maritime

Dredging Protocol

Baseline Document Fal and Helford Estuaries

Karrek Konsel
Carrick
DISTRICT COUNCIL

Contents

1.0 Introduction

The Government considers that the EC Habitats Directive requires maintenance dredging proposals, which could potentially affect Special Areas of Conservation (SAC's), to be assessed in accordance with Article 6(3) of the Directive i.e. they should be treated as a new *plan or project* and will therefore require an appropriate assessment where it is likely to have a significant effect on a European site.

Whilst not endorsing this interpretation of the law, representatives of the ports and marine leisure industries have agreed to work in co-operation with Defra, DfT and English Nature in order to develop an approach which allows the effect of the maintenance dredging on a European Marine Site (EMS) to be assessed without placing a disproportionate burden on those who commission or approve maintenance dredging operations.

To provide a basis against which maintenance dredging applications can be assessed, this protocol recommends preparation of a 'Baseline Document'. This document will draw on existing and readily available information, and will describe the current and historical patterns of dredging in relation to the conservation status of the site.

The Baseline Document will contain information to allow all conservation aspects relevant to the N2K site to be considered. The presumption is that maintenance dredging proposals in line with established practice as described in the Baseline Document, will be found unlikely to have a significant effect, usually without the need for further detailed information or consideration. This stream-lined approach will enable these proposals not likely to have an adverse effect on a N2K site to be quickly and easily identified.

Prepared by
A Brigden
Carrick District Council
November 2004
First Revision August 2005

2.0 Background

2.1 The Fal and Helford Estuaries

English Nature's advice given under Regulation 33(2) of the Conservation (Natural Habitats &c.) Regulations 1994 states:

'The Fal and Helford European Marine Site (EMS) in Cornwall is a complex site comprised of the two ria (drowned river valley) systems of the Fal and Helford Rivers and adjacent Falmouth Bay. The rias receive a low freshwater input and therefore contain a notable range of fully marine habitats which are affected by the degree of wave exposure ranging from extremely sheltered within the inlets to the wave-exposed, tide swept open coast'

With regard to the existing human activities the SAC Management Scheme considers that:

'In common with other estuaries, the Fal & Helford SAC has a long history of human activity and use, both around its shores and on its waters. It is important that the wide range of activities continues to be accommodated within the overall management of the SAC whilst ensuring that the quality of the site and its habitats does not deteriorate. Uses of this area are both commercial, e.g. shipping and ship repair, bunkering, lay-ups, scalloping (although now currently the subject of a byelaw ban), oyster dredging, sewage discharges and moorings and recreational, e.g. diving, canoeing, sailing and water skiing. Not all the activities occur across the site and most tend to be focused within the harbour areas.'

2.2 Harbour Authorities

The Fal and Helford estuaries complex is made up of a number of different harbour authorities plus other non-statutory undertakings.

These include the following:

- Port of Truro - Municipal Harbour Authority (Carrick District Council)
- Port of Penryn - Municipal Harbour Authority (Carrick District Council)
- Falmouth Harbour Trust Port (Falmouth Harbour Commissioners)
- Falmouth Docks - Private Port (A&P Falmouth Ltd)
- St. Mawes Harbour - Private Port (St. Mawes Pier & Harbour Co.)
- Percuil River - Leased to the Percuil River Moorings Ltd. from the Duchy of Cornwall.

- Restronguet Creek - Former Harbour Authority run by the Redruth & Chacewater Railway and now abandoned.

- Helford River - No statutory Harbour Authority. Kerrier District Council and the Duchy of Cornwall own and /or have an interest in the Helford River.

Statutory harbour Authorities generally have a duty to maintain charted depths and to undertake works as outlined in their Harbour Orders. For example the relevant Harbour Orders (1903) in the case of the Port of Truro state:

5. The works authorised by this Order comprise –

The deepening and improvement of the harbour the improvement of the quays the laying down buoys and moorings and the erecting or placing of other appliances or conveniences for the use of vessels frequenting the harbour:

The improvement of the navigable channel from Truro Quay to Sunny Corner Quay by widening and straightening the channel and deepening the harbour by dredging:

12. – (1) In addition to the works authorised by section 5 of this Order the Corporation may deepen dredge scour and excavate any portion of the foreshore and bed of the sea within the harbour to the extent necessary to secure good and sufficient waterway and approaches to the quays and other works and conveniences.

(2) All rock sand mud and materials dredged up under the powers contained in this Order shall be the property of the Corporation who may from time to time sell or otherwise dispose of the same or remove or deposit the same within the harbour. Provided that no rock sand mud or other material shall be laid down or deposited in any place below high water mark without the consent in writing of the Board of Trade having been first obtained.

(3) All moneys arising from any sale or other application of any rock sand mud or other materials under this section after payment of any expenses connected therewith shall be applied as part of the revenue of the harbour.

2.3 Port Marine Safety Code

The Port Marine Safety Code introduces a national standard for every aspect of port marine safety. It aims to improve safety for those who use or work in ports, their ships, passengers and cargoes, and the environment. It establishes a measure by which harbour authorities can be accountable for the legal powers and duties which they have to run their harbours safely.

2.4 Guide to Good Practice on Port Marine Operations

This guide has been written to support the Port Marine Safety Code.

The section dealing with Conservancy states:

Conservancy

Summary

Chapter 2.3 of the Code describes the general requirements imposed upon a harbour authority under its conservancy duty;

A A harbour authority has a duty to conserve the harbour so that it is fit for use as a port, and a duty of reasonable care to see that the harbour is in a fit condition for a vessel to use it.

B Harbour authorities should provide users with adequate information about conditions in the harbour.

C Harbour authorities have duties and powers as local lighthouse authorities; and specific powers in relation to wrecks.

6.1.3 Conservancy includes not only monitoring but also protection of the hydrographic regime in a harbour, and so covers the licencing of construction and dredging in order that the safety of navigation is not adversely affected.

6.4 Dredging

6.4.1 Harbour authorities typically have a statutory power in their local legislation to dredge for the maintenance and improvement of channels. The latter is commonly referred to as capital dredging, although the distinction between the two kinds may be blurred in practice.

Maintenance Dredging

6.4.2 For the purposes of this guide, maintenance dredging is that which is required to maintain existing access to the port and discharges the responsibility to ensure that all vessels using the port may do so safely. It is done on a routine basis to maintain the level of water at the depth advertised on charts. It is important that risk assessments deal with this requirement. Maintenance dredging should be planned for the sake of efficiency and to minimise environmental effects. Advertised depths should be determined - and reviewed - having regard to the need to ensure the safety of commercial and recreational vessels using the port. Water depth may be reduced to a level less than that charted, or otherwise promulgated, for example because no user any longer requires the charted depth to be maintained. However, appropriate warnings to mariners must be given and charts up-dated as soon as reasonably practicable.

2.5 Bathymetry

It is a requirement for statutory harbour authorities to undertake bathymetry surveys from time to time. With this periodic information it is useful to compare depths with those currently advertised on the chart and with earlier surveys in order to quantify the level of deposition/siltation that is taking place.

3.0 Maintenance Dredging Requirement:

Within the Fal and Helford estuaries all kinds of activity take place including commercial shipping and a significant leisure industry. Consequently there is a need for a small maintenance dredging commitment within the Fal and to a lesser degree the Helford. This is either to maintain charted depths in order to ensure adequate underkeel clearance and safe swinging circles for commercial shipping or to allow for safe and maintained depths in boatyards, marinas etc.

The relatively low level of maintenance dredging within the estuaries is considered to be because of the nature of the local rock (granite) which does not lend itself to coastal erosion like other types. Most of the siltation is caused by inputs from the land via the river systems.

In addition the level of commercial shipping activity within the estuary is low compared to other more industrial areas and the natural depths in and around the estuary are significant (Falmouth is believed to be the third naturally deepest harbour in the world).

The type of dredger that undertakes the physical process of dredging is either a backhoe digger or single grab crane that loads into either a bottom opening hopper barge or similar vessel. This generally means that the accuracy of the dredge is better especially where there is a more precise requirement alongside quays, pontoons etc. This method also reduces the dredge plume of sediment in suspension.

All the various organisations, authorities and businesses who have a dredging requirement were contacted and the extent and need for dredging was discussed by meetings, telephone conversations and letter.

Considering the areas around the estuaries that have a need for maintenance dredging:

3.1 Ports of Truro and Penryn

Historically, Truro has been a port in its own right since 1170, Penryn dates back to the 14th Century whilst Falmouth has been a port since around the 1680's. In 1701 a complaint regarding the silting up of the Truro River was recorded in the Borough Order Book.

Dredging within the Port of Truro only really became a regular feature around the 1930's and 1940's when the Harbour Authority owned and operated the dredger 'Tolverne'.

The dredger 'Reclaim', with a hopper capacity of c47 cubic metres, that was in operation between 1952 – 1991 replaced this.

During this latter period around 7 500 tonnes (5 770 cubic metres) was dredged each year at locations between Town Quay, Truro and Lighterage Quay, Newham.

This dredged material was used to build up the riverbank at Boscawen Park, which was an intertidal mudflat once used as a municipal dump by Truro City Council. No disposal licence was therefore required and this operation was known as 'riverbank reinforcement' and was exempt from any disposal licence.

Occasionally, at intervals of about every seven years, a dredging contractor was brought in to dredge a further 4 000 – 5 000 tonnes (3 076 – 3 846 cubic metres) and dispose of it to a disposal site at sea.

Since 1991 the maintenance dredging in Truro had been considerably reduced principally owing to the financial costs involved. Good records have only been available since the adoption of an Environmental Management System in 1996 which gives the following tonnage's:

1996	200 tonnes	-	Riverbank re-inforcement
1997	1 770 tonnes	-	770 tones to landfill and 1 000 tonnes in soil factory.
1998	No dredging undertaken.		
1999	7 825 tonnes	-	Disposed at sea (Consent granted for 6 500 tonnes).
2000	5 850 tonnes	-	Disposed at sea (Consent granted for 8 450 tonnes).
2001	No dredging undertaken.		
2002	No dredging undertaken.		
2003	5 031 tonnes	-	Disposed at sea (Consent granted for 25 350 tonnes over three years)
2005	5 720 tonnes	-	Disposed at sea.

This maintenance dredging commitment is that of the Harbour Authority, which in turn benefits a number of users within the commercial and leisure sectors. Other maintenance dredging requirements come from the following:

All chartlets and photographs are found in Enclosure 1

See Chartlet: Port of Truro – Maintenance Dredging Location
See Photo: Aerial View of the Port of Truro

See Chartlet: Port of Penryn
See Photo: Aerial View of the Port of Penryn

3.2 Port of Falmouth

The Falmouth Harbour Commissioners have a requirement to maintain a dredging commitment at their Visitors Yacht Haven of approximately 1 300 tonnes (1 000 cubic metres) every ten years.

This follows capital works that were undertaken in 1999 when approximately 8 500 tonnes (6 538 cubic metres) was dredged by backhoe digger and dumped at sea.

See chartlet: Port of Falmouth
See Photo: Aerial View of Port of Falmouth

3.3 Falmouth Docks and Engineering Company (FDEC)

FDEC have a requirement to remove silt from a pit in which their No. 2 dock gate lies when open. The pit can contain 3,600 cubic metres of silt but the silt is removed when approximately half full i.e. 1,800 cubic metres every 3 years to ensure that the dock gate can operate correctly. This equates to 600 cubic metres every year.

See chartlet: Port of Falmouth
See Photo: Aerial View of Port of Falmouth

3.4 Environment Agency

At the upper end of Lighterage Quay, Newham is a tidal defence system owned and operated by the Environment Agency. From time to time there is a need to dredge, by gully sucker some sediment which gathers around the bottom of the gates.

Approximately 5 tonnes (3.85 cubic metres) per year is removed and taken to a licensed infill site. It is hoped that as from 2004 a bubbler jet system can be used which will mean that dredging will not be required.

See Chartlet: Tidal Barrier - Truro
See Photo: Tidal Barrier Truro

3.5 Mylor Yacht Harbour Ltd.

Mylor Yacht Harbour was redeveloped in 2000/2001 which entailed a capital dredge scheme with the removal of 59 800 tonnes (36 000 cubic metres) of dredged spoil which was dumped at sea. In addition, 8 450 tonnes (6 500 cubic metres) of treated sediment was used in the infill of a grid to create a car park, quay and slipway. It is estimated that there will be a maintenance dredging commitment of around 1 300 tonnes (1 000 cubic metres) every six to seven years.

A significant amount of detailed hydrographic data also exists with this company in the form of their Environmental Impact Assessment that was undertaken prior to the capital works commencing in 2000/2001.

See Chartlet: Mylor Yacht Harbour
See Photo: Aerial View of Mylor Yacht Harbour

3.6 Falmouth Boat Yard

Falmouth Boat Yard has a slipway that was constructed in 2003 for company and public use. Whilst there is no maintenance commitment known at the moment it is expected that there is a need to dredge approximately 20 – 30 tonnes each year to keep it clear. The Penryn Harbour Authority subject to the normal constraints and permissions would undertake this work and it would be dumped at sea provided the chemical analysis allowed.

