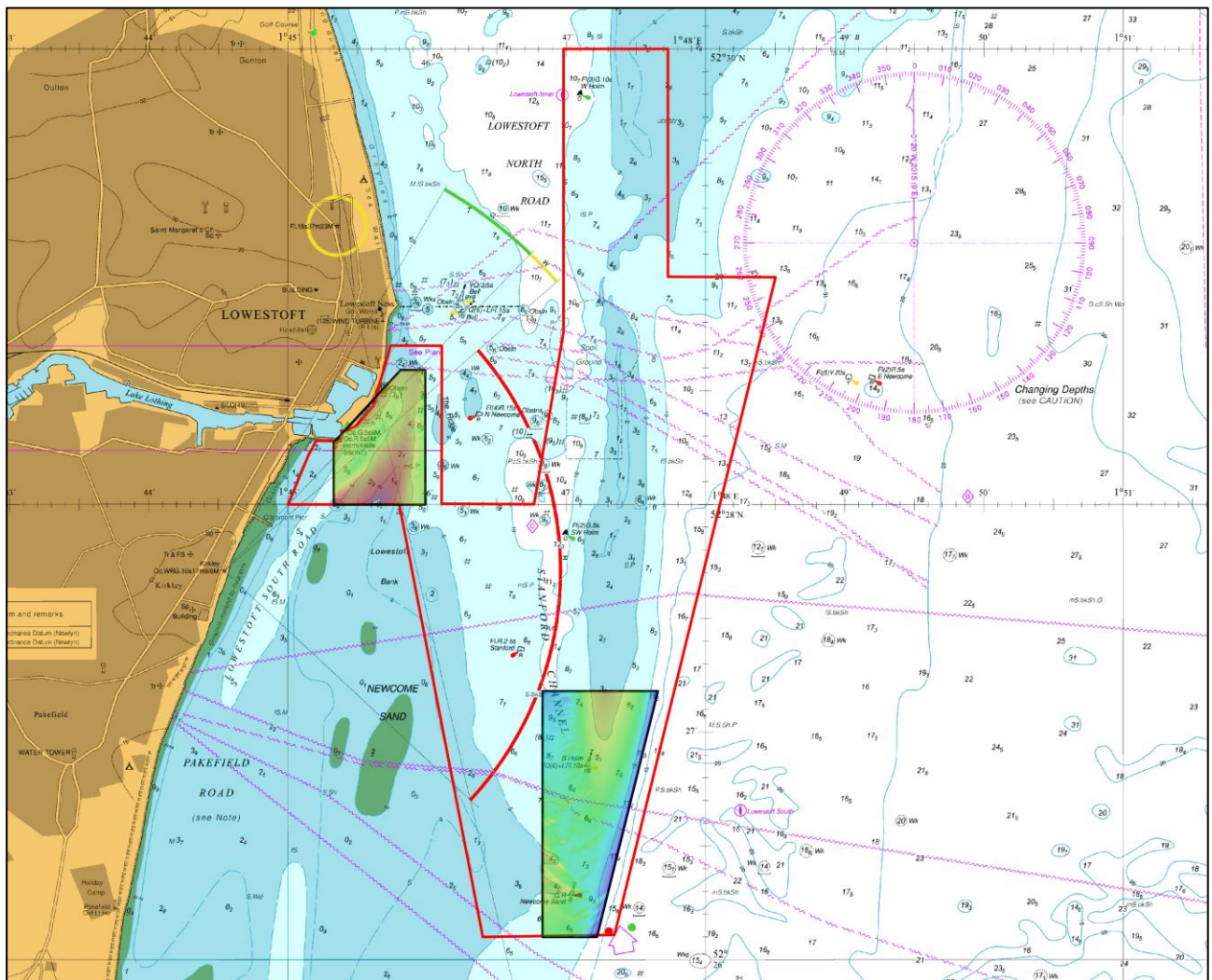




## EAST ANGLIA APPROACHES TO LOWESTOFT

SUMMARY ASSESSMENT ON THE ANALYSIS OF  
ROUTINE RESURVEY FOCUSED AREAS EA10-A & EA10-B  
FROM THE 2015 SURVEY



ENGLAND - EAST ANGLIA  
APPROACHES TO LOWESTOFT  
Summary Assessment EA10/2015

A summary assessment of the 2015 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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## **APPROACHES TO LOWESTOFT, EA10A and EA10B, 2015**

### **1 INTRODUCTION**

- 1.1 The full area of EA10 is re-surveyed every three years; within that area, two focused sub-areas A and B (shown at Annex B) are surveyed annually. These focused areas concentrate on the areas of greatest concern, taking into account sediment mobility, depth of water and draught of shipping using the areas.
- 1.2 This summary report looks at the latest survey and compares it against the previous surveys. For more details on the area, including long-term changes, the more detailed report on the last full survey, conducted in 2012, should be consulted.
- 1.3 The forward plan shows the 2015 survey was to cover the entire EA10 area for a full assessment, but due to long periods of weather stand-by it was deemed a priority to complete the focused areas of EA10A and EA10B, with the full area not being completed following instructions by the MCA to cease survey operations. The full survey has therefore been delayed until 2016 and the 2015 survey is now used to produce this summary report of EA10A and EA10B.

