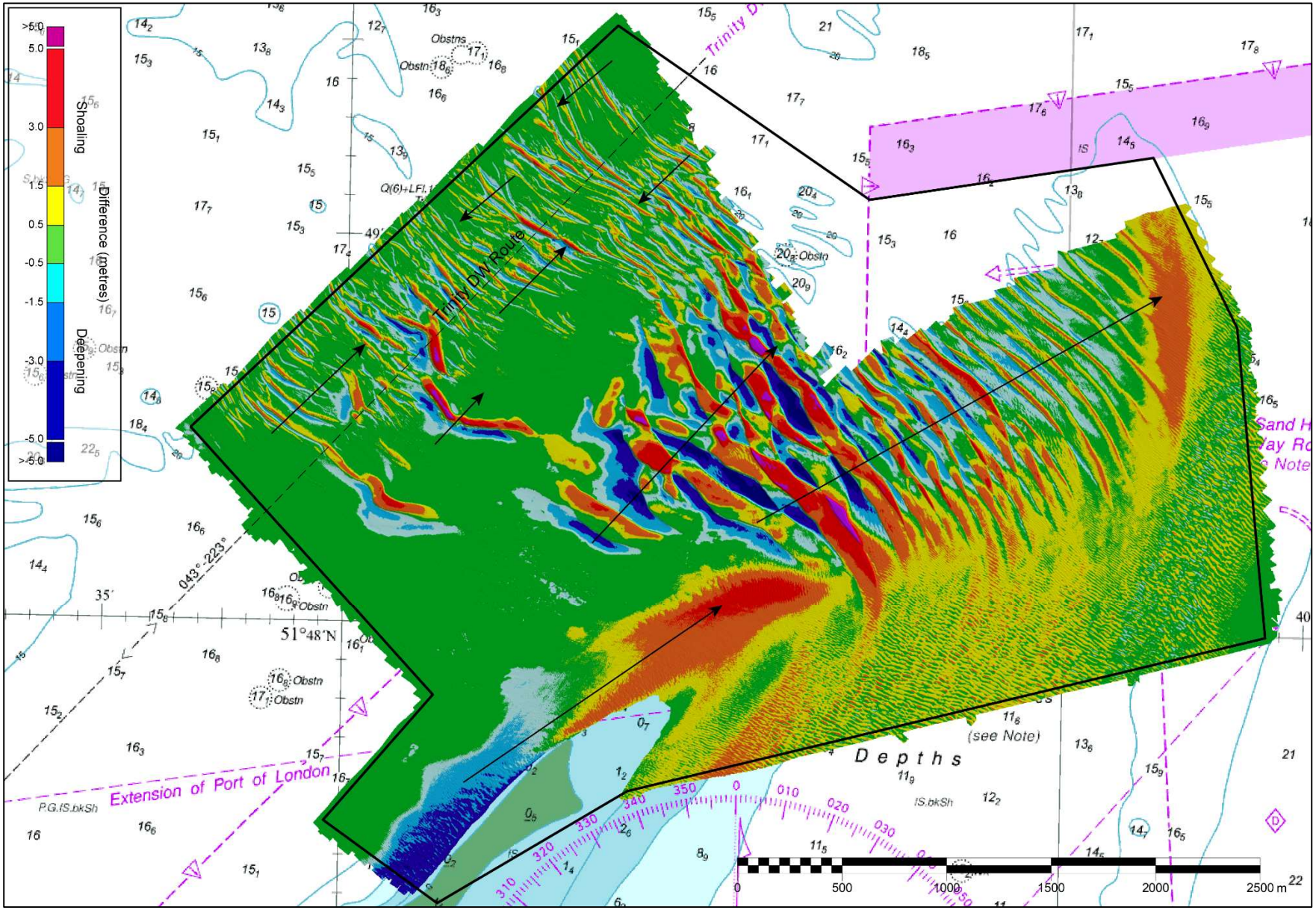


Figure 6: Difference surface showing bathymetric changes between the 2022 and 2019 surveys overlain on BA Chart 2692-0. Arrows show feature migration since 2019.