See Chartlet: Falmouth Boat Yard
See Photo: Falmouth Boat Yard

3.7 Falmouth Yacht Marina

Falmouth Yacht Marina was created in the early1980's by infilling an area known as Turnpike Creek and creating a 350 pontoon berth facility. The following dates are of note:-

1979 – 1980	Marina first dredged (Quantity and disposal of dredged spoil unknown)
1987 – 1988	Marina extended (Quantity and disposal of dredged spoil unknown)
1994	Maintenance dredge of 4 425 tonnes undertaken by backhoe digger and dumped at sea. (License for 9 500 tonnes)
1995	Maintenance dredge of 3 900 tonnes undertaken by backhoe digger and dumped at sea. (License for 9 500 tonnes)
1996	License obtained for dredging 9 500 tonnes but no dredging undertaken. Received first letter from MAFF restricting the removal of TBT contaminated sediment in certain areas.

1997	License obtained for dredging 9 500 tonnes but no dredging undertaken. Received letter from MAFF restricting any form of dumping at sea.
2003	Application to undertake 16 000 tonnes of dredging (12 000 tonnes maintenance, 4 000 tonnes capital)
2004	Licence for dredging 82 650 tonnes

All maintenance dredging is undertaken in order to maintain a depth of 2.0 metres below chart datum.

The dredging requirement is in order to continue with commercial operations and to provide for general small craft safety.

See Photo: Falmouth Yacht Marina

3.8 Challenger Marine

Capital dredging was first undertaken here in 1991 with a maintenance dredge taking place in 1996/1997. A floating bulldozer and crane undertook the original capital dredge with the spoil dumped inland. The maintenance dredge was undertaken by single grab dredger and dumped at sea.

The disposal licence (MAFF/DAS 5021/96/0) for the maintenance dredge was for 4000 tonnes (3077 cubic metres) and a total of 5 616 tonnes (4320 cubic metres) was dredged over a two year period.

It is estimated that there is a requirement to undertake maintenance dredging of about 5 000 tonnes (3846 cubic metres) every ten years.

See Photo: Challenger Marine

3.9 St Mawes Harbour

There is a small maintenance dredging commitment required off the jetty in St Mawes to remove banks built up by propeller wash from the passenger pleasure vessels and ferries using the steps.

This commitment is generally for the removal of about 100 -150 tonnes (77 – 115 cubic metres) every 1 – 2 years. In addition there is a requirement to undertake some dredging in the inner harbour at intervals of about seven years. Amounts do vary but the average dredge is for 1000 tonnes (769 cubic metres). A long reach digger undertakes the dredging with the spoil taken away for landfill.

See Chartlet: St Mawes Harbour
See Photo: Aerial View of St. Mawes Harbour

3.10 Port Pendennis

Port Pendennis is a marina situated near the Docks in Falmouth that offers 130 berths for vessels ranging from small craft, cruising yachts, powerboats and superyachts.

The original site was developed in 1988 when there was the construction of a land reclamation and marina complex. The reclamation involved dredging 10 000 cubic

metres of unsuitable material from the shoreline and retaining 5 000 cubic metres of imported fill behind 10,000 square metres of anchored sheet piling.

It is estimated that there is a need for a maintenance commitment of 4,000 – 6,000 cubic metres of spoil (5,200 – 7,800 tonnes) every 6 years which equates to an annual requirement of 666.67 – 1 000 cubic metres per year.

The dredging operation is carried out by a backhoe digger mounted on barge / pontoon which loads into a bottom opening barge and dumps the spoil at sea.

See Chartlet: Port Pendennis
See Photo: Port Pendennis

3.11 Gweek Boatyard

Gweek Boatyard has a requirement to undertake some limited maintenance dredging in order to maintain depths alongside the quay and allow for safe depths for vessels passing others and turning. The dredged spoil is not dumped at sea and has either been used to replenish existing riverbanks or placed back on the land.

See Chart: Gweek

3.12 Ponsharden Park and Float

A capital dredge scheme was commenced here in 2005 consisting of a 10metre wide channel from the landing pontoons at Ponsharden to the entrance of the marked channel adjacent to the Falmouth Yacht Marina.

These works were identified in the initial Baseline Document (under paragraph 4.0 Future Dredging Requirements) but the maintenance commitment has yet to be established. The licence allows for a total of 46,530 tonnes (35,792 cubic metres) to be deposited between 01.02.05 and 31.01.08.

The purpose of these works is to allow the passenger craft all tide access to the ‘Park and Float’ pontoons in order to take more passengers by boat into Falmouth rather than taking the bus thereby helping to create a more environmentally sustainable transport network.

4.0 Future Dredging Requirements

As part of the Falmouth Docks regeneration programme it is understood that there will be an application to undertake a capital scheme with a maintenance commitment thereafter. The quantities involved are likely to be in the region of 250,000 cubic metres and will involve dredging the old docks channel. This capital improvement scheme is required owing to a growth in vessel size together with the

requirement for increased navigational safety more specifically related to the growth in the cruise market. Maintenance dredging requirements needed thereafter are unknown at present.

Another dredging requirement currently being considered is the possibility of establishing a 70-80 berth marine alongside the Upper Quays in Truro.

4.1 Sediment Budget of the Fal

Stapleton & Pethick (1996) - Institute of Estuarine and Coastal Studies, consider this in their report 'The Fal Estuary: Coastal Processes and Conservation'

The lack of sedimentological information for the Fal Estuary precludes the determination of a sediment budget. However, the high degree of accretion evident in some of the major creeks such as Ruan and Restronguet creeks indicates there has been large quantities of sediment available for deposition. Most of this sediment is derived from fluvial rather than marine sources due to the various mining activities within the rivers' catchments although accretion was evident before such activities began.

With the catchment of the River Fal, the main source of sediment was the china clay industry, which until the 1960's resulted in large volumes of sediment being input into the valley below Tregony although marine sediments were also being deposited as evidenced by the discovery of marine shells at Tregony by Hals (cited in Whitely, 1881b).

However, the decline of the industry and improvements to working techniques, reducing the amount of sediment input into watercourses, have resulted in lower sedimentation in Ruan Creek in more recent years. Evidence suggesting that the rapid development of saltmarsh commensurate with the high sediment loads has declined in concert with the decrease in sediment input more recently, however, is not available.

Other creeks, including Restronguet and Calenick Creeks and the Tresillian River have received sediments input into the watercourses as a result of metal ore mining within their catchments. Of these creeks, Restronguet Creek has received the greatest amount of sediment due to mining activity. However, sedimentation was evident prior to the onset of mining activities, which during the Holocene resulted in deposition of up to 30 metres of sediment in the incised channel.

The upper creek during the late 17th and early 18th centuries also experienced a high degree of disturbance to the sediments as a result of opencast mining of the tin-bearing gravels present below estuarine sediments. Following decommission of the streamworks the development of Devoran port resulted in further modifications. The present situation in these creeks is unclear, although there is evidence of an undercutting of the saltmarsh edge in places. This is possibly a response to sea level rise (Section 7.1).

The high rates of sedimentation experienced in the creeks, however, are not experienced within Carrick Roads, the morphology of which appears to be relatively stable for at least the past 200 years. This stability is the result of the lack of deposition resulting in the estuary closely resembling the form it attained prior to the

Holocene transgression (Section 7.2). Thus, there is only a thin layer of sediment within the central deepwater channel and over the shallow banks, which flank the channel. Sediment has been lost from the system as a result of anthropogenic activities including extraction of maerl and the dredging of approach channels and wharves.

Little evidence of accretion within Carrick Roads has been identified which suggests the sediments input from fluvial sources are not reaching the tidal basin, instead these being deposited solely within the upper reaches of the estuary. Most sediment therefore appears to be input from the marine sources, although this is at a very low rate. Thus the outer estuary is still to attain its equilibrium morphology as described in Section 2.5.1.

The Summary of this report states:

The Fal Estuary can be divided into two distinct sections: the outer estuary of Carrick Roads, which has experienced only limited sedimentation during the Holocene and is relatively stable, and the inner tidal creeks, which have experienced a high degree of infilling.

Comparison of the Fal Estuary with East Coast estuaries indicates that the estuary is in an embryonic stage of development. The Fal appears to be too deep and possesses a larger mouth area than would be expected for its morphodynamic equilibrium form. This indicates that the estuary will need to experience a high degree of deposition to achieve its equilibrium shape.

Although the Fal has continued to develop throughout the Holocene, and despite a flood dominant tidal current regime, the outer estuary has experienced limited deposition due to the lack of a source of sediment and low tidal currents. The dominant process in the estuary for the future will be depositional, although the rate will be low.

In contrast to the outer estuary, the inner creeks have experienced a high degree of infilling during the Holocene, which has resulted in up to 30 metres of sediment in Restronguet Creek. Many of the creeks were experiencing accretion prior to the onset of metal ore and china clay mining within the Fal catchment although these activities increased deposition rates.

The deposition of sediments in the River Fal valley (Ruan Creek) has resulted in a 4.5km seaward migration of the tidal limit since the Middle Ages when Tregony marked the tidal limit. Evidence of fluvial and marine deposition prior to the development of the china clay industry is documented although during the peak of the china clay industry deposition of micaceous waste was much increased. The subsequent development of a saltmarsh to tidal woodland transition along the Fal valley represents a rare habitat in both the UK and Europe.

Restronguet Creek was also experiencing sediment deposition before metal ore mining was developed within the catchment. The tidal limit of the Carnon River has experienced a seaward migration although this may have been influenced by open cast mining of the lower valley during the early 19th century. Large areas of saltmarsh have developed within Restronguet creek since 1908.

Other creeks such as the Truro and Tresillian Rivers have also experienced accretion although rates of deposition are lower than in Ruan and Restronguet

Creeks. This is primarily due to the lack of mining activities within the catchments of these rivers.

Sea level rise of approximately 1.8 mm a year has been identified over the period 1916-1982. Sea level rise may be responsible for the erosion of the seaward edge of saltmarshes in Ruan and Restronguet creeks.

Few management options are available for the Fal. The inner creeks are likely to suffer erosion in the future as a consequence of sea level rise, which is a natural response. It is possible that the marshes re undergoing a landward migration as indicated by continued vertical accretion; this landward migration in many creeks is permitted due to the undeveloped nature of the heads of the creeks. The mobilisation of contaminated sediments may present a potential management problem.

The outer estuary is expected to experience deposition in the future in response to both sea level rise and development of an equilibrium shape. The limited sediment supply to the outer estuary will inhibit this process, resulting in increased tide and wave energy throughout the estuary.

Anthropogenic modifications to the outer estuary appear to have little impact on estuarine morphology, although such developments in the inner creek areas are more serious. Development of creek heads by reclamation or the construction of fishponds will prevent the landward shift of the coastal zone associated with sea level rise.

The constriction of the Truro River resulting from the development of a tidal barrage may have altered estuarine dynamics in an area where the estuary is already artificially constrained by reclamation. It is suggested that investigations into the impact of the barrier on estuarine processes and morphology are carried out.

5.0 Chemical Analysis of Sediments

As applications for disposal licences are made there is a requirement to undertake chemical analysis of the spoil. In addition extra sampling has taken place when considering the beneficial uses of dredged spoil together with other ad hoc analysis undertaken by other agencies and non-governmental organisations.

The Environment Agency undertook a large-scale sampling programme in 1997, which looked at a TBT Baseline Monitoring Programme.

The background to this is that '*historically samples of water and sediments taken in the Fal Estuary have shown very high levels of TBT with sediment levels being among the highest found in the UK. TBT is known to be toxic to aquatic organisms at low levels and since 1987 its use for antifouling boats of under 25 metres has been banned. However, discharges to the marine environment in the Falmouth area continue from larger vessel activities, leaching from historically contaminated sediments and other diffuse sources'*

In addition the Fal and Helford cSAC was considered in a ‘Site Characterisation of the South West European Marine Sites’ (March 2003) :

Executive Summary

The Environment Agency and English Nature have undertaken investigative work in order to review permissions required under Regulation 50 of the Conservation (Natural Habitats &c) Regulations 1994. Phase 1 of this exercise was the characterisation of designated European Marine Sites. In the South West these sites include the Fal and Helford candidate Special Area of Conservation (cSAC).

The project, undertaken by the Plymouth Marine Science Partnership (PMSP), comprising Marine Biological Association (MBA), University of Plymouth, (UoP) and Plymouth Marine Laboratories (PML), has two main objectives. Firstly, to characterise the site in terms of water quality, both current and over recent years (up to 2002), and to identify areas where conditions might result in effects on habitats and species for which the site was designated. Secondly, to consider permissions, activities and sources, ether alone or in combination which have, or are likely to have, a significant effect on the site.

Site characterisation has been accomplished by review of published literature and unpublished reports, together with interrogation of raw data sets, notably that of the EA (this did not include recent compliance data and other forms of self monitoring for Integrated Pollution Control sites, which was not available).

Key findings are; that parts of the cSAC, principally Carrick Roads, are impacted by past mining activities outside the boundary of the site (notably from Restronguet Creek) which continue to influence the area via mine drainage discharges and remobilisation of metals from sediments.

The whole system, and in particular, the Falmouth area, is affected by organotin contamination. The principle source is Falmouth Dockyard, although sediments now also contribute significantly to the overall burden.

Parts of the system, notably the upper Fal estuary, are subject to eutrophication. Although the majority of nutrient inputs in the cSAC may be due to diffuse sources such as agricultural run-off, localised enrichment from sewage treatment works are also significant. This is particularly so in the more enclosed reaches of the upper Fal estuary where chronic contamination and nutrient-associated water quality problems have resulted in toxic algal blooms. The most recent incidence, in 2002, also affected the Helford Estuary, resulting in invertebrate mortalities.

The problem of hypernutrification has lead to the designation of the Truro, Tresillian, and Fal Estuaries as a Sensitive Area (Eutrophic), under the Nitrates Directive 91/676/EC, which it is hoped, will bring about improvements to the nutrient status of the region. However, nutrient enrichment in some of the more enclosed waters of the Helford Estuary is also a cause for concern and warrants further investigation.