### **2 DESCRIPTION OF THE AREA**

- 2.1 Focused area EA10A covers the ridge and sandwaves that lie at the southern entrance to Stanford Channel, while Area EA10B covers the final approach to Lowestoft Harbour.
- 2.2 Sediments in the area are mobile and subject to change as the banks evolve and sandwaves migrate.

### **3 SURVEY DATA**

- 3.1 The 2014 survey was carried out from the 27<sup>th</sup> July to the 14<sup>th</sup> August. Sea states during surveys reported as varying between smooth (2) to moderate (4), with occasional short periods of bad weather causing survey operations to be halted.
- 3.2 The 2015 survey was conducted from the 23<sup>rd</sup> September to the 9<sup>th</sup> December, Sea states during surveys reported as Slight to Moderate (3-4), however, bad weather meant survey operations were halted for long periods of time, resulting in the main EA10 area not being fully completed.
- 3.3 Both surveys were conducted on board the vessel *Wessex Explorer* using a Kongsberg EM3002D, with positioning via C&C technologies CNAV-3050 and 2050 GNSS receivers interfaced with a V5 Applanix POS MV 320E system for post processing of position and attitude data.
- 3.4 All survey data is referenced to International Terrestrial Reference Frame 2005 (ITRF05). Vertical data from post processed GPS heights together with the UKHO supplied Vertical Offshore Reference Frame (VORF) model were used to obtain depths reduced to Chart Datum.
- 3.5 Both surveys were validated by the UKHO and found to meet IHO S-44 (5<sup>th</sup> Edition) Order 1a Standard.
- 3.6 The 2015 survey data overlaid on chart 1535, Lowestoft and Approaches (1:25,000) is shown at Annex B.

## **4 CHANGES SINCE THE 2014 SURVEY**

- 4.1 A Variability Difference Plot, showing changes between the 2015 and 2014 surveys is at Annex C. Changes in contoured depths are shown at Annex G and H for area EA10A and Annex I for area EA10B.

### **Entrance to Stanford Channel (Area EA10A)**

- 4.2 The sand bank in the North of the area has undergone small change, with the 5-metre contour remaining in a similar location, and the 7-metre contour moving 30 metres to the southwest (seen at Annex G). However, sediments and sand waves migrating to the south and west on the western side of the bank are causing depths to shoal by 0.1 to a maximum of 1 metre in the buoyed entrance to Stanford Channel (as seen in the colour banded depth plots at Annex E and F).
- 4.3 In the south of the area sediment and sand waves from Newcome Sand are further encroaching to the west with the 7-metre contour moving up to 100 metres with depths shoaling by 4.2 metres below Newcome Sand Buoy seen in the Colour Banded Depth Plot at Annex E and F and in the 7 metre contour plot at Annex G.
- 4.4 The effects of sediment movements mentioned above has meant a shoaling of depths across the area where shipping traffic enters Stanford Channel and starting to encroach on the areas marked by both Newcome Sand Buoy and South Holm Cardinal Buoy.

### **Final Approach to Lowestoft (Area EA10B)**

- 4.5 Depths at the entrance to Lowestoft harbour have deepened since 2014 with the 5-metre contour moving 18 metres to the northwest towards the harbour mouth (Seen at Annex I).
- 4.6 In the south of area EA10B the Northern section of Lowestoft bank has widened, with the 5-metre contour on the western side moving 75 metres to the North West (Seen at Annex I), slowly encroaching across the northern part of Lowestoft South Road, becoming shoaler in this area by up to 4.5 metres seen in colour banded depth plot at Annex E and F, and in the Profile E-F at Annex D.
- 4.7 The northern tip of Lowestoft bank, in the centre of the area, has undergone only very slight change since 2014, with a general widening of the 5-metre contour, especially on the eastern side, of up to 40 metres to the East, and shoaling of depths from 0.1 metres to a maximum of 1.2 metres, shown in the Colour Banded Depth Plots at Annex E and F.

