Natural Environment Research Council

Institute of Oceanographic Sciences
Crossway, Taunton, Somerset. TA1 2DW

PROVISIONAL CRUISE REPORT

VESSEL: M L LABRAX (Southampton University, Department of Oceanography)

CRUISE LOCATION: Southampton Water. Rivers Test and Itchen

CRUISE PERIOD: 2 - 3 September 1983

PERSONNEL:
K R Dyer (Principal Scientist)
A L New
A J Marks

OBJECTIVES: It is thought that internal waves may be generated by flow over topographic features in estuaries. These waves could then be advected upstream at the end of the ebb tide, break and cause mixing. The aim was to locate these internal waves by echo sounding and determine their movement during the tide.

PROCEDURE AND METHODS: Previous work in Southampton Water has shown that layers of backscattering correlated with the depth of the halocline. Consequently echo sounding at frequencies of 200 KHz (Raytheon) and 2 MHz (IOS developed) was carried out to detect internal waves. Echo sounding profiles were obtained by repeated traverses from the Bury Swinging Ground in the Test River (Figure 1) where the depth was about 13 m, into the mouth of Eling Channel, where the depth was about 2 m. At each end of the traverse a vertical profile of salinity and temperature was taken with an MC5 TS Bridge. Measurements were obtained from just before 2nd high water until about the young flood stand, halfway through the flood tide.

In the Itchen River similar measurements were taken from just above the Itchen Bridge (6 m depth) to the dredged channel off Princess Alexandra Dock (9 m depth). Between these two points there is a shallow zone of 4 m depth (Figure 2).

Position fixing throughout was by transits with beacons and shore markers.

EQUIPMENT PERFORMANCE: Raytheon echosounder. Excellent.
IOS 2 MHz echosounder. This performed very well, giving good backscatter returns within the top 2 m. There was some electronic noise and interference from the Raytheon, which appeared to worsen with time.
The Medelec recorder was adequate.

RESULTS:

Test River. Internal waves formed on the halocline downstream of the topographic step at about maximum ebb tide. As the current diminished the waves travelled upstream and appeared to break. Multiple layering and bifurcation of interfaces was also visible. Force 9 Westerly wind hampered operations and waves affected the records during the afternoon.

Itchen River. Similar results were visible in the Itchen, though because the stratification was less intense, the features were not as marked.

In both areas entrainment of large backscatters was visible near the bed at quite low velocities.

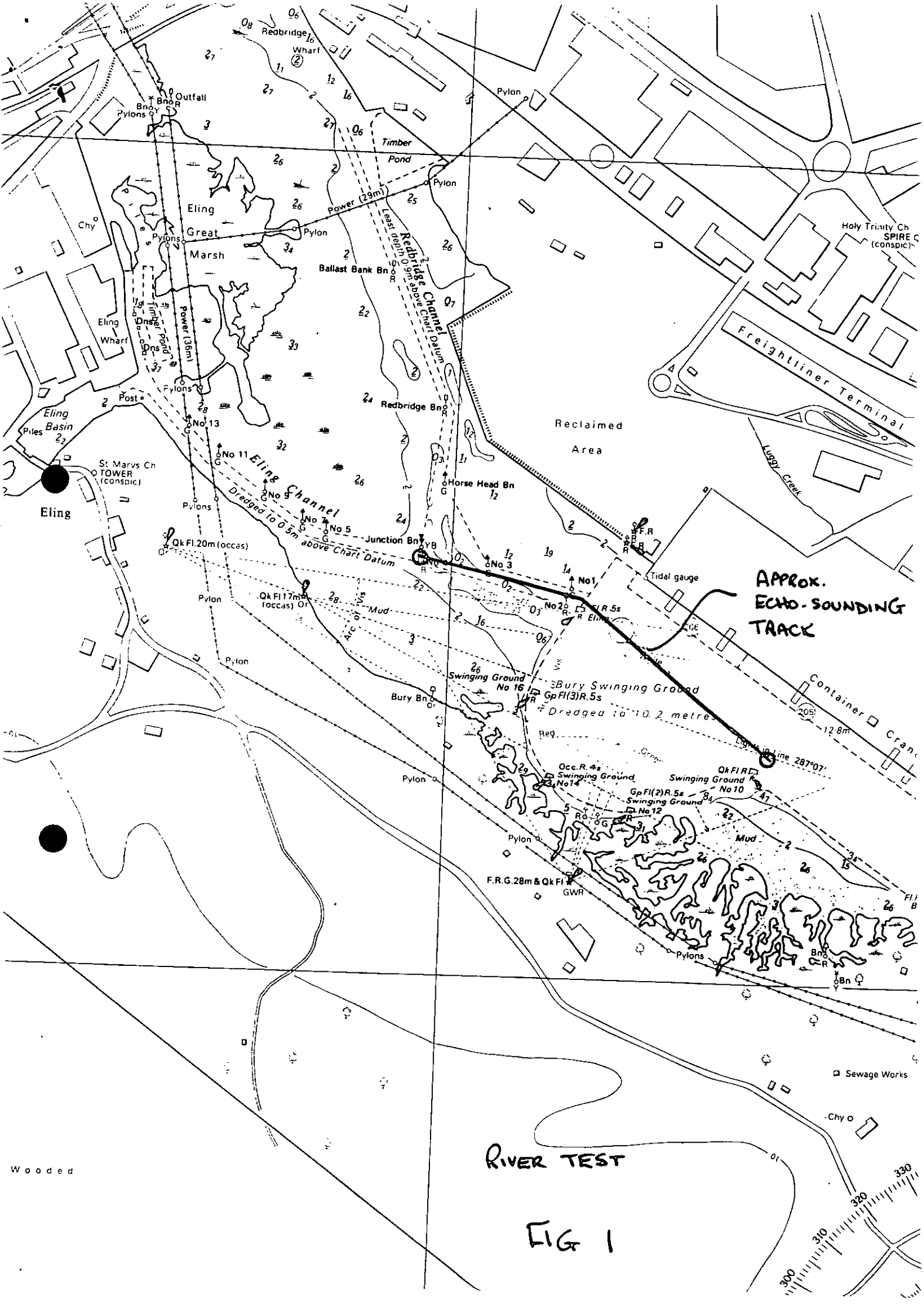
ITINERARY:

1 September 1983.	Personnel travelled to Southampton and loaded LABRAX.
2 September 1983. HW 0648 LW 1221 HW 1924	Sailed 0800. Commenced echosounding in Test River at 0920. Completed surveying at 1630. Returned to boatyard at 1730.
3 September 1983. HW 0818 LW 1353 HW 2041	Sailed 0900. Commenced echosounding in Itchen River at 0920. Completed surveying at 1618. Returned to boatyard at 1645. Unloaded. Returned to Taunton.

PREPARED BY: K L Dyer

APPROVED BY:

DATE: 10 October 1983


Redbridge
Wharf
Outfall
Bn
Pylons
Timber
Pond
Pylon
Power (29m)
Eling
Great
Marsh
Chy
Least depth 0.9m above Chart Datum
Redbridge Channel
Ballast Bank Bn
Holy Trinity Ch
SPIRE
(conspic)
Freightliner Terminal
Eling
Wharf
Timber Pond
Dns
Power (36m)
Post
Eling
Basin
Piles
Redbridge Bn
Reclaimed
Area
Luggy Creek
St Marys Ch
TOWER
(conspic)
No 13
No 11
Eling Channel
Dredged to 0.5m above Chart Datum
No 9
No 7
No 5
Junction Bn
Horse Head Bn
Qk Fl.20m (occas)
No 3
No 1
Tidal gauge
F.R
No 2
Fl R.5s
Eling
Qk Fl 17m
(occas)
Mud
Arc
Swinging Ground
No 16
Bury Bn
Bury Swinging Ground
Gp Fl(3)R.5s
Dredged to 10.2 metres
12.8m
Container Crane
Occ.R.4s
Swinging Ground
No 14
Qk Fl R
Swinging Ground
No 10
Gp Fl(2)R.5s
Swinging Ground
No 12
F.R.G.28m & Qk Fl
GWR
Pylons
Sewage Works
Chy
Wooded
APPROX.
ECHO-SOUNDING
TRACK
RIVER TEST
FIG 1

