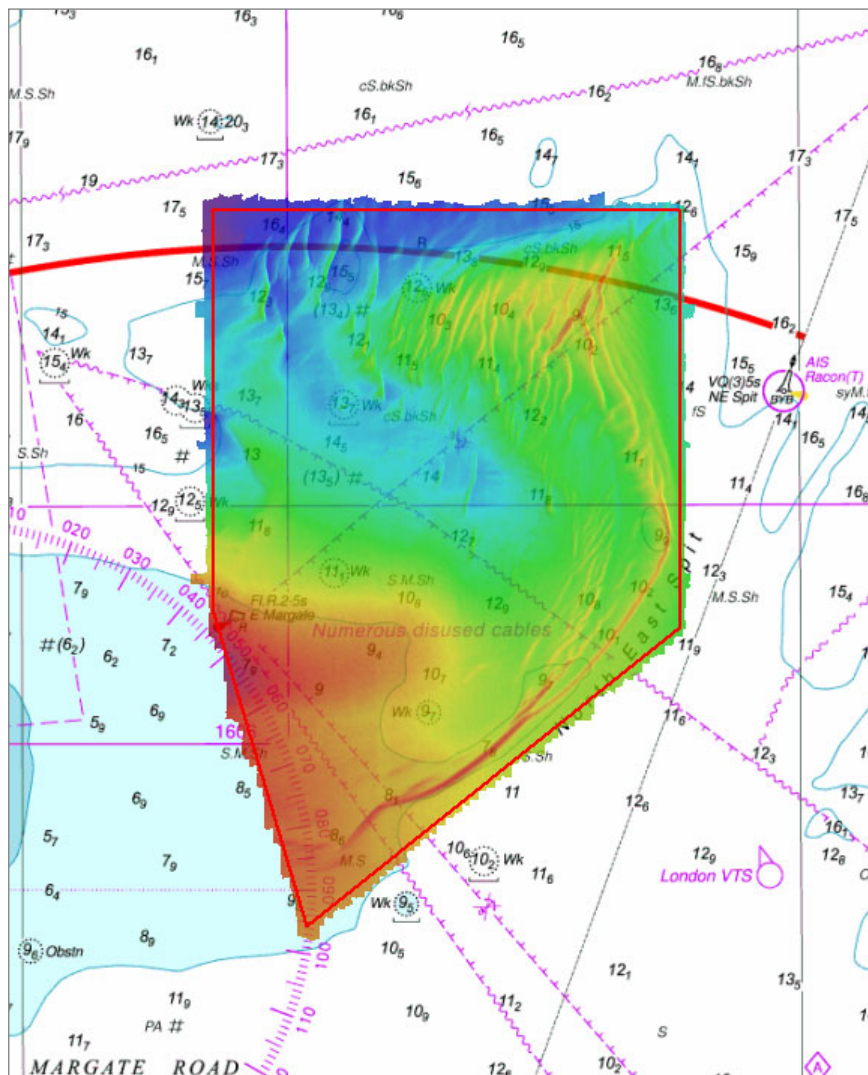




# THAMES ESTUARY NORTH EAST SPIT

## SUMMARY ASSESSMENT ON THE ANALYSIS OF ROUTINE RESURVEY AREA TE14 FROM THE 2013 SURVEY



# THAMES ESTUARY

## NORTH EAST SPIT

### Summary Assessment TE14/2013

A summary assessment of the 2013 hydrographic survey of the area: to monitor recent seabed movement; to identify any implications for shipping; and to make recommendations for future surveys.

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## 1. EXECUTIVE SUMMARY

### The Area and Recent Changes

- 1.1 TE14 covers North East Spit and the eastern end of Margate Sand and is due to be surveyed every 6 years under the Civil Hydrography programme. A 3 metre high sandwave marks much of the spit, which terminates in a characteristic triangular shoal area. The 2013 survey examined in this assessment is the second multibeam survey of the area under the programme.
- 1.2 Princes Channel (via the eastern end of Queens Channel) and Fisherman's Gat provide access to the Thames Estuary for vessels approaching from the east or southeast. North East Spit, with minimum depths of between 8.6 metres and 9.6 metres, is crossed by vessels approaching Princes Channel from the southeast.
- 1.3 Historical surveys indicate that the area is generally stable, with little change in controlling depths across North East Spit. The range in minimum depths in the shoal areas examined is no greater than 0.9 metres over the last 52 years. In the central area of the spit, the overlying sandwave has moved up to 40 metres eastwards since last surveyed and reflects an ongoing eastward migration of both this and many of the other sandwaves which cover the spit.
- 1.4 Depths over the eastern end of Margate Sand have increased slightly.

### Reasons for Continuing to Resurvey the Area

- 1.5 North East Spit and the eastern end of Margate Sand are crossed by vessels bound to or from Princes Channel (via Queens Channel). Some vessel drafts are close to the charted depth and the following areas need routinely re-surveying:
  - the shoal sandwaves delimiting North East Spit, as currently defined by the 10 metre contour;
  - the far eastern end of Margate Sand as marked by East Margate buoy.

### Recommendations

- 1.6 The limited variability in the area supports an extended survey interval; however, considering shipping draught and density in the area, it is recommended that the area limits and frequency remain unchanged.