## **5 IMPLICATIONS FOR SHIPPING**

- 5.1 Seabed changes in the final approach to Lowestoft (Area EA10B) present no new concerns to shipping; however the shoaling of depths at the northern tip of Lowestoft bank and the western side of the bank at the northern area of Lowestoft South Road need continued monitoring as these areas could become an implication for vessels in the future. Changes that have occurred in area EA10A, to the west of Newcome Sand buoy and around South Holm buoy, fall outside the route adopted by shipping, as shown at Annex A, so currently have no immediate impact on shipping movements, however, will ongoing monitoring is required.

## 6 RECOMMENDATIONS

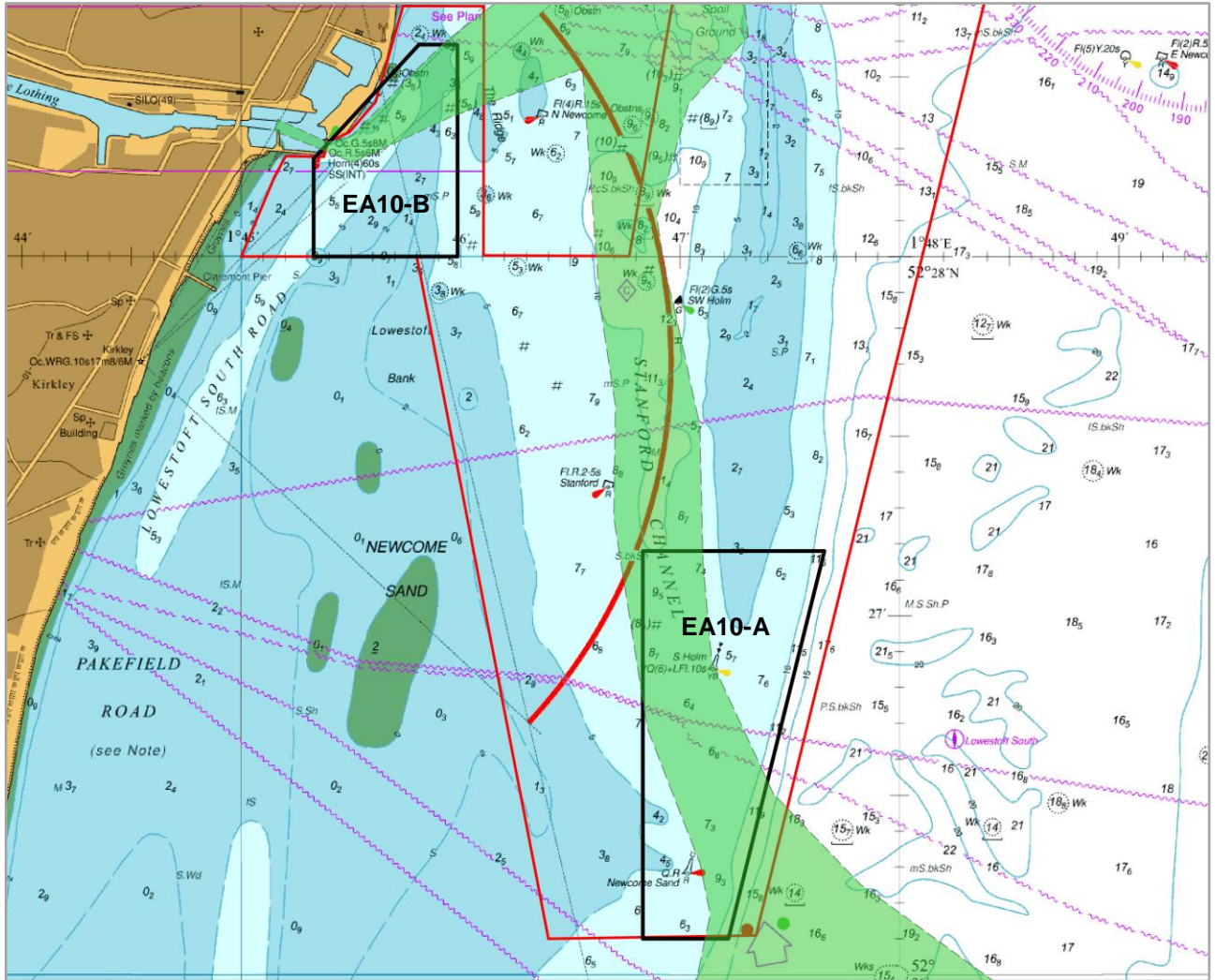
### ***Entrance to Stanford Channel (Area A)***

- 6.1 Changes in the south of the area and to sandwaves within the buoyed entrance support retaining the existing limits and survey frequency.