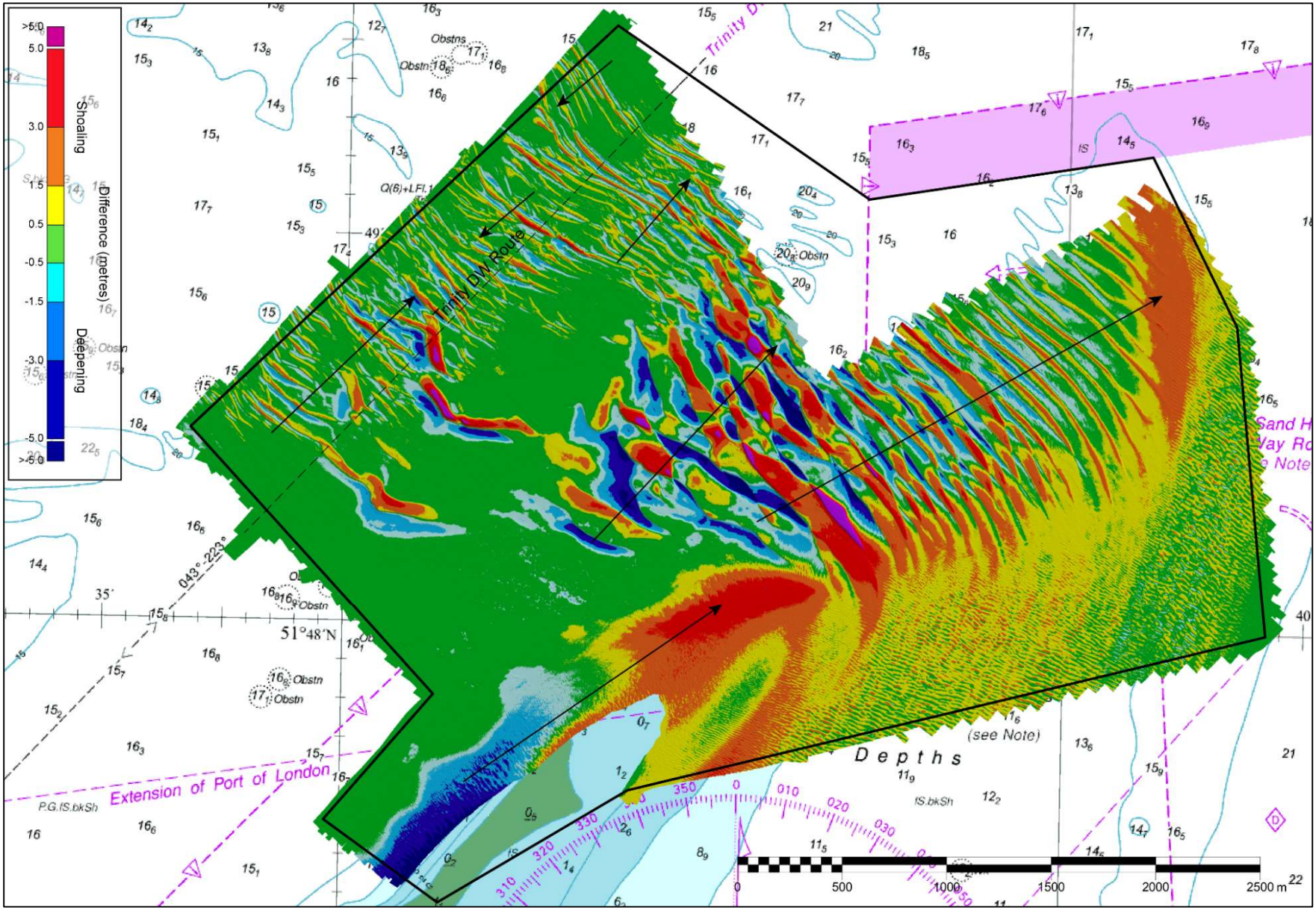


Figure 7: Difference surface showing bathymetric changes between the 2022 and 2018 surveys overlain on BA Chart 2692-0. Arrows show feature migration since 2018.