## 2. INTRODUCTION

- 2.1 This Assessment is produced by the United Kingdom Hydrographic Office (UKHO) for the Maritime and Coastguard Agency (MCA).
- 2.2 Analysis of the Routine Resurvey Areas forms part of the Civil Hydrography Programme and the reports are made available to members of the Committee On Shipping Hydrography (COSH) through the UKHO website, before being 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).

### **3. HISTORY**

- 3.1 Area TE14 was established in 1980, following a comprehensive review of routine resurvey activities in the Thames Estuary. Much of the area was formerly covered by area O, which was re-surveyed every 3 years. Based on recommendations resulting from analysis of that area, the survey interval for TE14 was also set at 3 years.
- 3.2 Following recommendations made in reports produced in 1982 and 1985, the survey interval was relaxed to the current 6 year interval. The last report examined the 2007 survey and supported the frequency with reduced limits.

### **4. DESCRIPTION OF THE AREA**

- 4.1 There are two principal features within the area; these are the eastern extremity of Margate Sand and North East Spit, which extends eastwards and northwards in an arc from the eastern end of Margate Sand, terminating in a characteristic triangular shoal area. A sandwave, up to 3 metres high and symmetrical along most of its length, runs along the spit's crest and the head of the spit is overlaid with a more general area of sandwaves. Sandwaves lie to the west of North East Spit and megaripples cover much of area TE14.
- 4.2 Details of area TE14, including the survey history, are at [Annex A](#).

### **5. SHIPPING IN THE AREA**

- 5.1 The main access channel into the Thames Estuary, for vessels approaching from the east or southeast is Princes Channel (via the eastern end of Queens Channel) to the west of TE14, Fisherman's Gat to the north is also used but by fewer vessels. Vessels unable to use these channels due to their draft use a northern approach through Black Deep.
- 5.2 Sample AIS data at [Annex B](#) shows much of the area used by vessels, passing northeast of Margate buoy en-route to Princes Channel from the southeast and from the Margate Road anchorage area. Some vessels approaching Princes Channel from the east pass through the northern part of the area.
- 5.3 North East Spit, with a minimum depth of 9.6 metres in the north, provides controlling depths for the larger vessels using the area. The Ruling Depth is 7.9 metres within Princes Channel and 8.7 metres within Fisherman's Gat at Chart Datum.
- 5.4 Vessels reporting up to 14 metres draught have been observed in data in the north of the area, with vessels reporting around 10 metres found more generally across the area.

### **6. 2007 SURVEY DETAILS**

- 6.1 The multibeam survey was conducted from 17 May to 2 June, in conjunction with area TE13 (Outer Tongue). Data gathering in area TE14 was largely completed over 11 days.
- 6.2 Weather in the area remained good throughout the survey period, with predominantly gentle or moderate breezes and a smooth sea state.
- 6.3 The Survey achieved IHO Order 1 standard.

## 7. 2013 SURVEY DETAILS

- 7.1 The survey was conducted from 12 October to 12 November, in conjunction with other areas and with numerous periods of weather standby; conducting surveying in TE14 on 9 days.
- 7.2 Weather conditions during survey work were generally slight to moderate.
- 7.3 In both surveys, the Vertical Offshore Reference Frame (VORF) and GPS heighting were used to reduce depths to Chart Datum.
- 7.4 The Survey achieved IHO Order 1a standard. The survey overlaid over chart 1607 is shown at [Annex C](#). A difference surface created from the two surveys shows a mean difference of 0.07 metres in the relatively stable central part of TE14, indicating good agreement between the surveys.

## 8. DESCRIPTION OF RECENT BATHYMETRIC CHANGE

- 8.1 Colour banded depth plots of the 2007 and 2012 surveys are at [Annexes D](#) and [E](#) respectively and allow a comparison of depth values.
- 8.2 A variability plot, at [Annex F](#), shows the changes in depth between the 2007 and 2012 surveys. Comparison plots of the 10 and 12.5 metre contours are at [Annex G](#) and [H](#).
- 8.3 Depths in the area are generally similar to those found in the 2007 survey. Differences over notable shoal areas are shown in [Annex E](#). Of the four areas compared, three have deepened and one shoaled by 0.2 metres. The ridge marking North East Spit has migrated up to 40 metres eastwards. Examination of the 10 metre contour indicates that Margate Sand has receded slightly.
- 8.4 Evidence from historical surveys, dating back to 1961 in two areas (1 & 2 in [Annex E](#) and table 8.1) and 1983 in two other areas (3 & 4 in [Annex E](#) and table 8.1) indicates that the area is generally stable, with little change in controlling depths across North East Spit. The depths are plotted in table 8.1 and show that in the individual shoal areas examined the minimum depths observed have an overall range no greater than 0.9 metres.