### ***Final Approach to Lowestoft (Area B)***

- 6.2 Changes in the south and north of the area support retaining the existing limits and survey frequency.

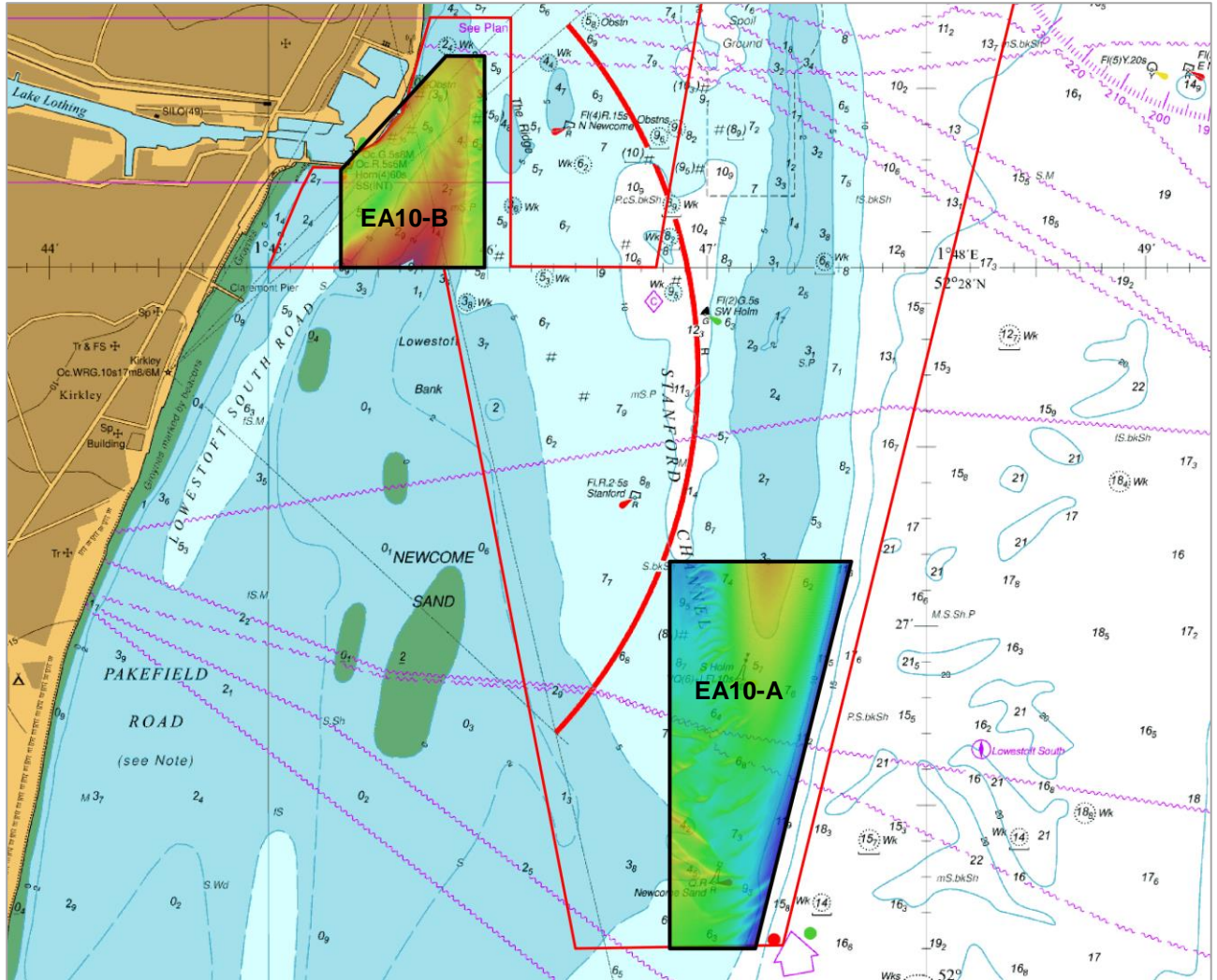
SHIPPING ROUTE





- Limits of full EA10 survey area
- Limits of EA10-A and EA10-B survey area
- Indicative shipping routes through the area