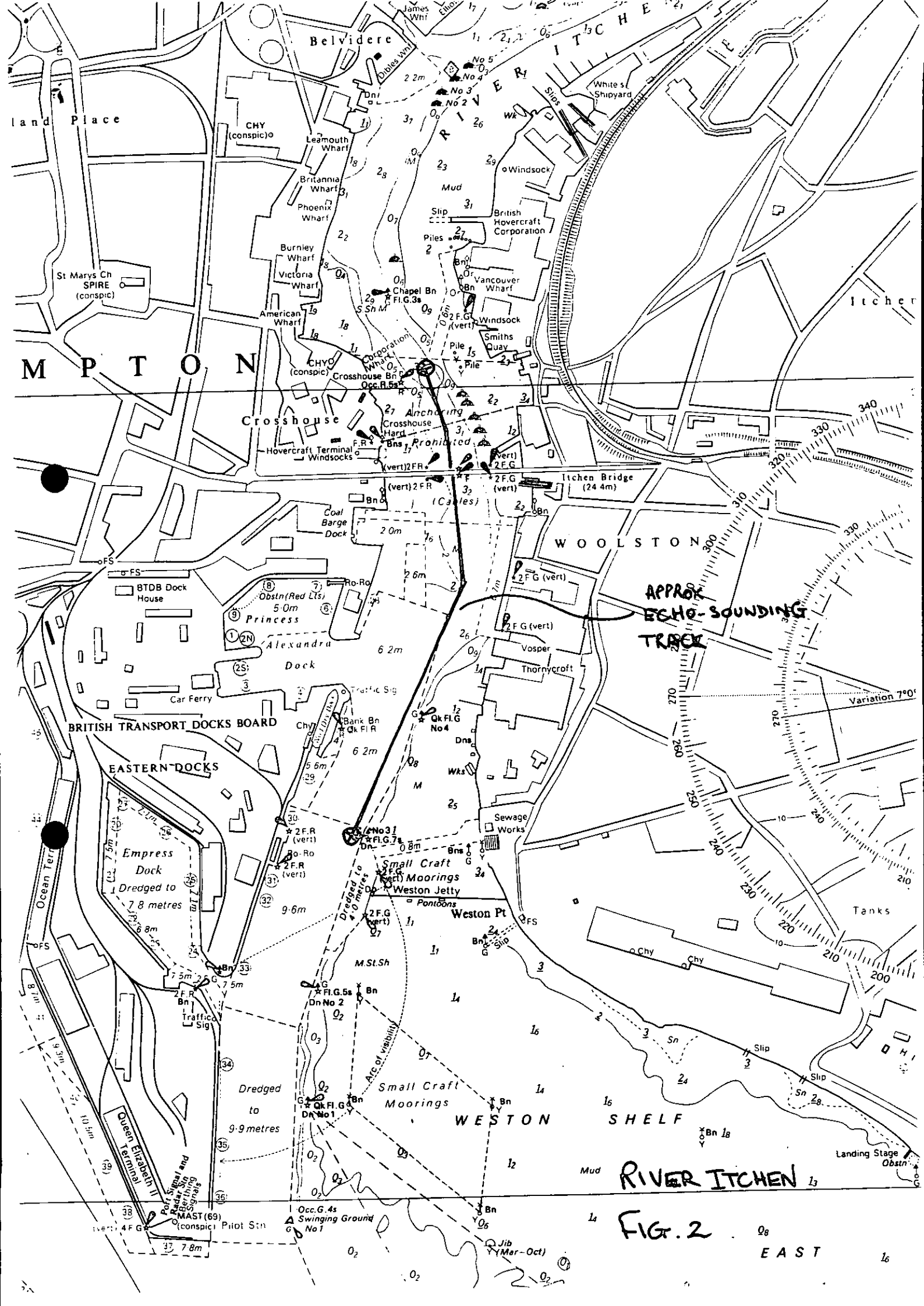

Belvidere
Dibles Wharf
No 5
No 4
No 3
No 2
RIVER ITCHEN
White's Shipyard
Slips
Wk
Windsock
Leamouth Wharf
Britannia Wharf
Phoenix Wharf
Mud
Slip
British Hovercraft Corporation
Piles
Burnley Wharf
Victoria Wharf
Vancouver Wharf
St Marys Ch SPIRE (conspic)
Chapel Bn Fl.G.3s
American Wharf
2 F.G (vert)
Smiths Quay
Pile
Corporation Wharf
CHY (conspic)
Crosshouse Bn Occ.R.5s
Crosshouse
Anchoring Prohibited
Crosshouse Hard
Hovercraft Terminal Windsocks
Itchen Bridge (24·4m)
(Cables)
Coal Barge Dock
WOOLSTON
BTDB Dock House
Obstn(Red Lts)
Princess Alexandra Dock
Ro-Ro
Car Ferry
Traffic Sig
BRITISH TRANSPORT DOCKS BOARD
Bank Bn Qk Fl.R
Qk Fl.G No 4
Vosper
Thornycroft
EASTERN DOCKS
Empress Dock
Dredged to 7·8 metres
Sewage Works
Small Craft (vert) Moorings
Weston Jetty
Pontoons
Weston Pt
Dredged to 7·0 metres
Tanks
M.St.Sh
Dn No 2
Fl.G.5s
Arc of visibility
Dredged to 9·9 metres
Small Craft Moorings
WESTON SHELF
Queen Elizabeth II Terminal
Port Signal and Radar Stn
Berthing Signals
MAST (69) (conspic)
Pilot Stn
Occ.G.4s Swinging Ground No 1
Jib (Mar–Oct)
Landing Stage
Obstn
RIVER ITCHEN
EAST
APPROX ECHO-SOUNDING TRACK
Variation 7°0'W

FIG. 2