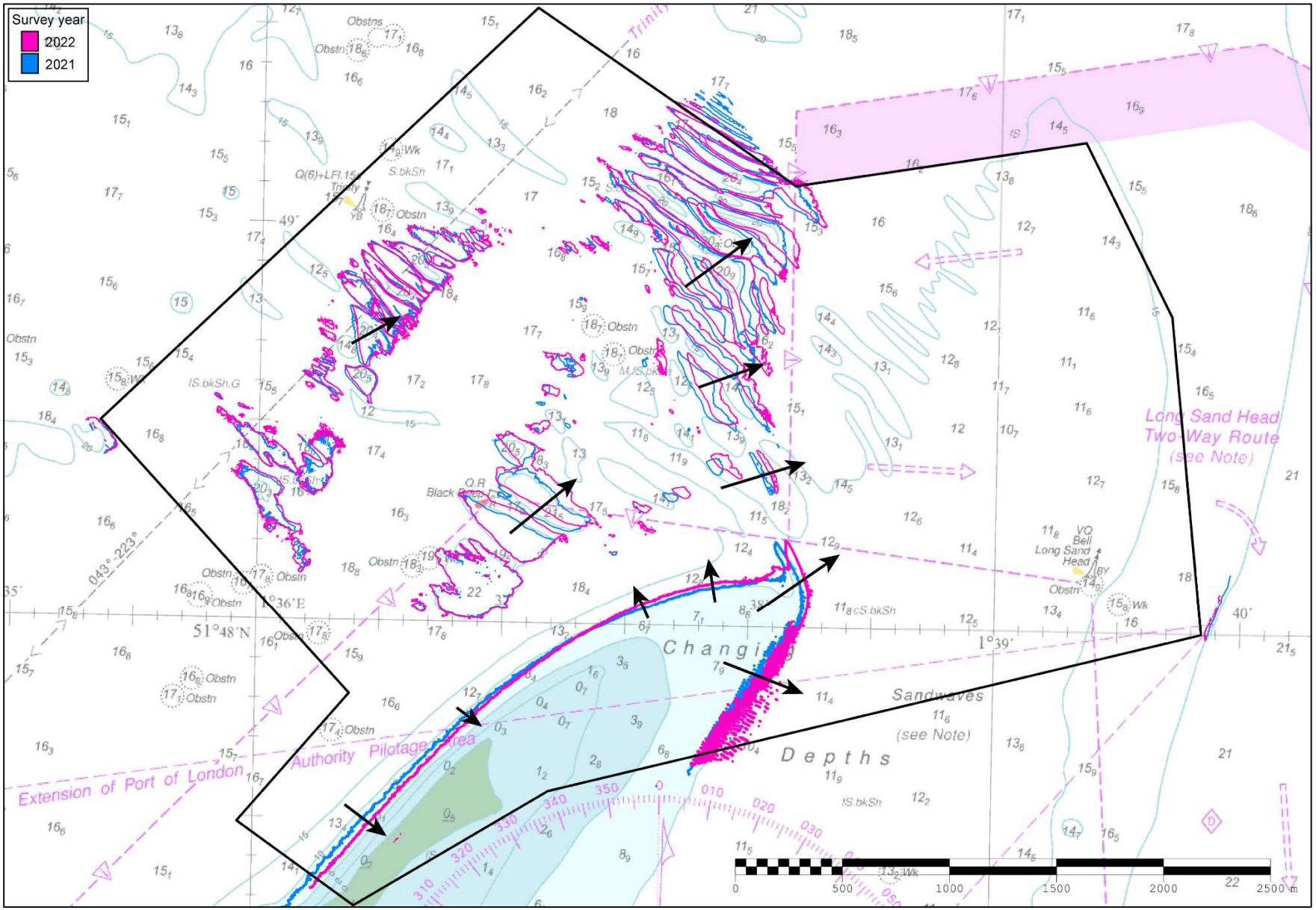


Figure 8: Contour plot showing changes in the 10 m and 20 m contours from 2021 to 2022. Black arrows show the direction of feature migration.