Note: Data from satellite AIS data for FY2015/2016 of vessels larger than 2000GT

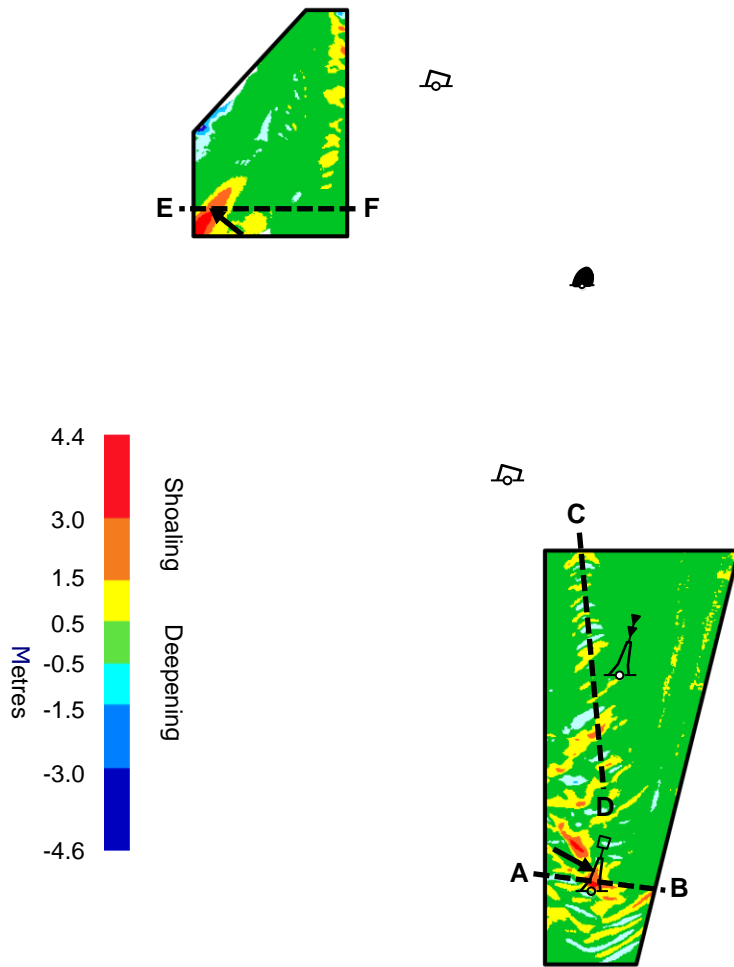
2015 SURVEY DATA OVERLAID ON CHART 1535,  
LOWESTOFT AND APPROACHES (1:25,000)







-  Limits of full EA10 survey area
-  Limits of EA10-A and EA10-B survey area



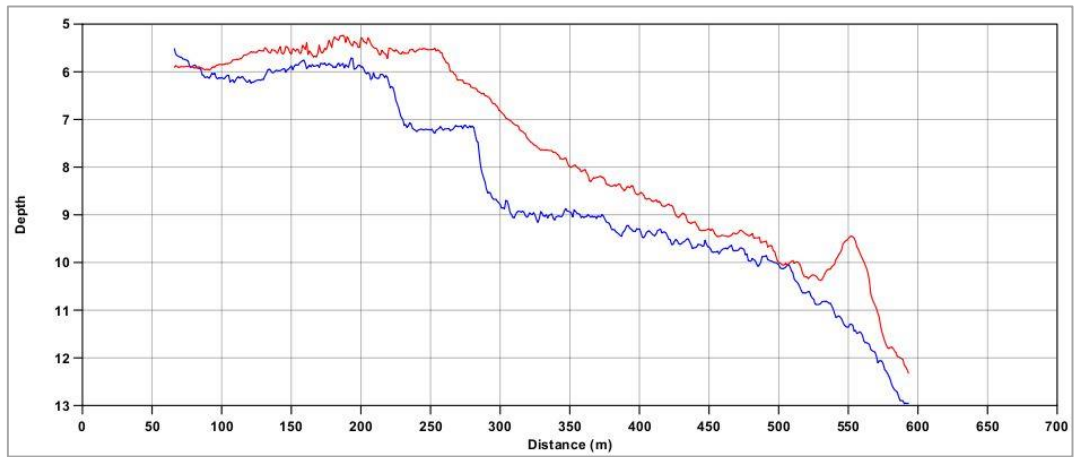
VARIABILITY PLOT SHOWING  
 BATHYMETRIC CHANGES BETWEEN THE 2014 AND 2015 SURVEYS  
 WITH LOCATIONS OF CROSS SECTION COMPARISONS  
 (Shown at Annex D)