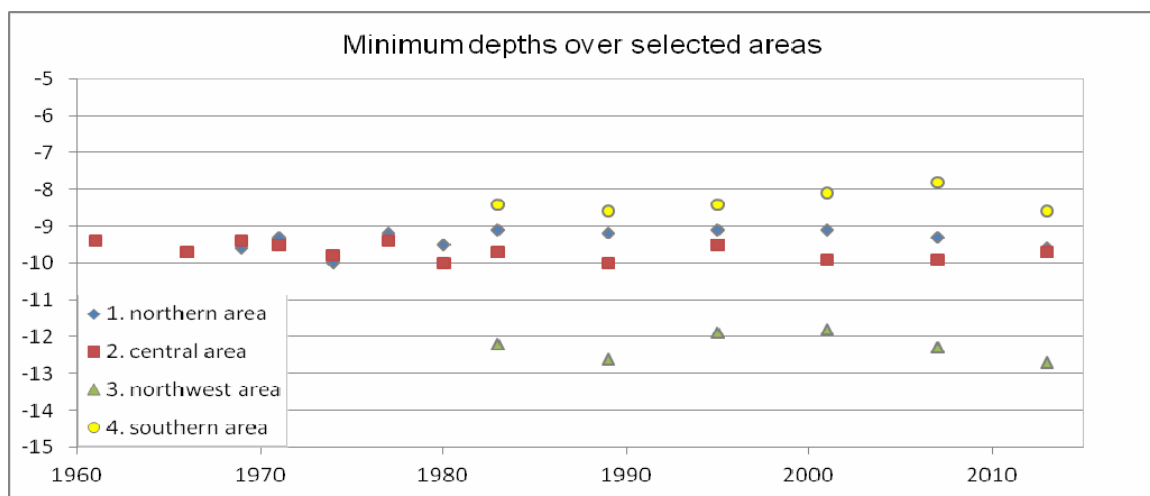


Table 8.1: Minimum depths over North East Spit (see Annex E for locations)

## **9. IMPLICATIONS FOR SHIPPING**

- 9.1 Depths across the area are generally similar to those found in the 2007 survey and there are no changes which would be of potential concern to shipping. Depths remain deeper than the Ruling Depth of 7.9 metres in Princes Channel to the west.
- 9.2 As the deepest draught ships crossing North East Spit only do so with the aid of the tide, changes to the minimum depths would be of potential concern.

## **10. RECOMMENDATIONS FOR FUTURE SURVEYS**

- 10.1 Minimum depths on the overlying features of North East Spit have changed little over the last 52 years, but given their significance to shipping using the area, and ongoing migration of the features, the area should continue to be resurveyed.
- 10.2 The limited variability in the area supports an extended survey interval; however, considering shipping draught and density in the area, it is recommended that the area limits and frequency remain unchanged.

AREA SPECIFICATIONS  
(Including Survey History)

**REGION:** Thames Estuary    **NAME:** North East Spit    **AREA:** TE14

**LIMITS:**

A	51.487°N	1.412°E
B	51.487°N	1.497°E
C	51.430°N	1.496°E
D	51.430°N	1.459°E
E	51.426°N	1.459°E
F	51.426°N	1.434°E
G	51.431°N	1.434°E
H	51.431°N	1.426°E

Area co-ordinates are referred to WGS84
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**AREA SIZE:** 10.17 SQ NM (34.89 SQ km)

**SURVEY INTERVAL:** 6 yr

**SURVEYS:** (conducted at 1:25,000 scale (not applicable to multibeam surveys))

Year	Survey	File Ref	Data	Year	Survey	File Ref	Data
1974	K6913	H4024/86	s.t.	1995	M2527	HH090/657/01	s.d.
1977	K7858		s.t.d.	2001	M3605	HH090/939/01	s.t.d.
1980	K8408		s.t.	2007	M4655	SDRA2007-7603	m
1983	K9302	H2051/82	s.t.	2013	HI1433	-	m
1989	M1479	H3936/88	s.t.d.				

**KEY:** s = sonar sweep, t = seabed texture tracing, d = digital data, m = multibeam digital data

**REPORTS:** 1982 Latest Survey included K8408 (H3911/80 dtd 22/01/82).  
1985 Latest Survey included K9302 (H0423/85).  
2001 Latest Survey included M2527 (HH145/010/045-01 E3).