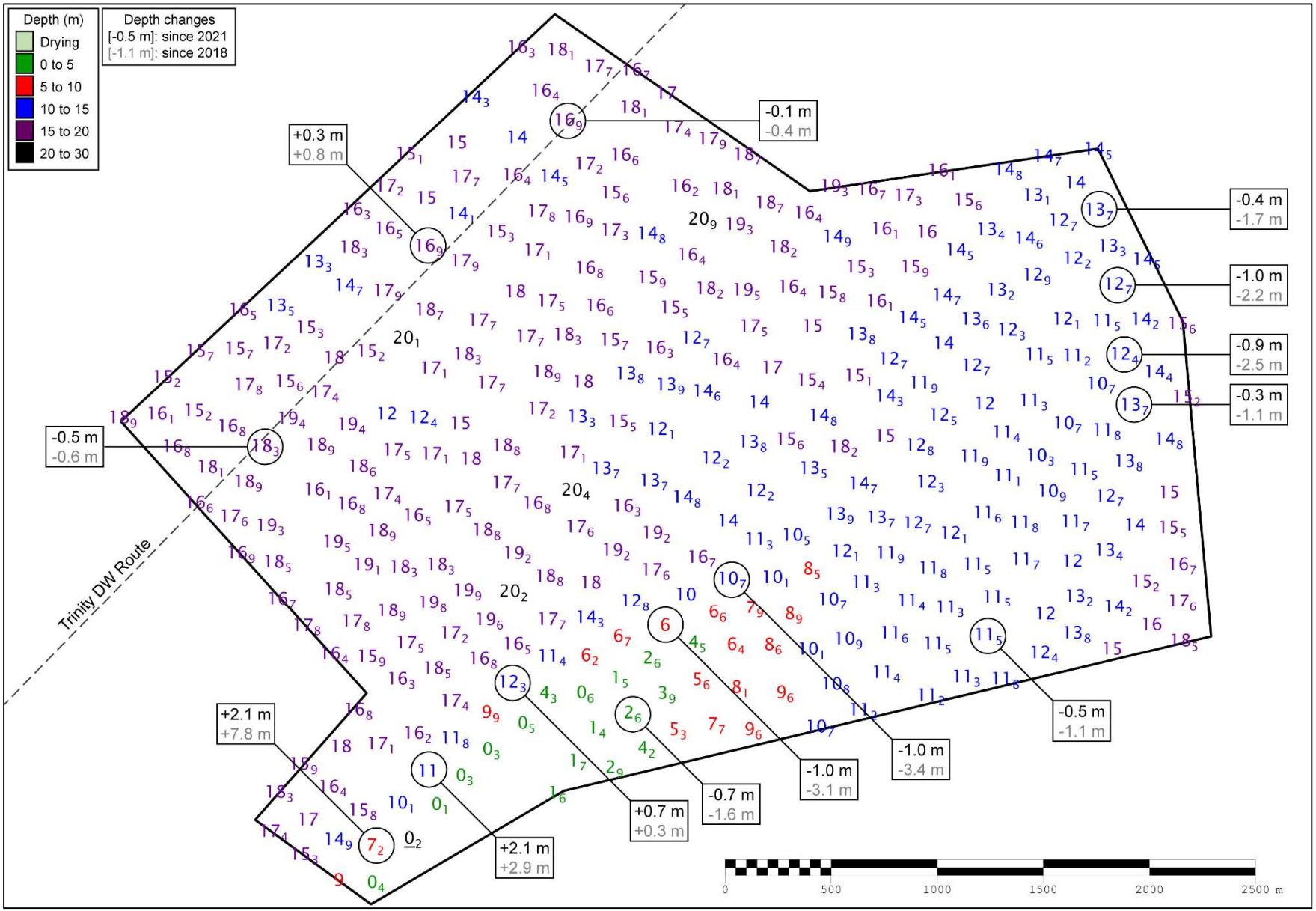


Figure 9: Colour banded depth plot from 2022 data. Selected depth changes since 2021 (black) and 2018 (grey). Positive values (+) show deepening. Negative values (-) show shoaling.

6. RECOMMENDATIONS FOR FUTURE SURVEYS

Survey Interval

6.1 Given the location of the area in relation to the DWR, and the draught of vessels navigating the area, TE5A should remain on the annual survey interval.

Survey Area

6.2 The survey area should be slightly expanded to the northeast. The area limits do not sufficiently cover sandbank migration within the Long Sand Head Two-Way Route, and this will become exacerbated in future. A large sand bank extending from Long Sand Head and centred on 51.814 N, 001.657 E, is migrating to the ENE at approximately 15 metres per year and is beginning to migrate beyond the bounds of the current survey area (see Figures 4–8 and Figure 9). A small extension (0.14 km^2/1.1%) to the survey area is recommended to capture the movement of this feature in future. The recommended extension is shown in Figure 10