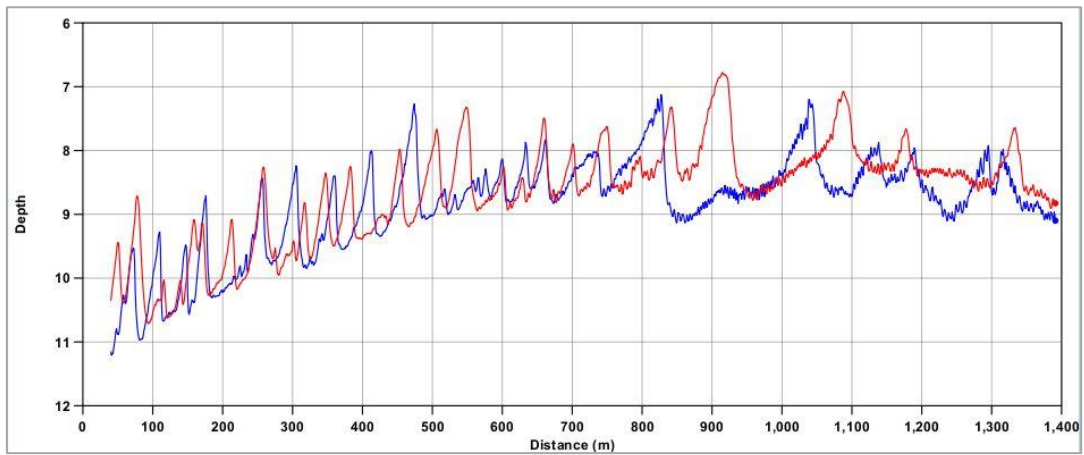
-  Limits of full EA10 survey area
-  Limits of EA10-A and EA10-B survey area
-  Sediment Transport
-  Profile lines

PROFILE COMPARISONS FROM THE 2014 AND 2015 SURVEYS

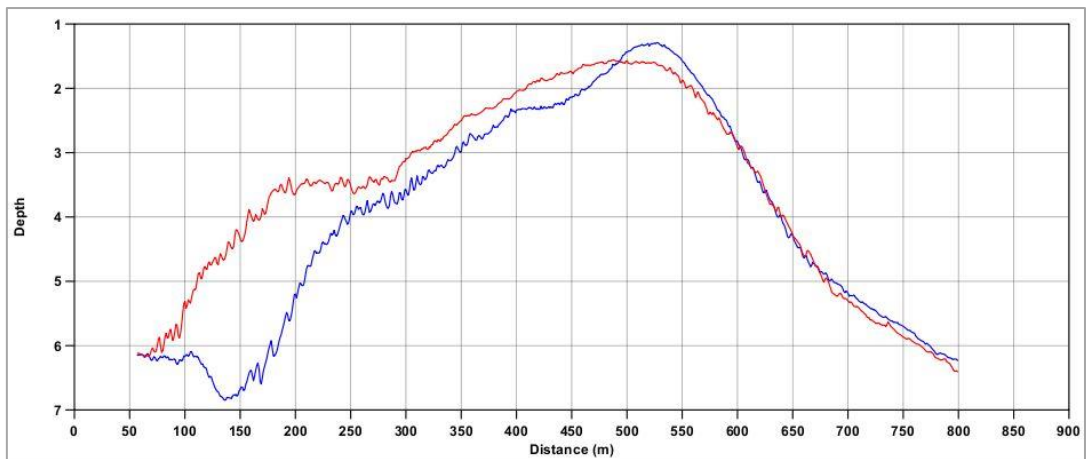
(See Annex C for Locations)