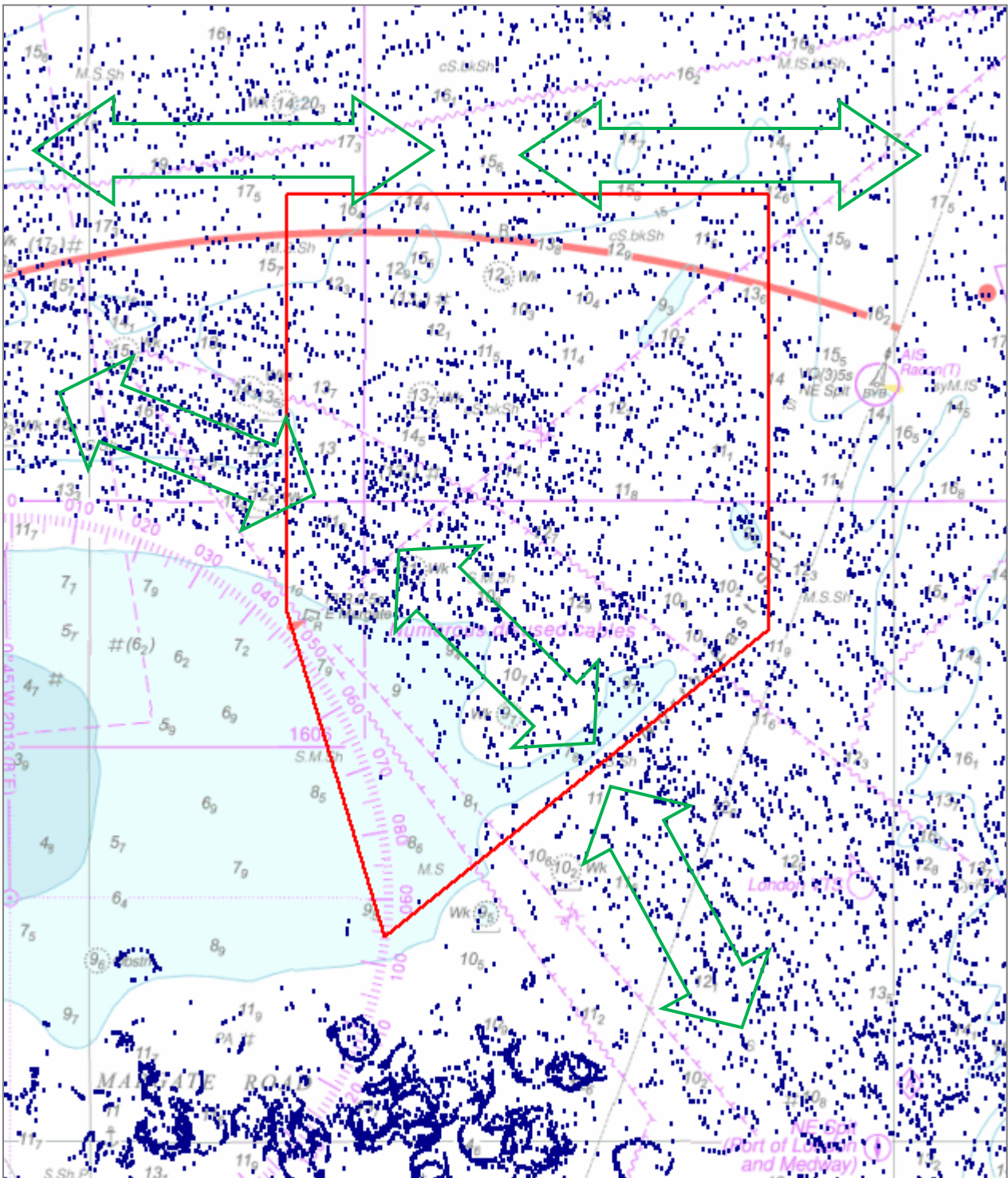
**ASSESSMENTS:** 1995  
2002 Latest Survey included M3605

**REMARKS:** 1977 Report on old area O (no reference).  
1980 Area 14 established. Part of old area O (H3911/80).  
2001 Area enlarged, due to TE16 being closed. See Report March 2001.

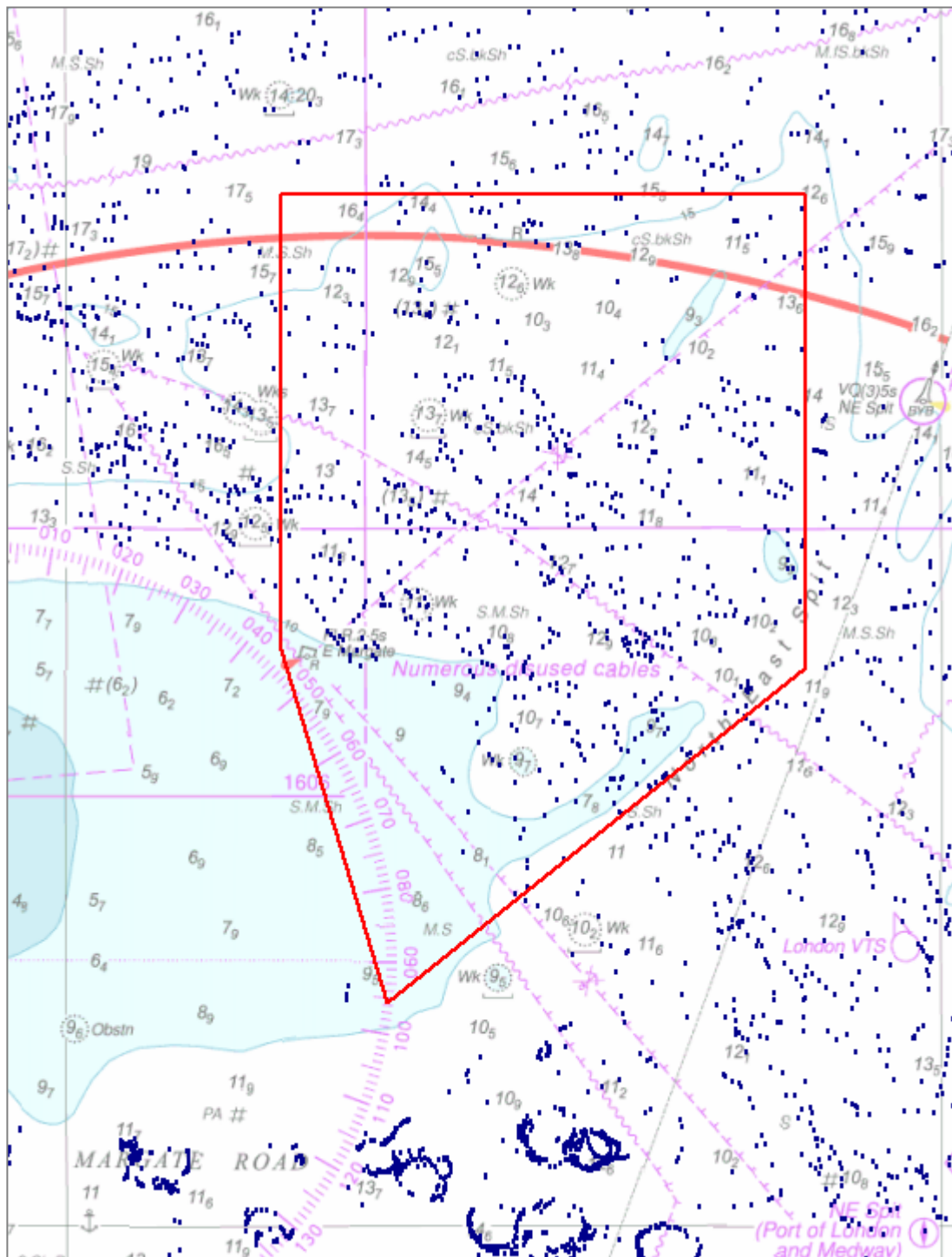
**LARGEST SCALE CHART:** BA 1607 (1:50,000)