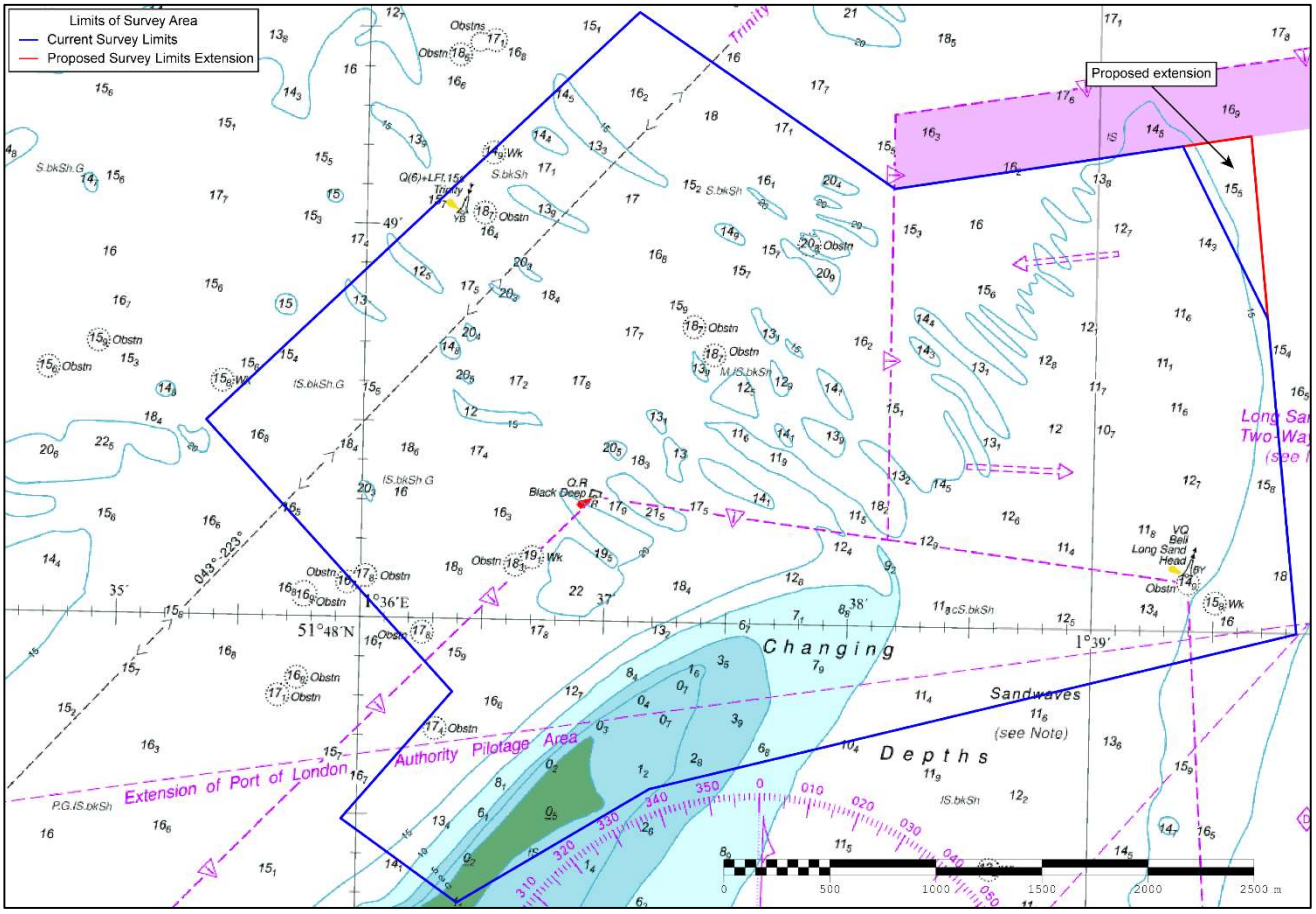


Figure 10: Recommended changes to survey limits of area TE5A. Existing survey limits shown in blue, proposed extension shown in red.

TE5A existing area: 12.78 km^2

TE5A proposed total area: 12.92 km^2

The coordinates of the recommended adjusted survey area limits for the annual focused area TE5A are given below:

Point	Latitude (D M.M)	Longitude (D M.M)
1	51 47.4876	1 35.9340
2	51 47.8152	1 36.3810
3	51 48.4950	1 35.3520
4	51 49.5498	1 37.1004
5	51 49.1130	1 38.1606
6	51 49.2636	1 39.6192
7	51 48.0000	1 39.8400
8	51 47.5764	1 37.1976
9	51 47.2794	1 36.4158

6.3 Changes in TE5A necessitate changes to the full area, TE5. It is recommended that survey area TE5 is expanded slightly (0.62 km^2/1.6%) to the northeast to fully encompass changes to TE5A (see Figure 11).