These principle findings are discussed in detail, together with implications for key habitats and species, and the ecological significance of potential effects. Gaps in

knowledge are identified and recommendations are made for future studies which may improve understanding of the system and assist Regulatory Authorities in their statutory responsibilities to ensure the favourable condition of the site and its features.

6.0 Locations of Dredging and Disposal

Locations of Maintenance Dredging are as outlined in the Section dealing with 'Maintenance Dredging Requirement'.

Licences for the deposits of spoil at sea are found in Enclosure 3.

The spoil ground location is identified on Enclosure 4.

Spoil Ground – see Enclosure 4

7.0 Beneficial Uses of Dredged Spoil

Serious attempts have also been made to utilise the dredged spoil as a form of 'topsoil substitute' for derelict land reclamation.

A preliminary assessment entitled 'The potential of Dredged Sediments from the Truro River for Reclamation as Topsoil' (Enclosure 5) was undertaken by the Soil Survey for England and Wales (T R Harrod BA PhD) in July 1987. The following extract from the report states:

' If it is decided to proceed with exploitation of dredged material from the Truro River further prior investigations of the sediments properties are recommended. While the indications (Tables 2, 3 & 4) are that the particle size (texture) and major chemical properties are amenable to any proposed use as soil, it should be borne in mind that this sampling strategy was devised as a preliminary investigation. It has not addressed the possibility of vertical variation within the deposits nor rates of lateral change.

This is particularly pertinent in terms of heavy metal concentrations, where the sample numbers were limited to four. The presence of substantial amounts of zinc at sites 7 & 10 (both on extensive mudflats) may be unacceptable for certain uses on land. However,whether that is so depends very much on the needs of the recipient. If the material is required for horticultural purposes it must be ensured that sources are not limited by heavy metal concentrations. Frequent, systematic analysis of the sediments, and possible mixing, would be necessary. Were the use to be a soil for restoration of old mineral workings or otherwise derelict land, the heavy metal levels in the sediment are likely to represent a substantial improvement on what exists at present, leaving aside their physical attributes considered below.

Other aspects of the sediments suggest that, suitably treated and used they can form acceptable soils.

Suitable treatment should include weathering over the winter half year in layers of modest thickness to allow leaching of salt and dewatering. (More precise recommendations appropriate to the Truro River sediments would require simple preliminary investigation to establish the acceptable depth of material set apart to weather, since excessive thicknesses are likely to remain salty and unable to 'ripen' and develop soil like properties).

The well sorted particle size class dominated by silt (Table 2) similar to that in the best of the silt fenland of eastern England makes for very large available water capacity (the standard assessment of soil's ability to store and release moisture) enabling plant growth to be maintained at all but the driest time. The low clay content ensures that salt will be rapidly leached once the sediment is exposed to rain. Small clay content also suggests that the material will be light and easily cultivated.

In its initial unripened and structureless condition (devoid of pores, fissures and natural aggregates) it will be unstable with a propensity to capping, slumping and particularly in sloping sites, erosion until a vigorously rooting crop or vegetation cover has been established. Once leaching and some beneficial drying have taken place this propensity also means that handling should only be carried out under dry conditions and with suitable equipment in order to avoid compaction and smearing. It may also be most advantageous to stand the sediment for leaching and initial drying at its final destination to avoid excessive handling.

The large silt content makes the material more than usually prone to capillary movement of water and to frost heaving.'

Since this initial preliminary report the 'soil factory' process has gone further and there is a small area set-aside for limited amounts of dredged spoilt to be mixed with other materials.

This 'soil factory' has been identified in the 'Good Practice Guidelines for Ports and Harbours operating within or near UK European Marine Sites (UK Marine SACs Project) as a case study. This study states that:

Good practice in using dredged materials for construction purposes can be illustrated by recent beneficial use schemes undertaken by the Port of Truro in the Fal and Helford SAC (Brigden 1996). The Port of Truro has been investigating the feasibility of mixing de-watered dredged material with china clay waste sands and other waste substances for composting (sewage sludge and green wastes) to cap derelict land on the site of former arsenic works.

Two derelict experimental sites are already underway, the first of which used basic dredged spoil and was left to colonise naturally, the other where the dredged material mix was used and sown with grass seeds. Vegetation has become established at both sites where no plants had grown before the placement of the dredged material, with the first site taking just three years to become established through wind borne seeding of native grasses, and the second sown site developing considerably quicker.

Adoption and adaptation of this beneficial use of dredged silts for 'composting' derelict sites may provide a number of benefits to other ports and harbours with a supply of silt, nearby storage places for dewatering dredgings, and access to suitable waste materials for mixing.

The current 'soil factory' site also benefits from an exemption for this activity, granted by the Environment Agency.

Exemption - See Enclosure 5

8.0 Interest Features

Reasons for Designation as a Candidate Special Area of Conservation (cSAC)

As outlined in section 1.2, SACs are selected as candidate sites by individual Member States on the basis that they support rare, endangered or vulnerable habitats and/or species, as listed in Annexes I and II of the Habitats Directive. In addition, some sites may be selected because they support outstanding examples of habitats, and characteristic of that particular region. The habitats or species that a site has been selected for are referred to as its *interest features.* Whilst some sites are only selected for one habitat or species, others are multi-interest and represent extremely valuable wildlife areas.

The Fal & Helford has been selected as a candidate SAC for the following habitats or interest features:

- large shallow inlets and bays
- estuaries
- sub-tidal sandbanks
- intertidal mudflats
- saltmarsh (this includes 'Atlantic Sea Meadows')
- reefs

The Fal & Helford cSAC also qualifies for the Annex II species shore dock *Rumex rupestris.* This does not however occur within the European Marine Site as it occurs above the Highest Astronomical tide, and is not covered by this scheme of management. Objectives to maintain shore dock in '"favourable condition"' are found within English Nature's conservation objectives for the relevant SSSI within the cSAC boundary and will be dealt with through procedures outlined in the Conservation (Natural Habitats &c.) Regulations 1994.

In section 2.1. there is a series of descriptions and examples of the main habitat types that make up these interest features and their locations are shown in Figures 2 & 3.

The Fal & Helford site encompasses the two rias (drowned river valleys) of the Fal Estuary and the Helford River and the inner part of Falmouth Bay between Zone Point on the Roseland Peninsula and Manacle Point on the Lizard Peninsula. For an overall site boundary map, see Figure 1, section 2.2.

2.1. Brief description of main features of site

Falmouth Bay is a relatively shallow and exposed section of the South Cornwall coast although protected from prevailing south-westerly winds. Both the estuaries are examples of drowned river valleys or rias, which explains their general sinuous shape. Whilst the Helford is quite shallow, with only 8 - 10 m at its mouth, the Fal is well known as a deep-water anchorage, with up to 33 m in the central channel.

Rias are important areas for marine life because of the range of habitats found along their length, from extremely sheltered mudflats, e.g. upper Fal, to the wave-exposed, rocky open coasts, e.g. Mawnan Shear to Rosemullion Head in the mouth of the Helford River. Unusually, all these habitats are fully marine as there is very little freshwater input into either estuary. The rocky coastline of Falmouth Bay, particularly where reefs are always covered by the tide, and the rare rocky areas within the estuaries are also valuable sites for marine life. Amongst the most important of these habitats are the following:

2.1.1. Large shallow inlets and bays

The rias of the Fal and Helford have a low freshwater input and as a result the area contains an unusual range of fully marine habitats. Large shallow inlets and bays are a physiographic habitat as well as being an interest feature. This site supports a wide diversity of habitats and species, key sub features of the site are identified below, or under the relevant interest feature habitat:

(i) Rocky shore communities

A description of this sub-feature is given under the interest feature ‘Reefs’, covered in section 2.1.6.

(ii) Sub-tidal rock and boulder communities

A description of this sub-feature is given under the interest feature ‘Reefs’, covered in section 2.1.6.

(iii) Sub-tidal mud communities

The extensive sub-tidal muddy sediments form a significant proportion of the shallow inlet and bay; they are also integral to maintaining the intertidal areas and are important feeding grounds for fish.

(iv) Kelp forest communities

A description of this sub-feature is given under the interest feature ‘Reefs’, covered in section 2.1.6.

Example sites for rocky shores: St. Anthony Head, Trefusis Point to Penarrow Point, Toll Point to Rosemullion Head.

Example sites for sub-tidal rock: Nare Point to Manacle Point, Carrick Carlys Rock (off Restronguet Point), lower Percuil River.

2.1.2 Estuaries

Estuaries are the largest coastal habitat resource in England, they form the downstream part of a river valley and are subject to the tide and extend from the limit of brackish waters. River estuaries are coastal inlets where there is generally a substantial freshwater influence. The mixing of freshwater and seawater and the reduced current flows in the shelter of the estuary lead to deposition of fine sediments, often forming extensive intertidal sand and mud flats. In reality estuaries, and the wildlife they support, are amongst our most threatened maritime habitats. Where they are relatively undeveloped, as in the Fal & Helford, they are seen as the last remaining source of development land, have pressures from land-claim and from cumulative effects of numerous small scale projects. Even though the estuaries have been extensively changed by human activities, they still remain productive habitats, with a diverse range of wildlife. Estuaries are a physiographic habitat as well as being an interest feature and as such supports a wide diversity of habitats and species. Key sub features of the site are identified below, or under the relevant interest feature habitat:

(i) Intertidal mud communities

A description of this sub-feature is given under the interest feature ‘Intertidal mudflats’, covered in section 2.1.4.

(ii) Subtidal mud communities

In the subtidal, muddy sediments are important as feeding grounds for fish such as juvenile sole *Solea solea*. These muddy sediments are even more productive than intertidal mud communities and contribute significantly to the overall functioning of the system. They are also integral to maintaining the intertidal areas

(iii) Intertidal mixed muddy sediment communities

A description of this sub-feature is given under the interest feature ‘Intertidal mudflats’, covered in section 2.1.4.

(iv) Subtidal mixed muddy sediment communities

Filamentous algae, including some rarities, are abundant on cobbles, shells and muddy sediments. The community structures of these subtidal communities are different to the intertidal communities outlined above, due primarily to the more mixed substrate providing niches for different plants and animals.

(v) Estuarine bedrock, boulder and cobble communities

A description of this sub-feature is given under the interest feature ‘Reefs’, covered in section 2.1.6.

(vi) Subtidal sandbank communities

As an interest feature in its own right, this feature is described in more detail in section 2.1.3.

(vii) Saltmarsh communities

As an interest feature in its own right, this feature is described in more detail in section 2.1.5.

(viii) Reedbed communities

Reedbeds are nationally scarce, with many of these sites being small. The reedbeds are inundated at high water providing nursery areas for fish. These habitats are of great importance to the structure and function of the estuaries, their dynamic nature

and interdependence with the intertidal mudflat communities. The benefit they provide in the form of natural sea defences should also not be overlooked.

<u>Example sites for estuaries</u>: Upper parts of the Fal Estuary and Truro River and upper parts of the Helford Estuary and associated creeks.

2.1.3 Sub-tidal sandbanks

These cover a large part of the lower Carrick Roads and extend across Falmouth Bay and into the mouth of the Helford. Sub-tidal sandbanks are habitats included within the Cornwall Biodiversity Action Plan. Key sub features are listed below:

(i) Maerl bed communities

Maerl beds are composed of accumulations of living and dead unattached coralline algae. Live maerl is pink and is found in the largest quantities in England and Wales on St Mawes Bank and offers shelter to a large number of species of plants and animals. There are also extensive areas of dead maerl, these sediments are also species rich and provide an important habitat for deep burrowing species, attached seaweed and large areas of brittle stars.

(ii) Eelgrass beds

Eelgrass is important in its own right and as a habitat for invertebrates, sea slugs and cuttlefish, also as nursery areas for various fish species, including seahorses. Eelgrass beds are included within the Cornwall Biodiversity Action Plan.

(iii) Gravel and sand communities

Fine sand and gravel support large numbers of invertebrates, bivalves, molluscs and other sand dwelling species such as polychaetes.

<u>Example sites for sandbanks</u>: St. Mawes (Vilt) Bank, Falmouth Bank, inner Falmouth Bay (off Maenporth).

<u>Example sites for mud/shell/gravel</u>: The Bar, Helford and Place Cove, Percuil.

<u>Example sites for eelgrass</u>: between Durgan and Toll Point (Helford); in St. Mawes Harbour particularly between Carricknath Point and Amsterdam Point and on the inside of St. Mawes Bank (Fal).

(i) Intertidal sand and gravel

The sheltered sandy shores at the mouth of the Fal are rich in species such as certain amphipods and polychaete worms and some bivalve molluscs.

2.1.4 Intertidal mudflats

Mudflats are exposed at low water in the majority of side creeks of both estuaries. They support a rich and diverse range of invertebrate species including molluscs and worms, and also many larger species such as bass and heron and nationally important populations of waterfowl. Mudflats are identified as a priority habitat within the Cornwall Biodiversity Action Plan (BAP). Key sub features are identified below:

(ii) Intertidal muddy sand communities
Dense beds of the sand mason worm *Lanice conchilega* are found in the lower shore muddy sand at Amsterdam Point and at Treath on the Helford. In Place Cove the muddy sand is dominated by the lugworm *Arenicola.* These areas are extensive and highly productive, supporting nationally important bird species.

(iii) Intertidal mud communities
The extensive mudflats present throughout the complex are a highly productive system forming a critical part of the food chain. The mudflats contain extensive and varied infaunal communities, rich in bivalves and other invertebrates, and provide important feeding grounds for internationally important numbers of waterfowl.