SAMPLE AIS DATA

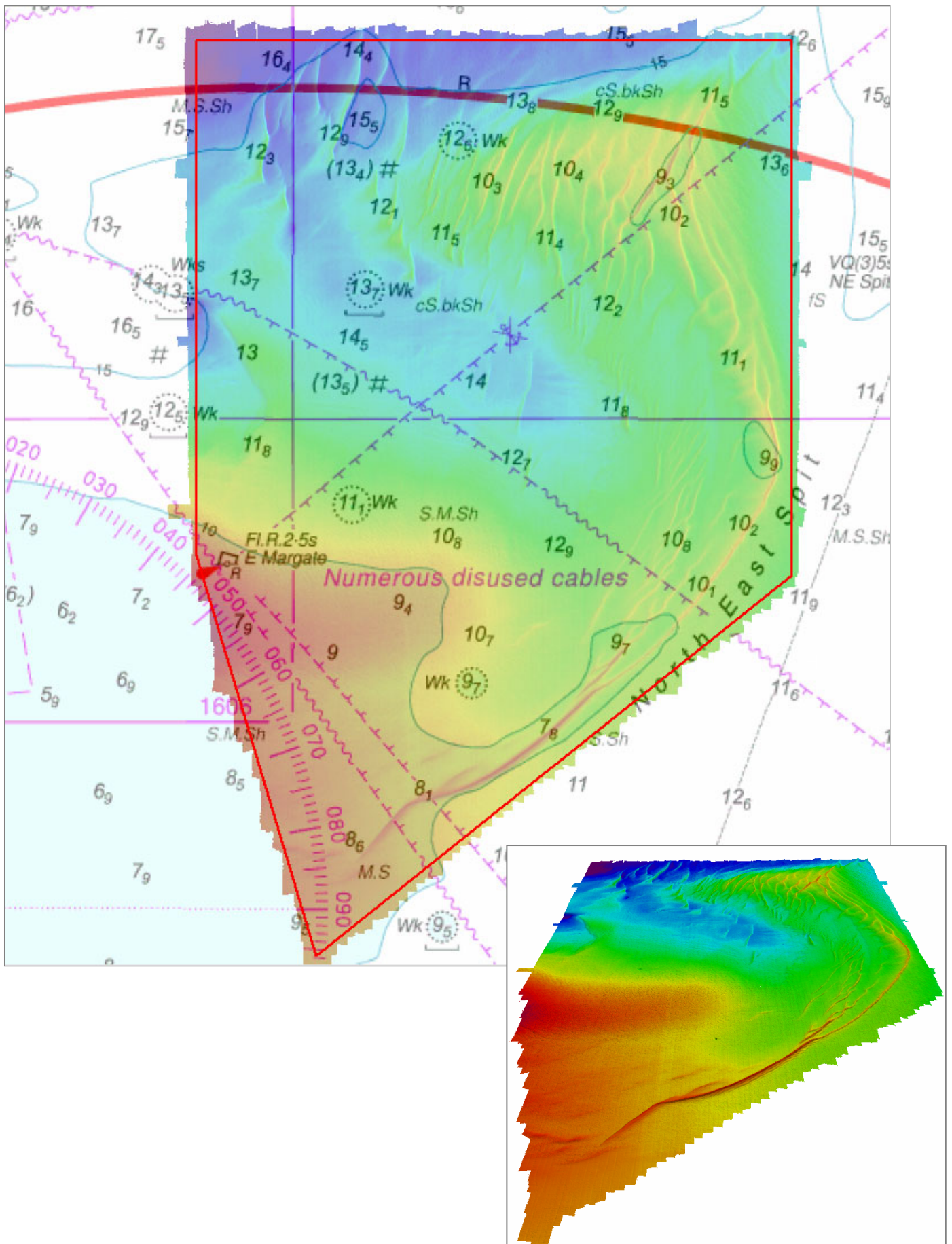


Sample AIS data showing reported draughts  $\geq 6$  metres and indicative routes