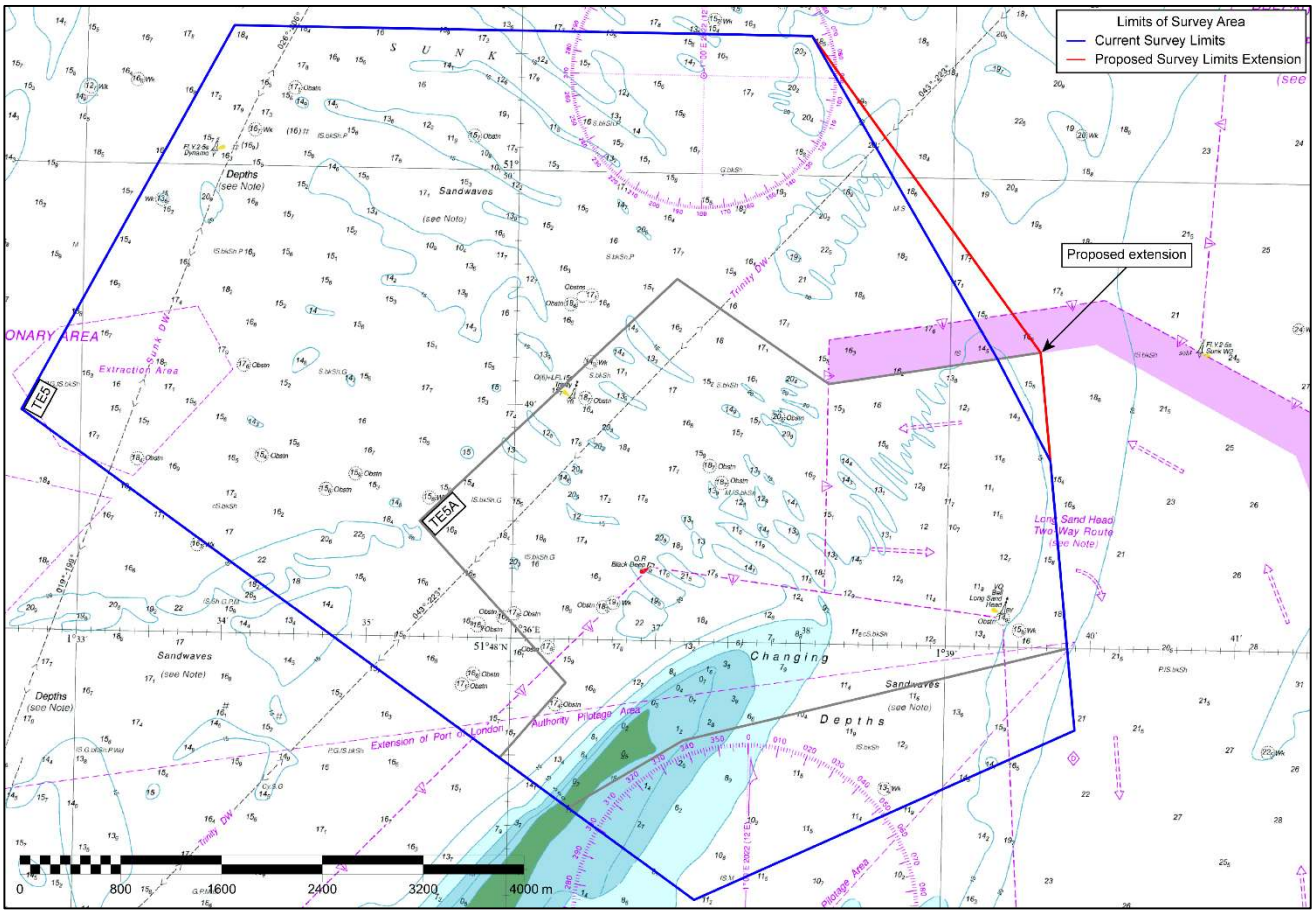


Figure 11: Recommended changes to survey limits of area TE5. Existing survey limits shown in blue, proposed extension shown in red. The TE5A survey limit is shown in grey.

The coordinates of the recommended adjusted survey area limits for the 3-yearly area TE5 are given below:

TE5 existing area: 38.64 km^2

TE5 proposed total area: 39.26 km^2

Point	Latitude (DD)	Longitude (DD)
1	51 50.5992	1 34.0080
2	51 50.5992	1 34.5834
3	51 50.5992	1 35.1570
4	51 50.5998	1 37.0290
5	51 50.5998	1 37.9998
6	51 49.2636	1 39.6192
7	51 47.6502	1 39.9000
8	51 46.8960	1 37.2960
9	51 48.9402	1 32.5884