(iv) Intertidal mixed muddy sediment communities
The mixed intertidal muddy sediments of the estuaries provide a habitat for different communities, primarily bivalves such as cockles *Cerastoderma edule* and native oysters *Ostrea edulis.* These can be found on the substrata containing more gravel and slates. The native oyster is also the subject of a UK BAP species action plan.

Example site for mudflats: upper Fal around Ardevora Veor; Place Cove in the Percuil, Polwheveral Creek in the Helford River.

2.1.5 Saltmarsh
Saltmarshes are found fringing the upper creeks of the Fal and Helford and offer important feeding, roosting and nesting areas for wading birds, as well as providing a natural form of sea defence. The more open edges of the saltmarsh are ideal nursery areas for young bass and other fish. There are also areas of transition from new saltmarsh through established saltmarsh to scrub and finally oak woodland, for example at Sett Bridge, an unusual and rare habitat in the UK. Typical plant species in salt marshes include saltmarsh and red fescue grasses, thrift and sea aster. Saltmarshes are another priority habitat with action included in the Cornwall BAP. The key sub features are listed below:

(i) Low marsh communities
This area experiences the greatest number of tidal inundations and is often species poor, composed of halophytes (salt tolerant plants) that can withstand such conditions.

(ii) Mid marsh communities
Transition zone between lower and upper marsh, as tidal inundations become less frequent, the vegetation becomes more diverse.

(iii) High marsh communities
Tidal inundations only occur at the highest spring tides, and the species present reflect this.

Example sites for saltmarsh: head of Fal & Ruan creeks, near Sett Bridge, Calenick Creek, Tresillian river and the upper portion of Restronguet Creek and Perranarworthal Creek. The latter two sites are not within the cSAC boundary, however the Management Forum is committed to supporting the voluntary inclusion of these areas within the management scheme.

2.1.6 Reefs

This includes underwater and intertidal rock, which typically fringes the coastline, extending offshore to varying degrees. Usually subtidal, or exposed at low tide, rocky substrates may extend into the littoral zone where there is an uninterrupted zonation of plant and animal communities. These reefs generally support a zonation of benthic communities of algae and animals. Although rocky reefs can appear robust and resilient, the communities which live on them can be delicate, particularly in areas which are sheltered from strong wave action. Typically, rock surfaces in shallow water are dominated by leafy seaweeds such as kelps. In deeper water there are fewer seaweeds and rock surfaces are covered by encrusting animals such as anemones, sponges and hydroids. The presence and continued well-being of species such as the pink seafan are important indicators of the general health of the rocky seabed. The pink seafan is large and easily damaged by modern commercial fishing gear, breaking down the reef structure and reducing habitat diversity. This in turn can reduce the suitability of the reef for commercial species such as crabs and lobsters. The key sub features are listed below:

(i) Rocky shore communities

The majority of the open coast including both the mouths of both the Fal and Helford are rocky, with a wide range of habitats such as overhangs and rocky platforms, rock pools and boulder shores. These habitats are important for their high diversity of communities and species richness, as well as their high productivity, they support a wide range of both common and rare plant and animal species, including the rare Giant Goby in shallow pools near Rosemullion Head.

(ii) Kelp forest communities

Kelp forests are highly productive ecosystems, found in the shallow subtidal and are the major primary producers in the coastal waters of the UK. They have been compared with rainforests in terms of their productivity and species richness. Kelp forests also have considerable conservation value because they harbour a very high diversity of organisms, confined to a narrow coastal fringe. For example, a single kelp holdfast may be home to several thousand small animals and the habitat plays a significant role as nursery areas for a wide variety of species, including commercial species such as crab and lobster. They are therefore key structural and functional components of this embayment.

(iii) Subtidal rock and boulder communities

These are important areas for soft and hard corals, including pink sea fans, particularly between Nare Point and Manacle Point, also rich sponge and sea squirt communities and kelp forests. Also rare patches of sub-tidal rock in Percuil and King Harry Passage which are unusual within ria systems and are important for sponges, sea mats and seaweeds.

(iv) Estuarine bedrock, boulder and cobble communities

Subtidal rock communities are typical of sheltered estuarine areas. The animal communities are dominated by the breadcrumb sponge *Halichondria panicea* with a high abundance of the barnacle *Balanus crenatus* and abundant shore crabs *Carcinus maenas*.

<u>Example sites for reefs</u>: St. Anthony's Head; inshore round Manacle Point; fringing reefs round Falmouth Bay and the Helford

9.0 Current Condition Assessment.

English Nature is required to report on the condition of the Fal and Helford cSAC at six-yearly intervals. The condition of the site will be assessed using data monitoring data specifically collected, data arising from appropriate assessments and information on activities taking place around the site.

The first assessment of the condition of the site has been undertaken by English Nature in summer 2004. This assessment determined that over most of the area, and for most of the features for which the site has been designated the site was in favourable condition. There are some exceptions, where particular activities or contaminants are impacting on the site. There is no evidence that areas where maintenance dredging are in unfavourable condition as a result of this current activity.

10.0 Conclusion

Maintenance Dredging, by its very nature, is likely to have a significant effect on the cSAC, by virtue of changes to habitats, increased suspended sediment loading, redistribution of contaminants and changes to hydrology.

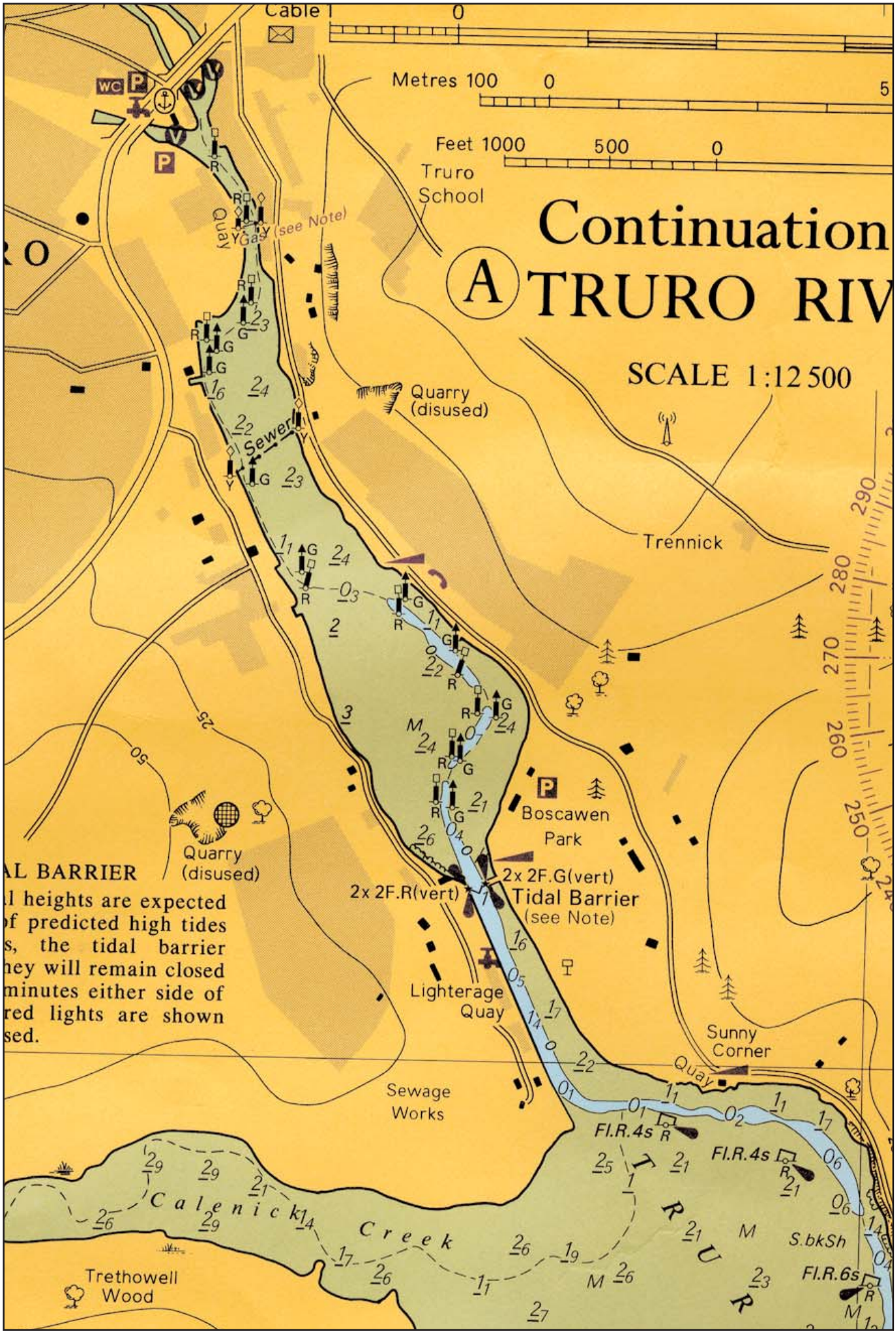
As maintenance dredging is likely to have a significant effect, this Baseline Document together with the other works outlined in it, notably ‘The Fal Estuary: Coastal Processes and Conservation’ – Stapleton & Pethick (1996) - Institute of Estuarine and Coastal Studies and ‘The Site Characterisation of the South West European Sites’ – Fal and Helford cSAC (March 2003), represents a record of the appropriate assessment for maintenance dredging currently taking place.

Any appropriate assessment should therefore demonstrate that there are no adverse effects and this Baseline Document should provide the evidence to support this.

Any maintenance dredging that does take place should also consider the timing and methodology of such dredging in order to further reduce any adverse effect.

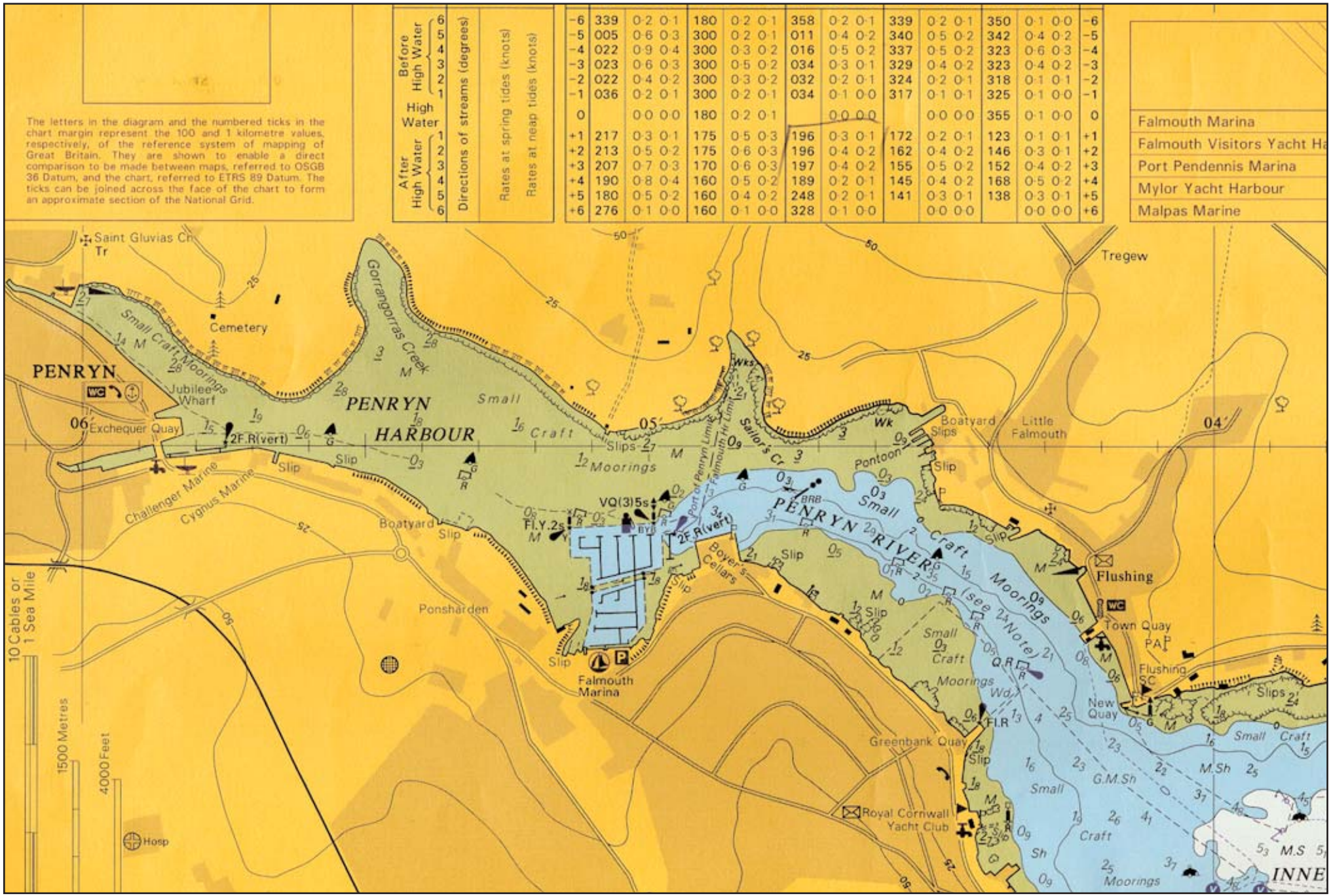
This Baseline Document must be constantly reviewed should the maintenance dredging commitment increase owing to more capital schemes taking place.