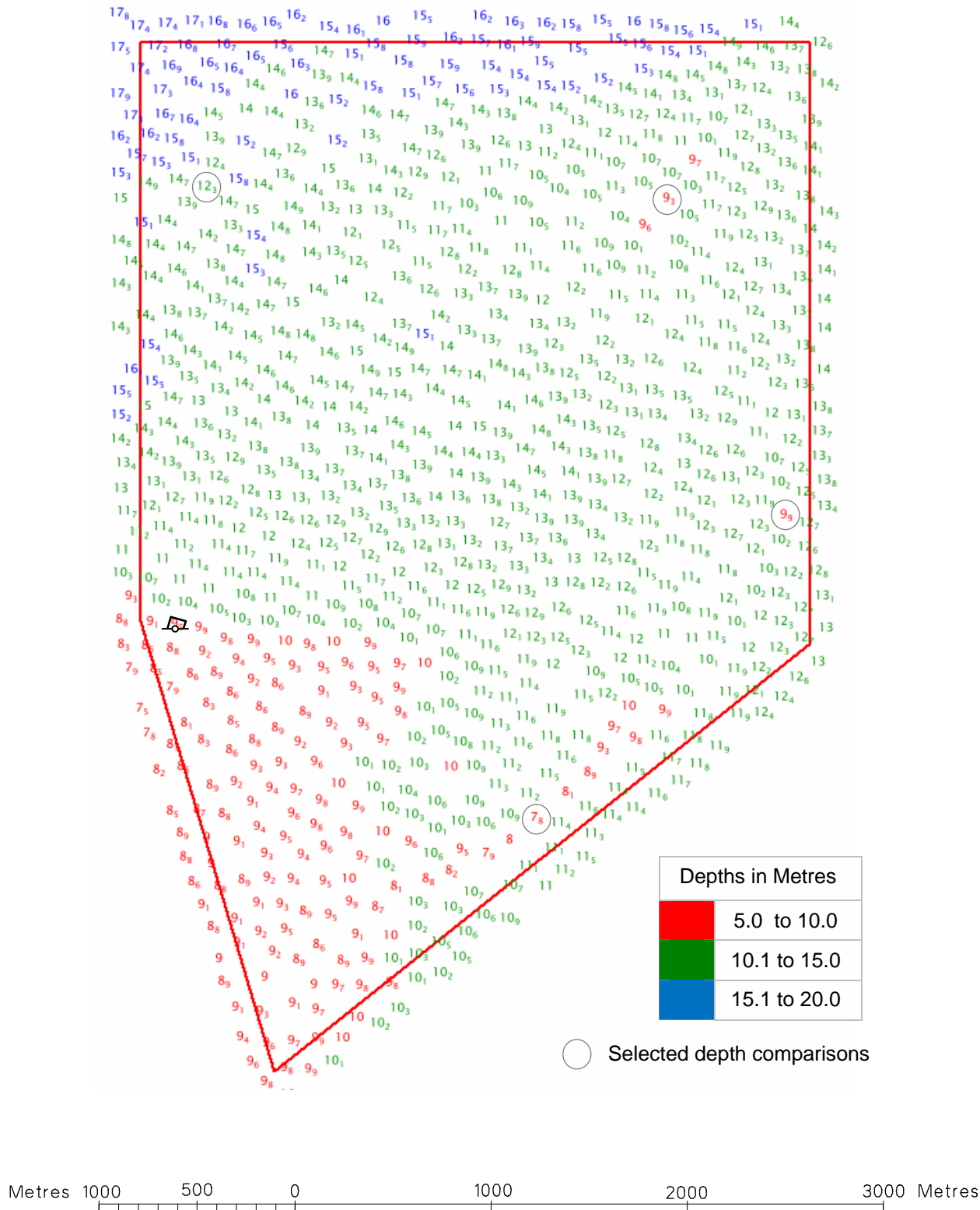


Sample AIS data showing reported draughts  $\geq 9$  metres

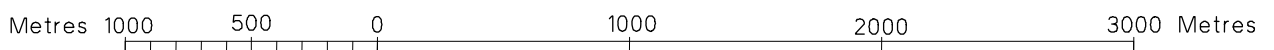
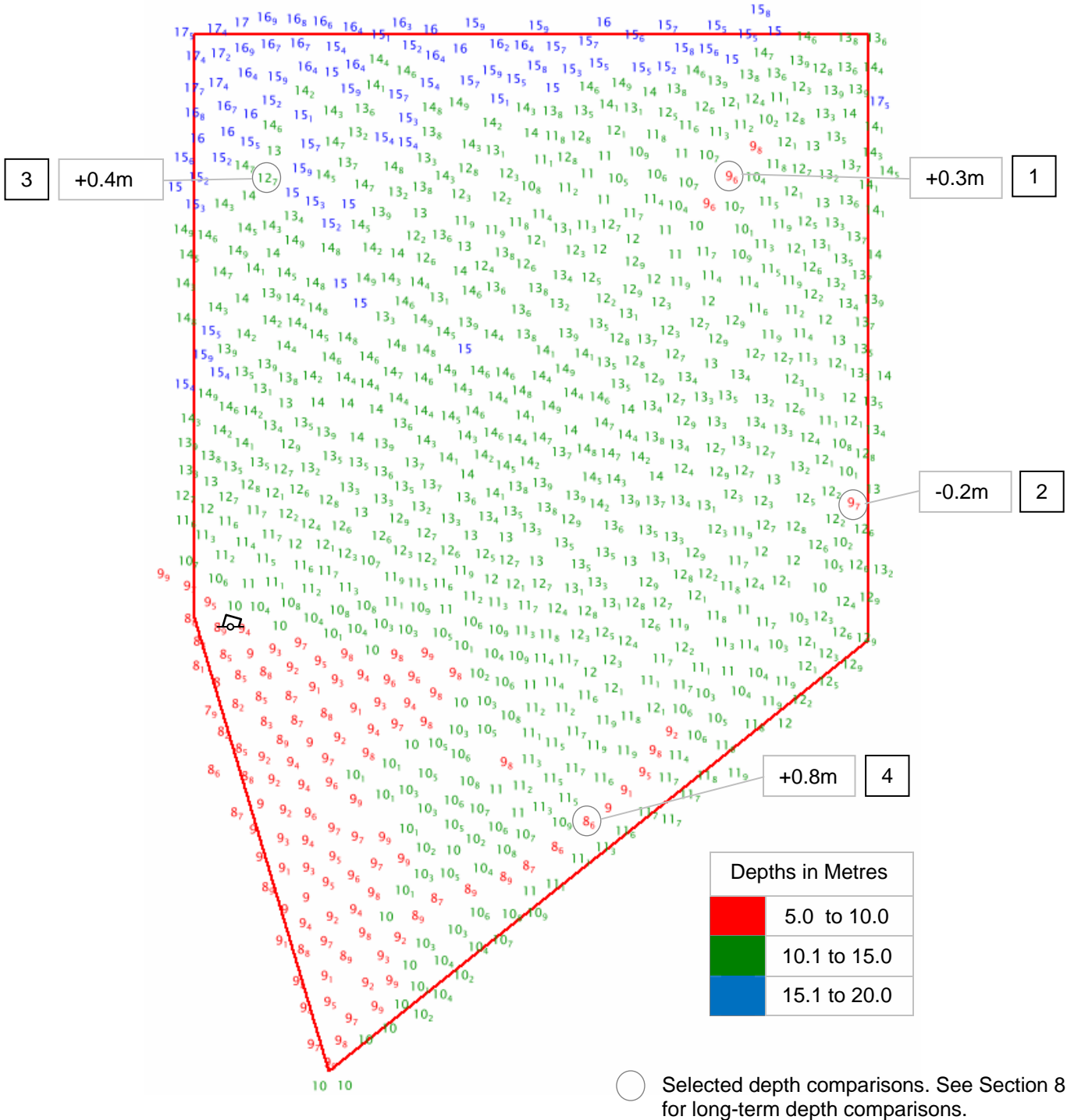