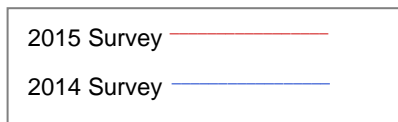
A Profile A-B B



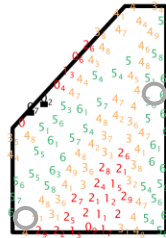
C Profile C-D D



E Profile E-F F



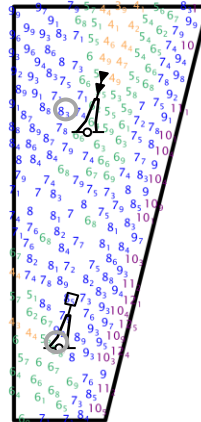
COLOUR BANDED DEPTH PLOT FROM THE 2014 SURVEY  
SHOWING SELECTED DEPTHS



12



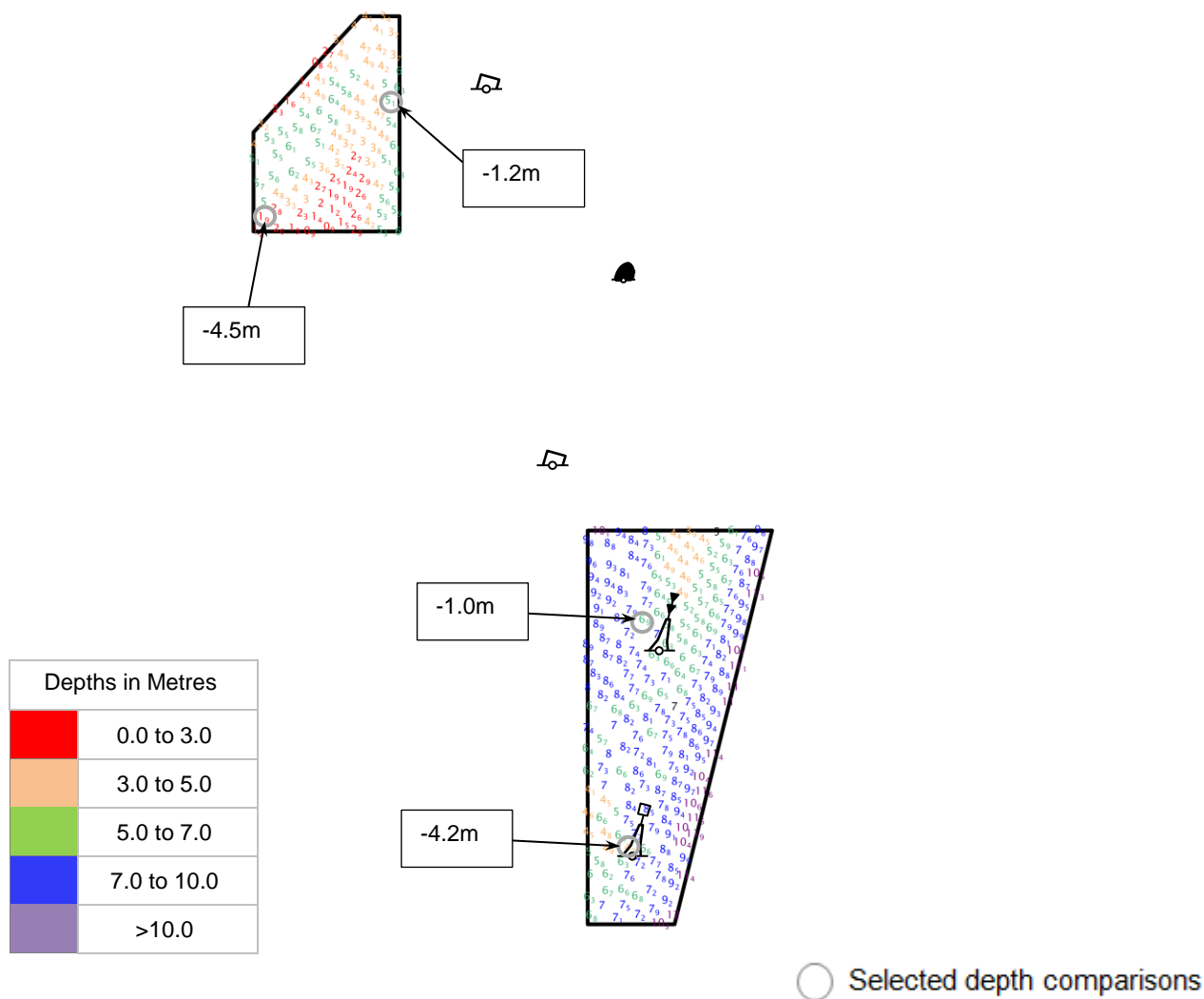
13



Depths in Metres	
	0.0 to 3.0
	3.0 to 5.0
	5.0 to 7.0
	7.0 to 10.0
	>10.0

Selected depth comparisons

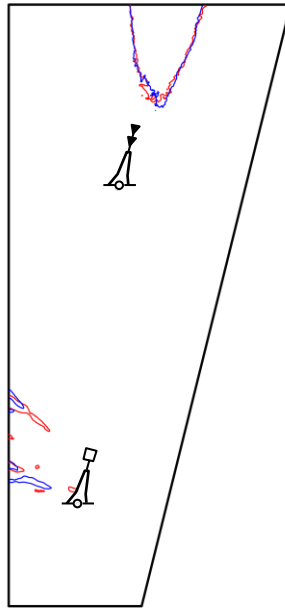
COLOUR BANDED DEPTH PLOT FROM THE 2015 SURVEY  
SHOWING SELECTED DEPTHS



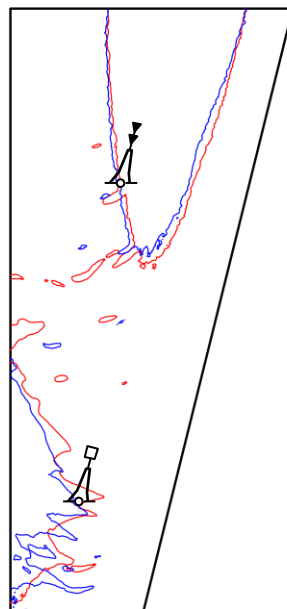
Note: Depth changes indicated above are for the same location as the sounding derived from the 2015 survey data. Hence values may not match the difference between the soundings shown in the 2014 and 2015 depth plots above as shoal bias sounding selection will select different positions that best represent the shoal values in a data set.