In addition, beneficial use of dredged spoil should continue to be considered wherever possible, bearing in mind environmental consideration.



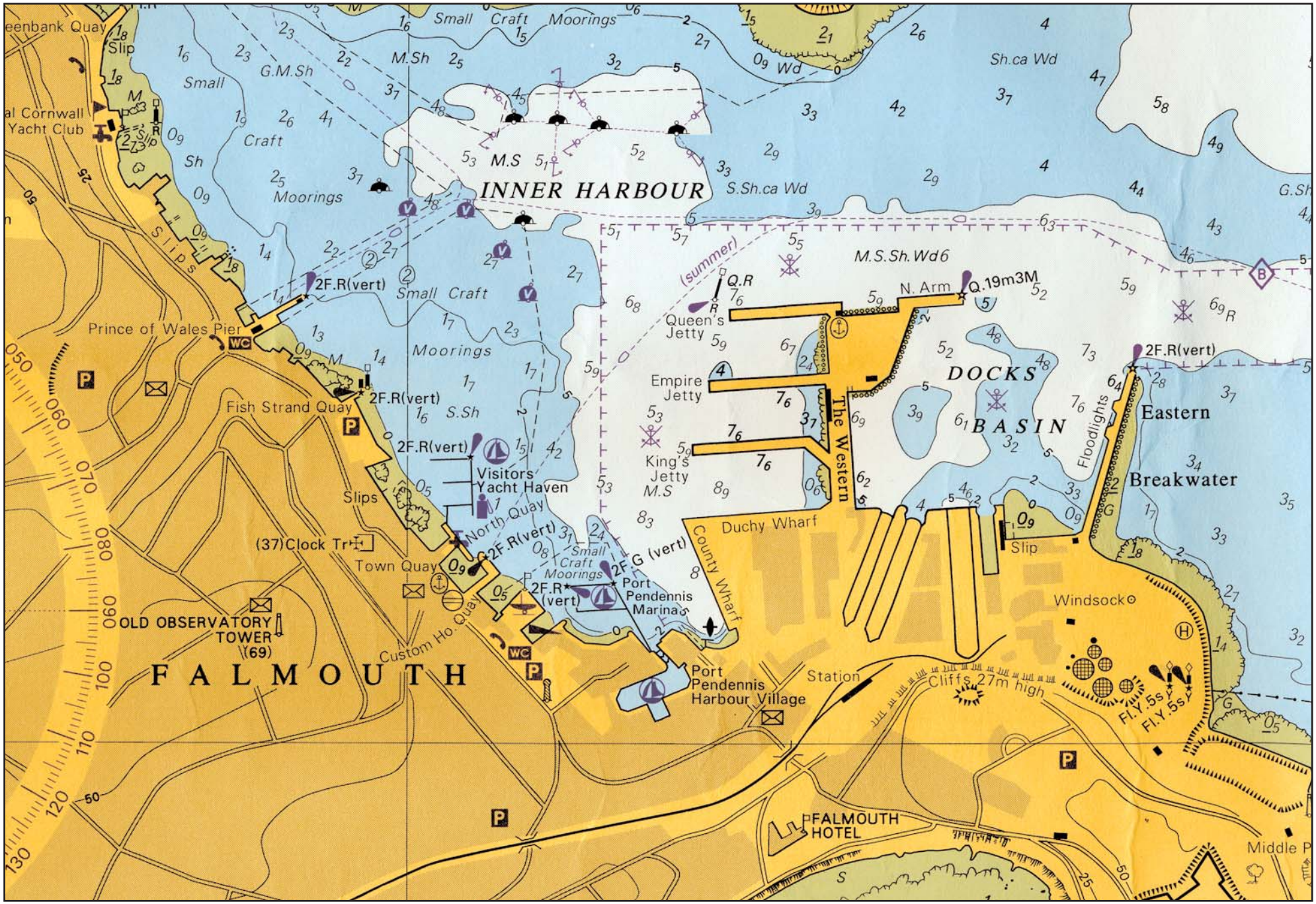
Port of Truro - Maintenance Dredging Locations

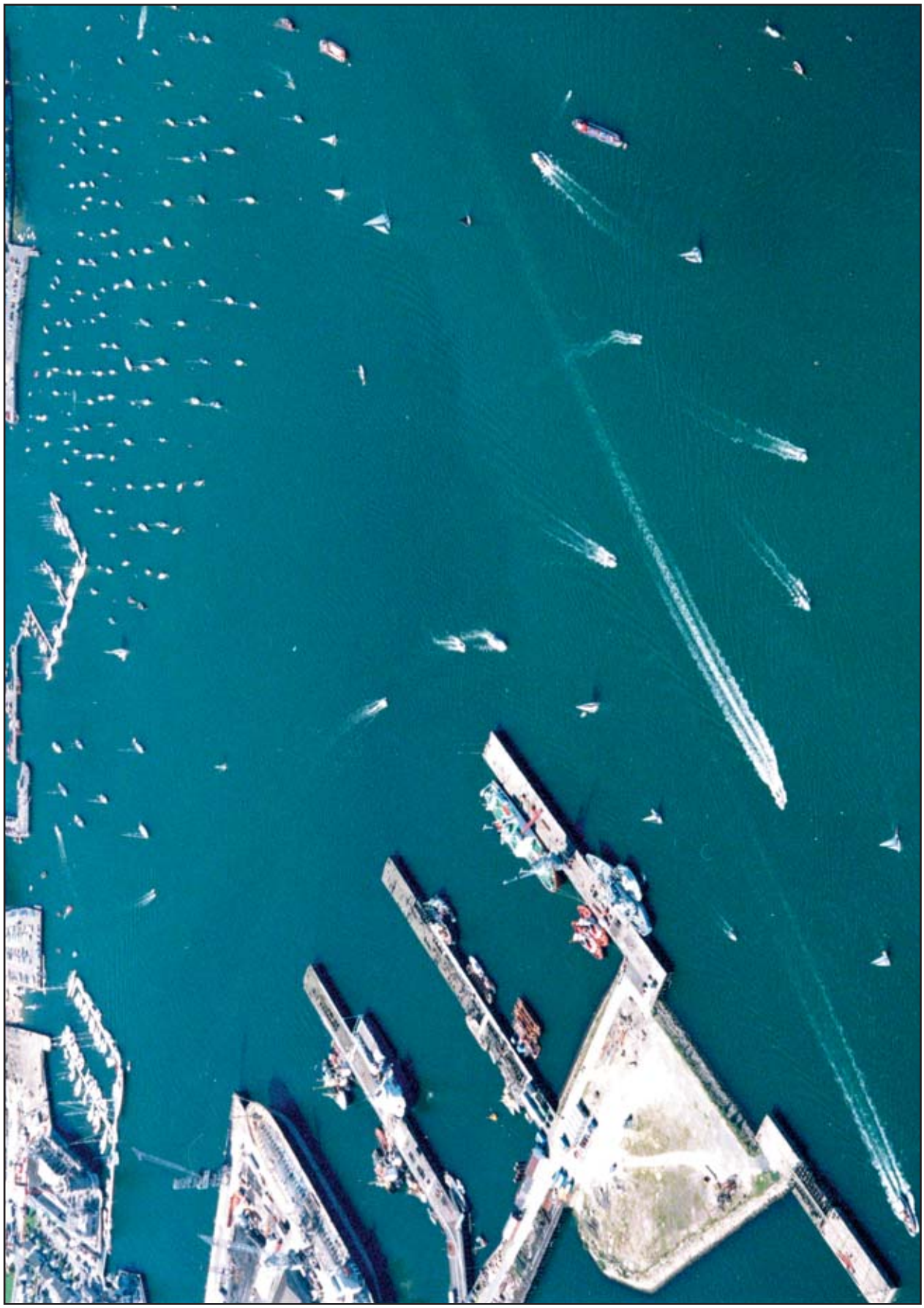
Aerial view of the Port of Truro


The letters in the diagram and the numbered ticks in the chart margin represent the 100 and 1 kilometre values, respectively, of the reference system of mapping of Great Britain. They are shown to enable a direct comparison to be made between maps, referred to OSGB 36 Datum, and the chart, referred to ETRS 89 Datum. The ticks can be joined across the face of the chart to form an approximate section of the National Grid.
Before High Water 6 5 4 3 2 1
High Water
After High Water 1 2 3 4 5 6
Directions of streams (degrees)
Rates at spring tides (knots)
Rates at neap tides (knots)
-6 339 0·2 0·1 180 0·2 0·1 358 0·2 0·1 339 0·2 0·1 350 0·1 0·0 -6
-5 005 0·6 0·3 300 0·2 0·1 011 0·4 0·2 340 0·5 0·2 342 0·4 0·2 -5
-4 022 0·9 0·4 300 0·3 0·2 016 0·5 0·2 337 0·5 0·2 323 0·6 0·3 -4
-3 023 0·6 0·3 300 0·5 0·2 034 0·3 0·1 329 0·4 0·2 323 0·4 0·2 -3
-2 022 0·4 0·2 300 0·3 0·2 032 0·2 0·1 324 0·2 0·1 318 0·1 0·1 -2
-1 036 0·2 0·1 300 0·2 0·1 034 0·1 0·0 317 0·1 0·1 325 0·1 0·0 -1
0 0·0 0·0 180 0·2 0·1 0·0 0·0 0·0 0·0 355 0·1 0·0 0
+1 217 0·3 0·1 175 0·5 0·3 196 0·3 0·1 172 0·2 0·1 123 0·1 0·1 +1
+2 213 0·5 0·2 175 0·6 0·3 196 0·4 0·2 162 0·4 0·2 146 0·3 0·1 +2
+3 207 0·7 0·3 170 0·6 0·3 197 0·4 0·2 155 0·5 0·2 152 0·4 0·2 +3
+4 190 0·8 0·4 160 0·5 0·2 189 0·2 0·1 145 0·4 0·2 168 0·5 0·2 +4
+5 180 0·5 0·2 160 0·4 0·2 248 0·2 0·1 141 0·3 0·1 138 0·3 0·1 +5
+6 276 0·1 0·0 160 0·1 0·0 328 0·1 0·0 0·0 0·0 0·0 0·0 +6
Falmouth Marina
Falmouth Visitors Yacht Ha
Port Pendennis Marina
Mylor Yacht Harbour
Malpas Marine
Saint Gluvias Ch Tr
Cemetery
Gorrangorras Creek
Small Craft Moorings
PENRYN
Jubilee Wharf
Exchequer Quay
2F.R(vert)
PENRYN HARBOUR
Small Craft Moorings
Slips
Challenger Marine
Cygnus Marine
Slip
Boatyard
Ponsharden
VQ(3)5s
Fl.Y.2s
2F.R(vert)
Port of Penryn Limit
Falmouth H.W. Limit
Boyer's Cellars
Falmouth Marina
Wks
Sailor's Cr
Wk
Boatyard Slips
Pontoon
PENRYN RIVER
Small Craft Moorings
(see 24 Note)
Tregew
Little Falmouth
Flushing
Town Quay
Flushing SC
New Quay
Slips
Fl.R
Greenbank Quay
Royal Cornwall Yacht Club
Small Craft
G.M.Sh
M.Sh
M.S
Moorings
INNE
10 Cables or 1 Sea Mile
1500 Metres
4000 Feet
Hosp