SUN ILLUMINATED VIEW OF THE 2013 SURVEY OVERLAID ON CHART 1607



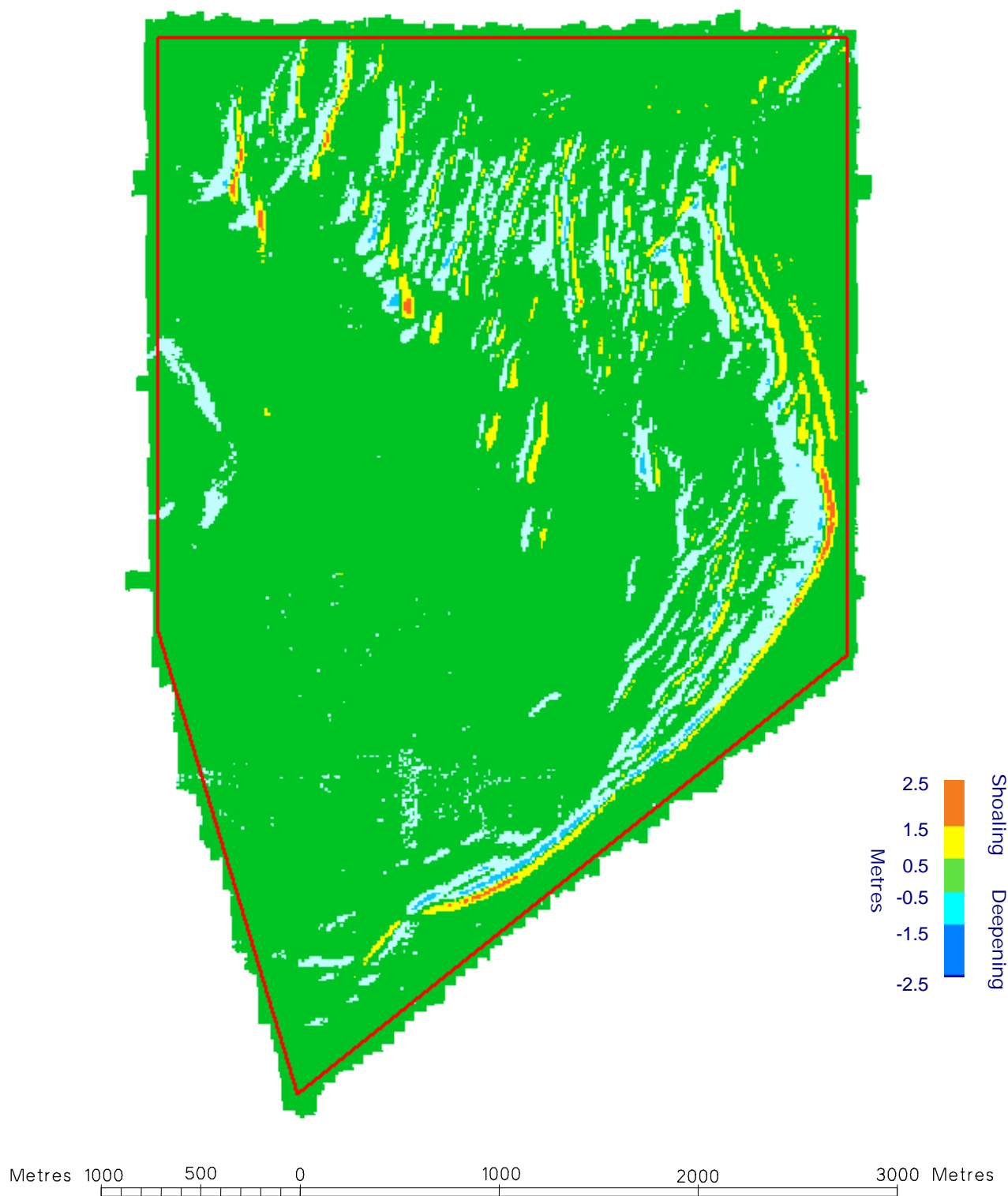
COLOUR BANDED DEPTH PLOT  
 FROM THE 2007 SURVEY  
 SHOWING SELECTED DEPTHS  
 SCALE 1:30,000