Deepening + Positive value / Shoaling - negative value

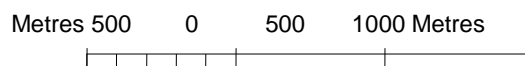
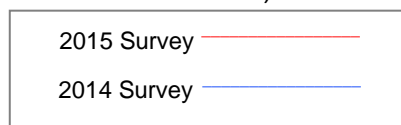
COMPOSITE DIAGRAM OF THE 2 METRE AND 7 METRE CONTOURS  
FROM THE 2014 AND 2015 SURVEYS FOR AREA EA10-A



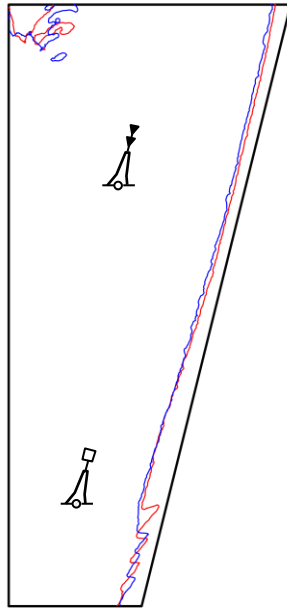
Above is the 5 metre contour from the 2015 and 2014 surveys in EA10 area A (South of Stanford Channel)



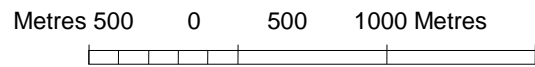
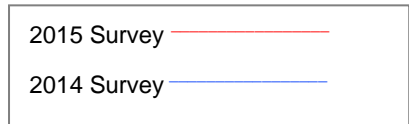
Above is the 7 metre contour from the 2015 and 2014 surveys in EA10 area A (South of Stanford Channel)



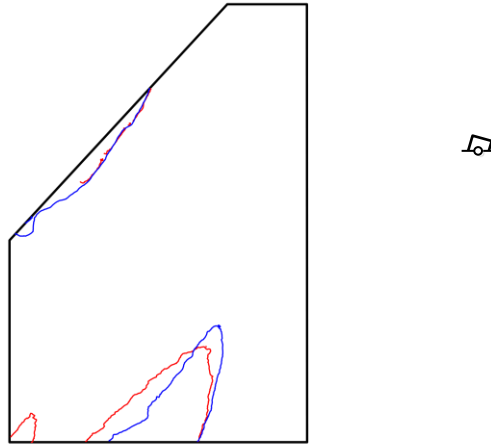
COMPOSITE DIAGRAM OF THE 10 METRE CONTOUR  
FROM THE 2014 AND 2015 SURVEYS FOR AREA EA10-A



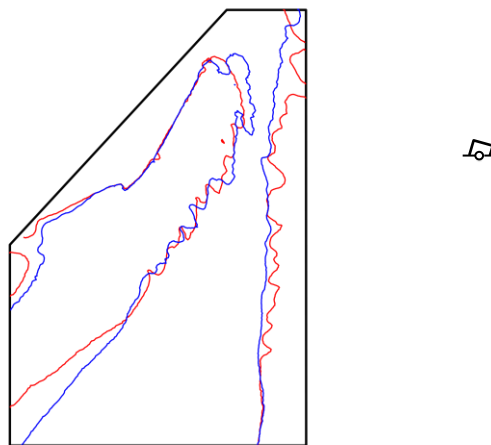
Above is the 10 metre contour from the 2015 and 2014 surveys in EA10 area A (South of Stanford Channel)



COMPOSITE DIAGRAM OF THE 2 METRE AND 5 METRE CONTOURS  
FROM THE 2014 AND 2015 SURVEYS FOR AREA EA10-B



Above is the 2 metre contour from the 2015 and 2014 surveys in EA10 area B (Final Approach to Lowestoft Harbour)



Above is the 5 metre contour from the 2015 and 2014 surveys in EA10 area B (Final Approach to Lowestoft Harbour)