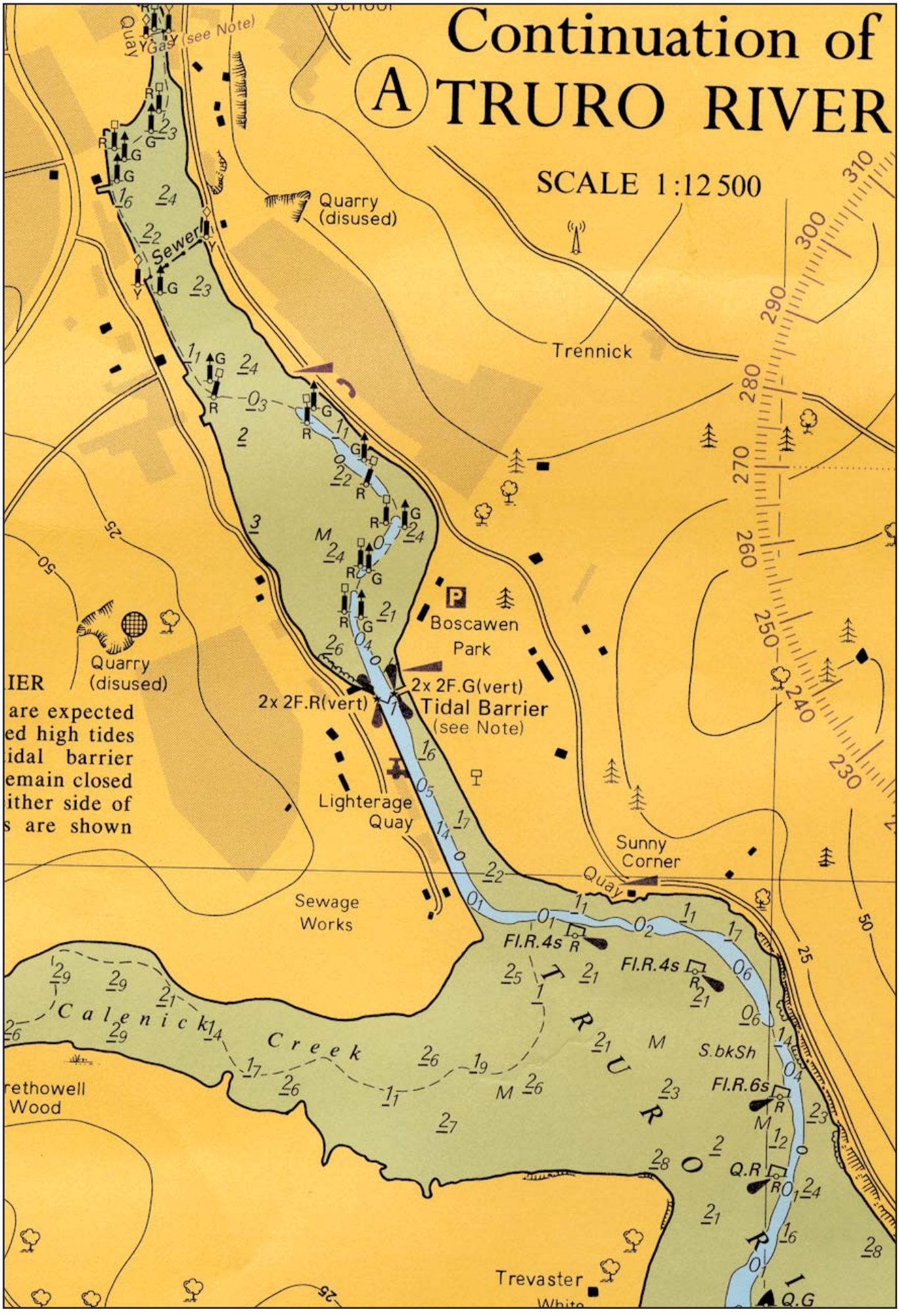
Aerial view of the Port of Penryn

Port of Falmouth





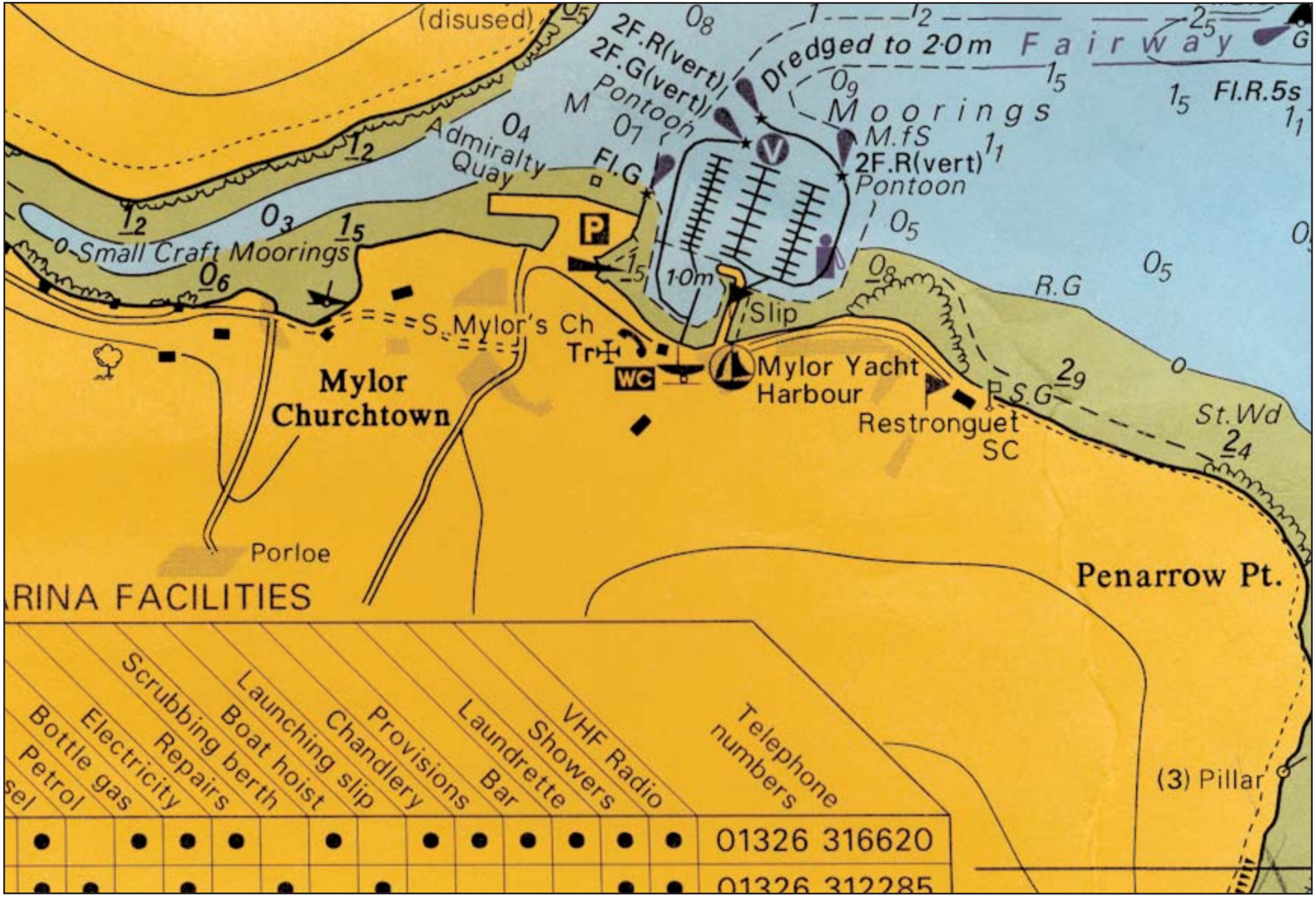
Aerial view of the Port of Falmouth

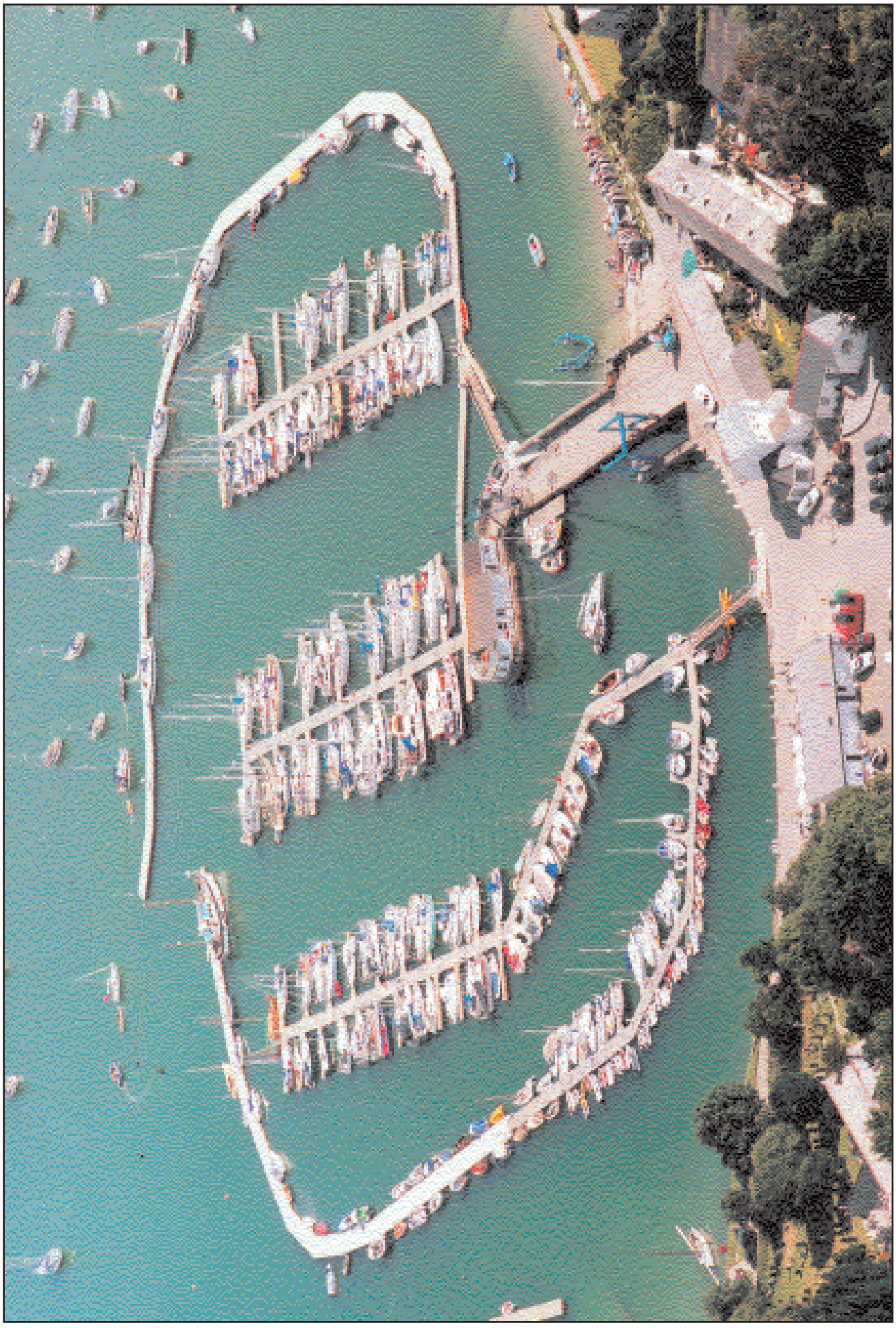


Tidal Barrier - Truro

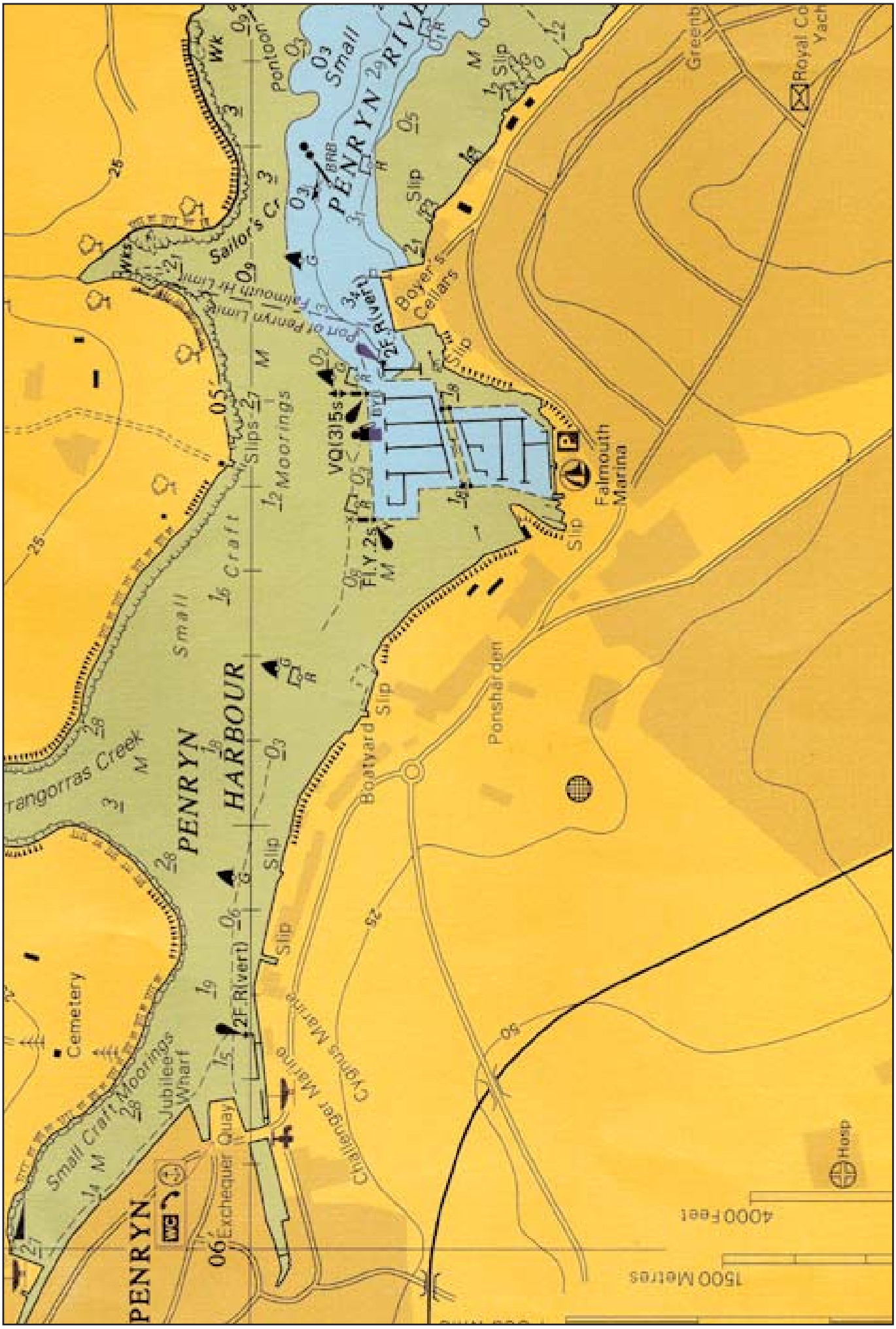
Flood Defence, Truro

Boscawen Park Slip Way, Truro


(disused)
2F.R(vert)
2F.G(vert)
Pontoon
Dredged to 2·0m
Fairway
Moorings
M.fS
2F.R(vert)
Pontoon
Fl.R.5s
Admiralty Quay
Fl.G
Small Craft Moorings
1·0m
Slip
R.G
S. Mylor's Ch
Tr
WC
Mylor Yacht Harbour
Mylor Churchtown
P.S.G
Restronguet SC
St.Wd
Porloe
Penarrow Pt.
(3) Pillar
RINA FACILITIES
Telephone numbers
VHF Radio
Showers
Laundrette
Bar
Provisions
Chandlery
Launching slip
Boat hoist
Scrubbing berth
Repairs
Electricity
Bottle gas
Petrol
sel
01326 316620
01326 312285