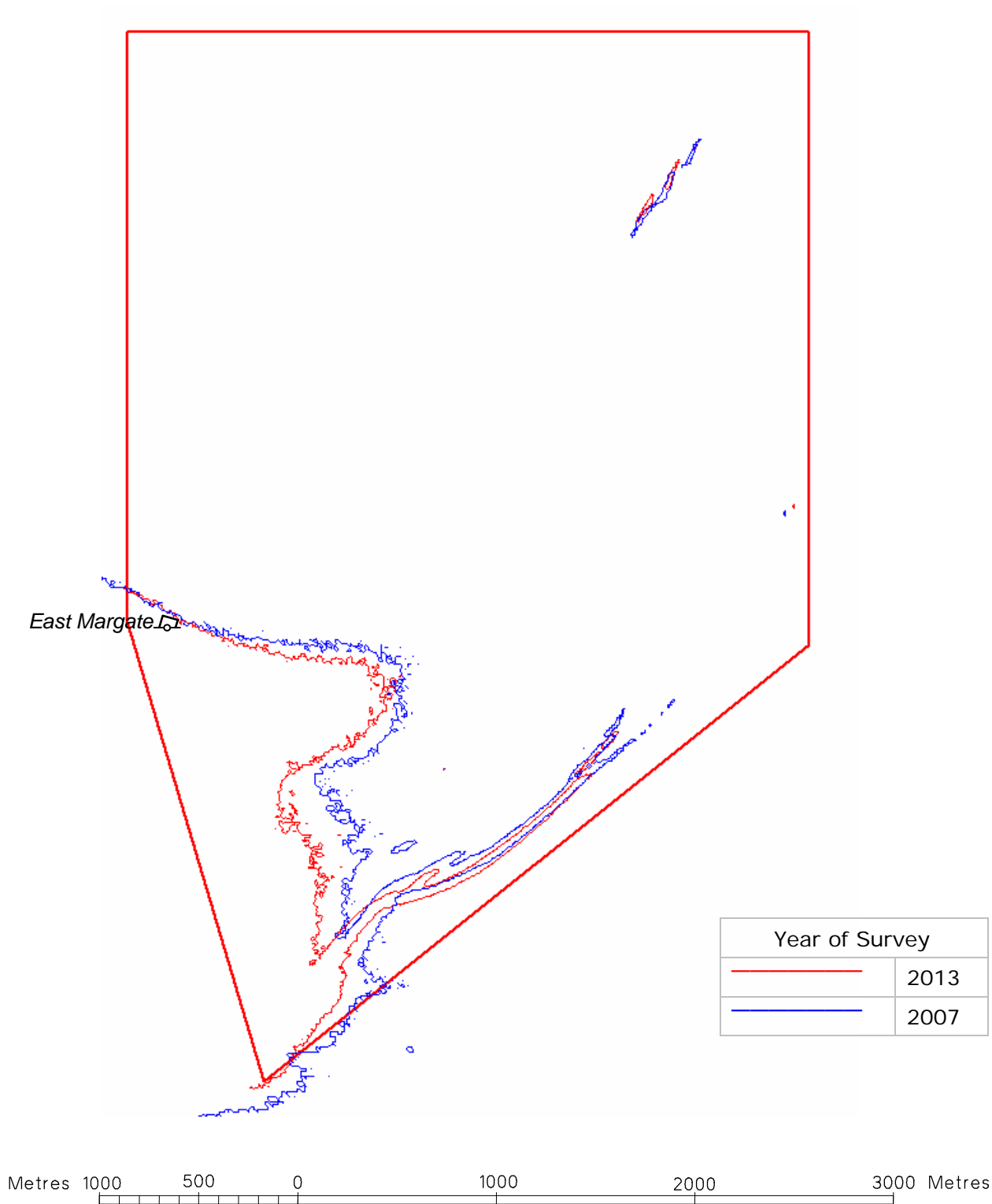
COLOUR BANDED DEPTH PLOT  
 FROM THE 2013 SURVEY  
 SHOWING SELECTED DEPTHS  
 SCALE 1:30,000



VARIABILITY PLOT SHOWING  
BATHYMETRIC CHANGES BETWEEN THE 2007 AND 2013 SURVEYS  
SCALE 1:30,000



COMPOSITE DIAGRAM OF THE  
 10 METRE CONTOUR FROM THE 2007 AND 2013 SURVEYS  
 SCALE 1:30,000



COMPOSITE DIAGRAM OF THE  
 12.5 METRE CONTOUR FROM THE 2007 AND 2013 SURVEYS  
 SCALE 1:30,000