Aerial view of Mylor Yacht Harbour



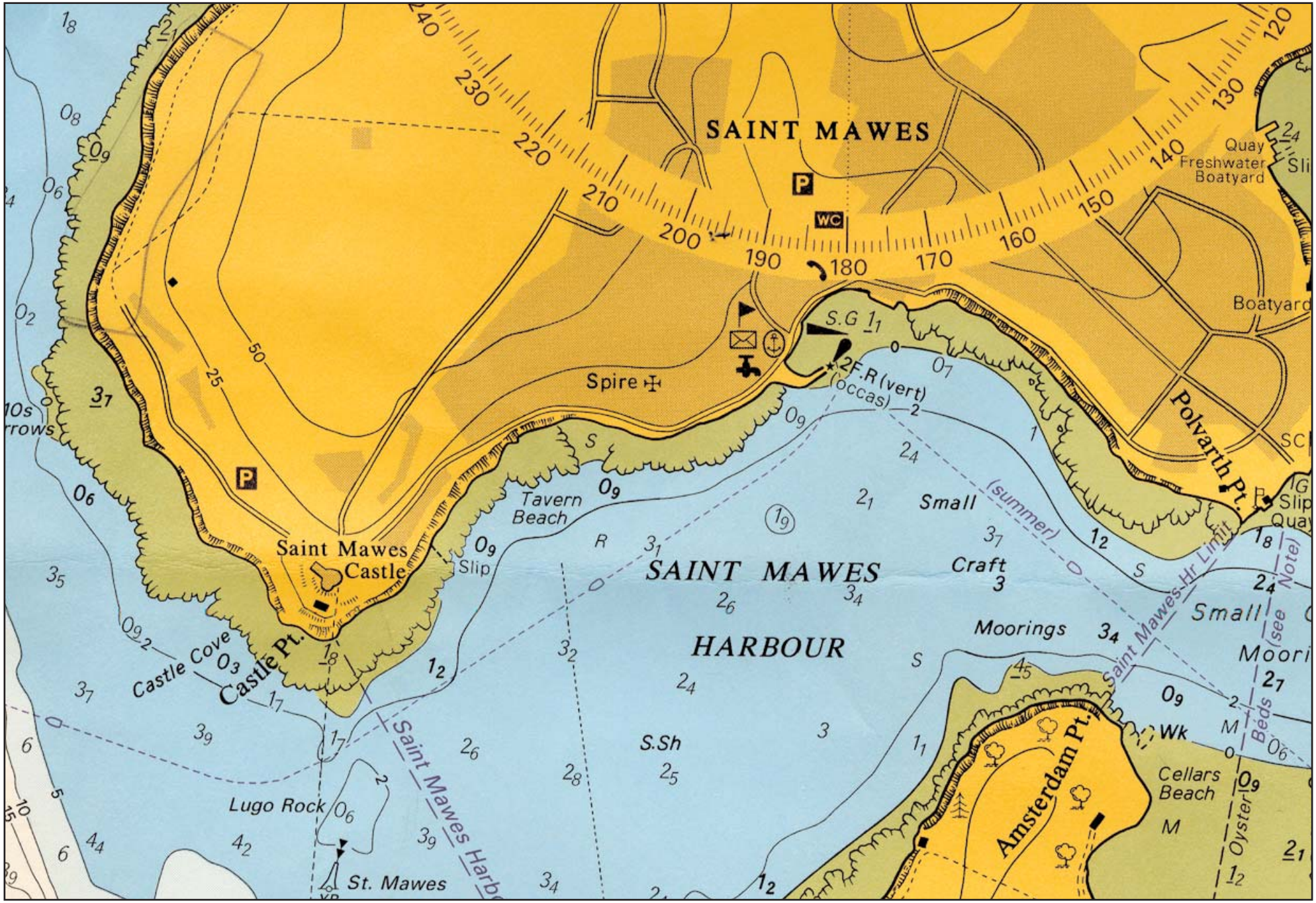
Port of Penryn showing waterside boat yard and marina

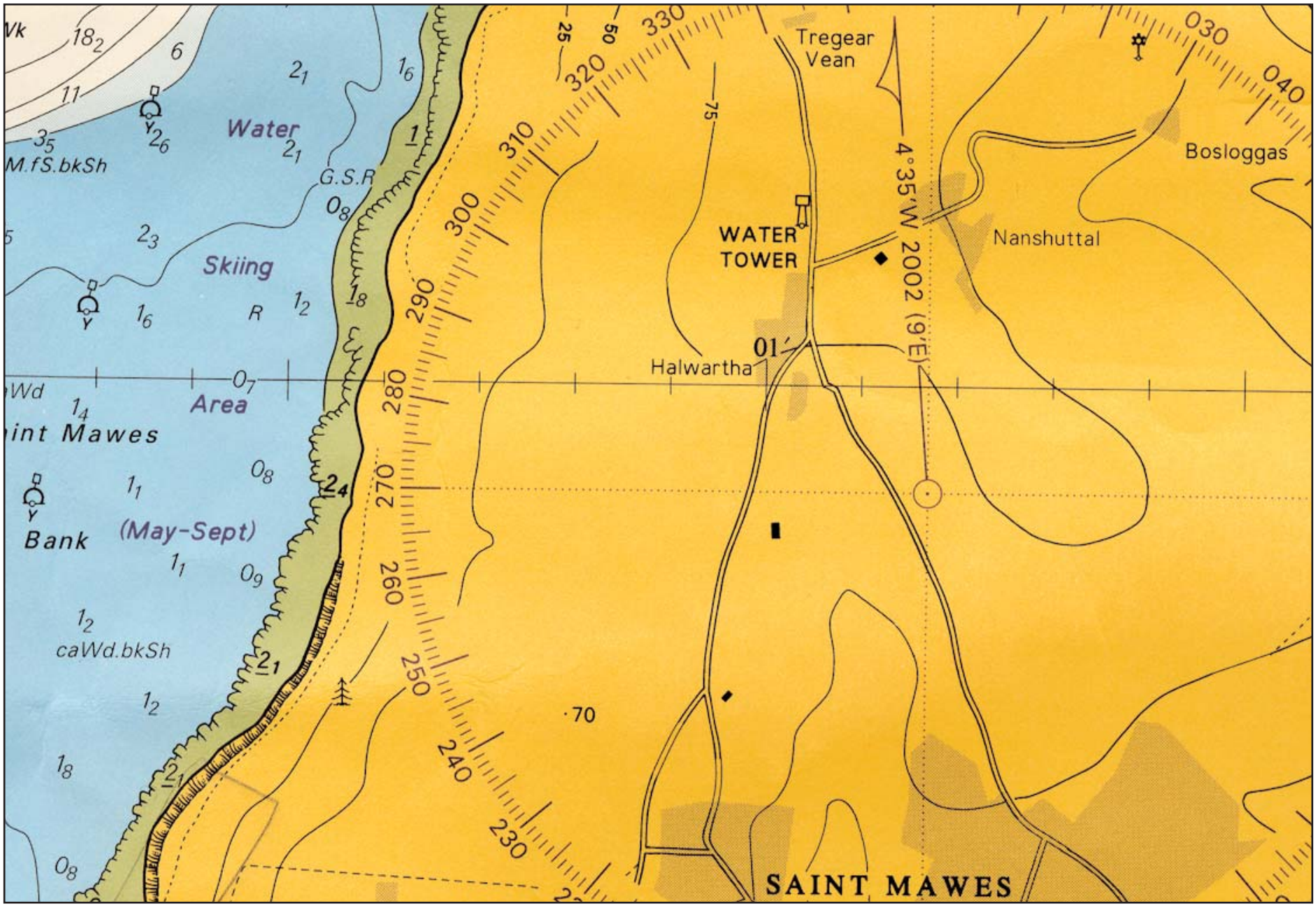
Falmouth Boat Yard

Falmouth Yacht Marina

Challenger Marine

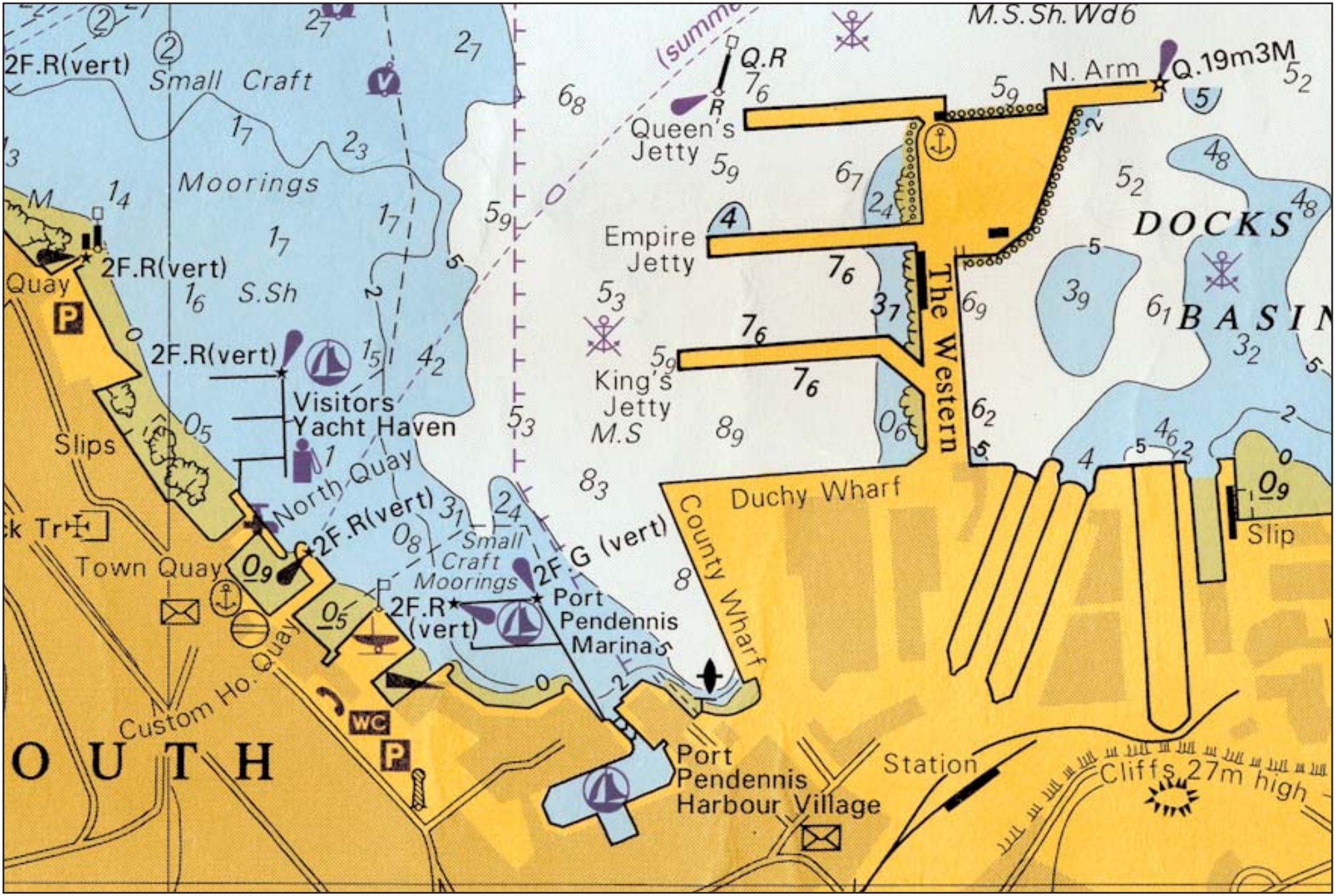
St Mawes Harbour



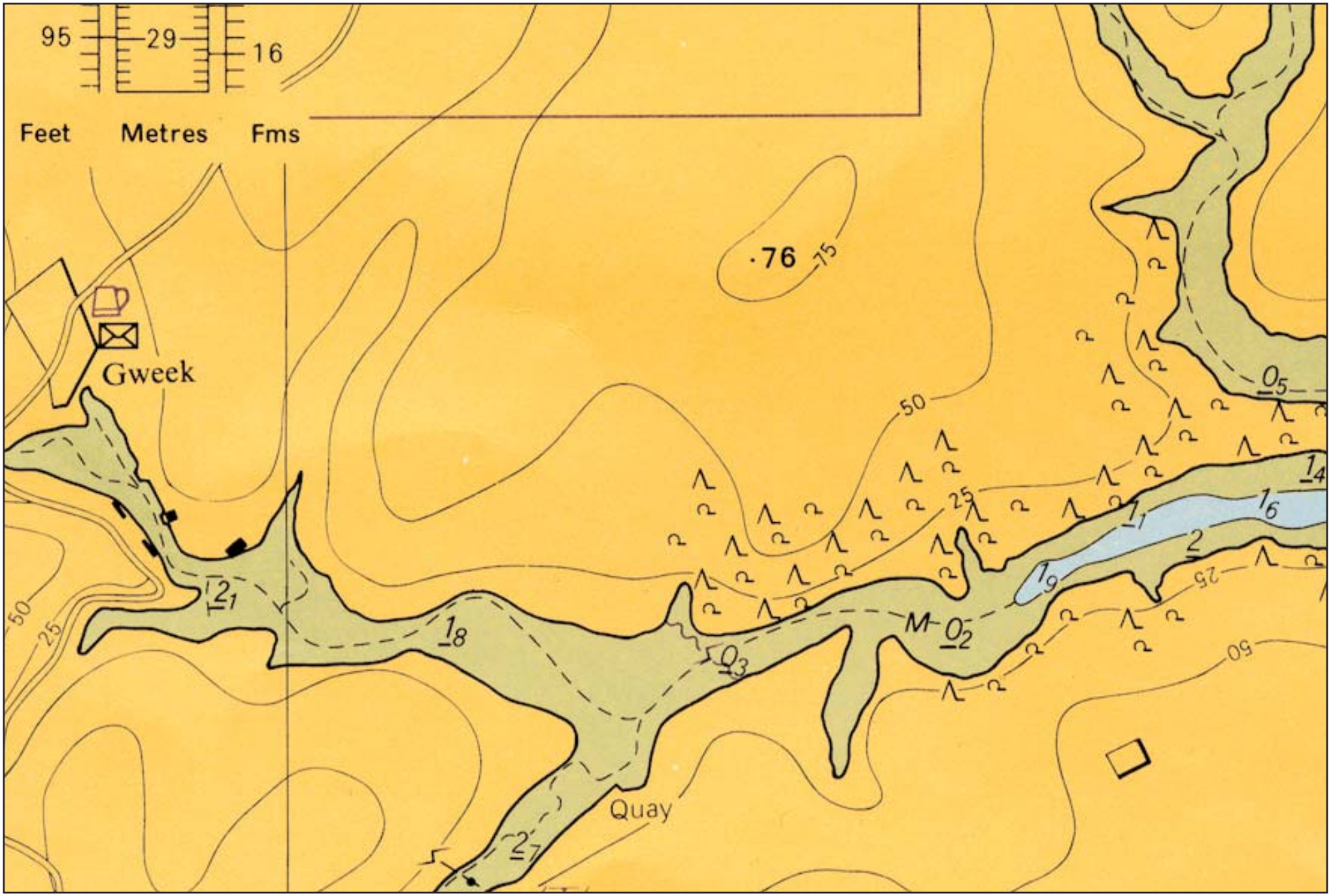


Aerial View of St Mawes Harbour

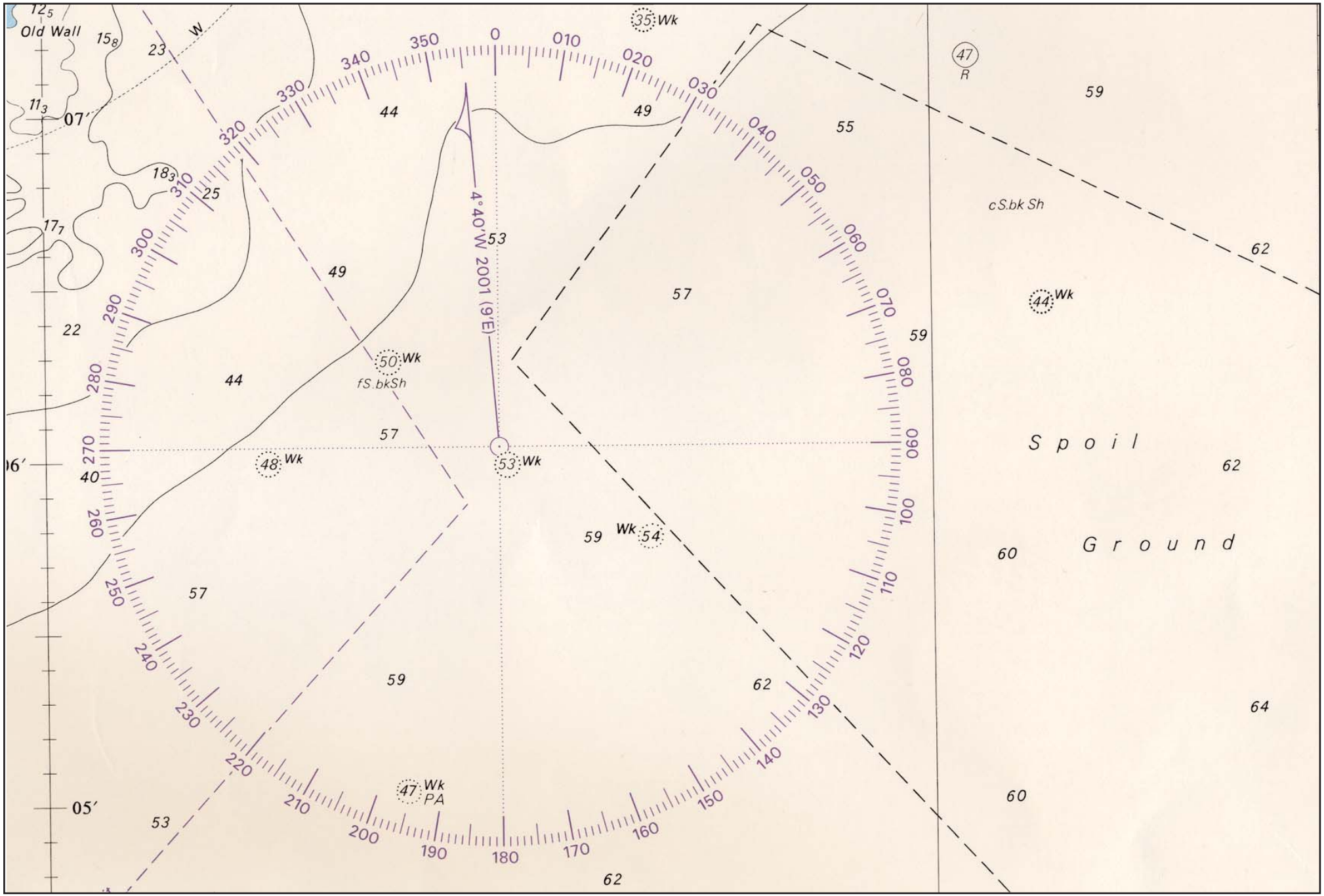
Port of Falmouth - Port Pendennis



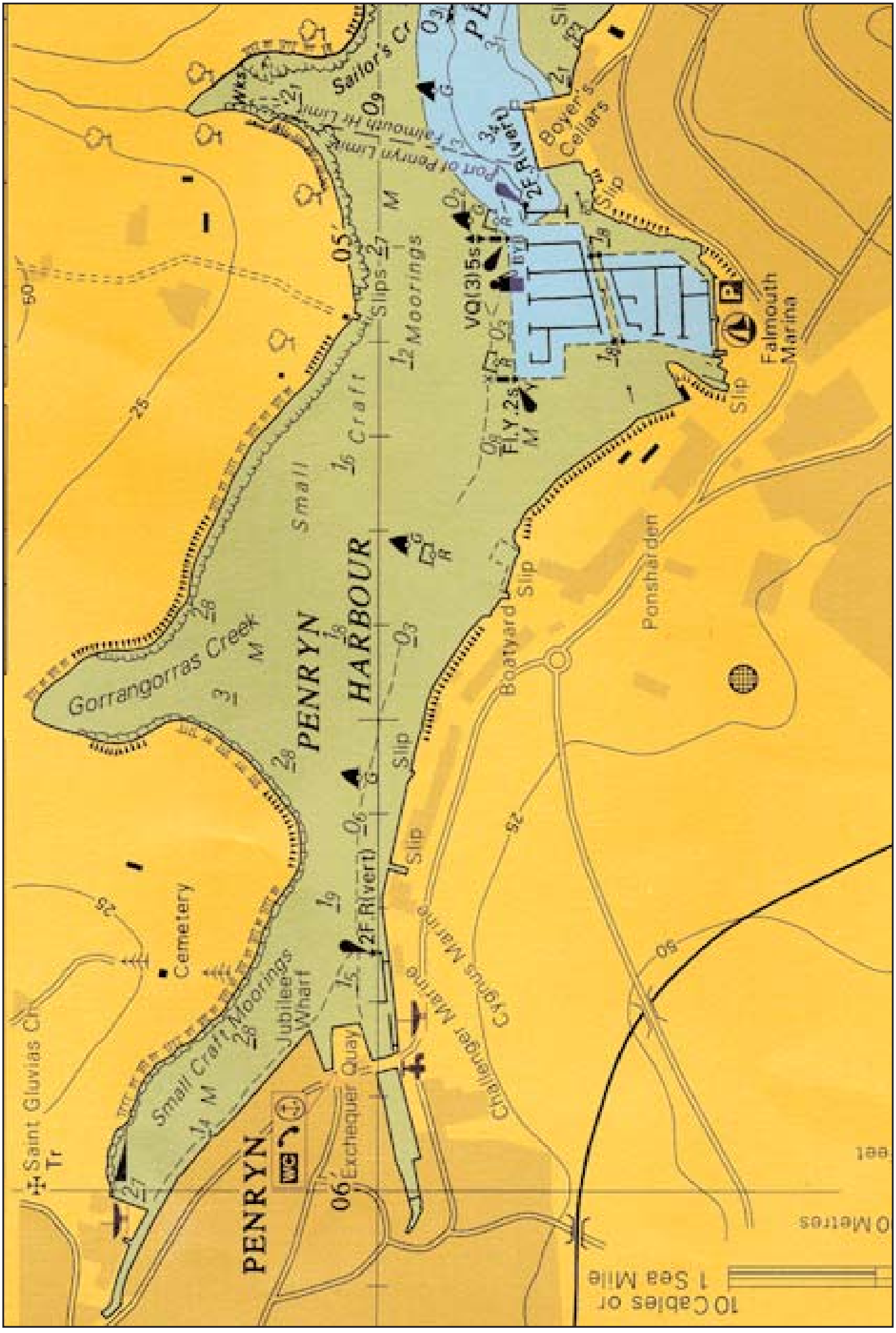
Port of Falmouth - Port Pendennis


95
29
16
Feet
Metres
Fms
·76
75
Gweek
50
25
2₁
1₈
0₃
M
0₂
1₉
2
1₁
1₆
1₄
0₅
Quay
2₇

Spoil Ground



Ponsharden Park and Float



Ponsharden Park and Float

Enclosure 2

Spoil Analysis

Our ref faldocks\051197b
Your ref

Date: 5 November 1997

ENVIRONMENT AGENCY

Captain A J Brigden
Harbour Master
Carrick District Council - Maritime Section
The Harbour Office
Town Quay
Truro
Cornwall, TR1 2HJ

Dear Andy,

PRELIMINARY RESULTS FROM THE ENVIRONMENT AGENCY 1997 FAL ESTUARY TBT BASELINE MONITORING PROGRAMME

Following our telephone conversation this morning, we are pleased to provide you with a summary of the results to date from the Fal Estuary TBT monitoring survey.

Background

Historically, samples of water and sediments taken in the Fal Estuary have shown very high levels of TBT with sediment levels being among the highest found in the UK. Tributyltin (TBT) is a prescribed substance for release to water and is also a List II substance with a non-statutory EQS of 2 ng TBT^{+}/l. TBT is known to be toxic to aquatic organisms at low levels and since 1987 its use for antifouling boats of under 25m has been banned. However, discharges to the marine environment in the Falmouth area continue from larger vessel activities, leaching from historically contaminated sediments and other diffuse sources. TBT has a variable half life depending on where it is found, eg. 1-2 years in surface sediments, >2 years in anoxic sediments, and >20 years estimated for very highly contaminated anoxic sediments.

The most significant source of TBT input to the Fal area is Falmouth Dockyard. Effluent from dockyard operations has contributed very significant loads of both TBT and TPT to the marine environment. TBT and TPT levels in the dockyard are the highest in the UK. In terms of water quality the problem is twofold, depending on historically contaminated sediments and the discharge of contaminated waste from stripping and painting of ships. There are also several additional sources of contamination of waters outside Falmouth Dockyards comprising Pennance Point and Middle Point sewage outfalls, vessel traffic, vessel mooring, and pre and post painting operations. When ships enter the dry dock the sediments are disturbed and resuspend TBT/TPT in the water column. Sources of TBT entering the sewage outfalls are being investigated.

The Environment Agency
Manley House Kestrel Way Exeter EX2 7LQ
DX Address 121350 Tel: (01392) 444000 Fax (01392) 444238

Summary of Sampling Programme and Preliminary Results

Sediment and Water Samples

During June 1997 the Agency collected a total of 32 shoreline surface sediment samples, 13 surface sediment samples in the vicinity of Falmouth Dockyard, 19 offshore surface sediment samples, and 66 water samples. Analysis was conducted by the Agency laboratory in Exeter.

Sediment sampling locations are presented in Figure 1, and results are presented in Table 1. Preliminary results from the sediment samples (64 confirmed results to date) are summarised as follows:

*Mean Result less than laboratory limit of detection (66 μg TBT^+/kg)	7.8%
*Mean Result less than laboratory limit of detection (66 to 603 μg TBT^+/kg)	37.5%
Mean Result between LOD and 500 μg TBT^+/kg	10.9%
Mean Result between 500 and 1000 μg TBT^+/kg	9.4%
Mean Result between 1000 and 5000 μg TBT^+/kg	18.8%
Mean Result between 5000 and 10000 μg TBT^+/kg	6.3%
Mean Result greater than 10000 μg TBT^+/kg	9.4%

* At present the Agencys lowest detection limit is 66 μg TBT^+/kg dry weight, however, many of the results had a higher detection limit (up to 603 μg TBT^+/kg). This was due to the amount of water contained in the sample, which when sieved and dried, reduced the amount of sample available for analysis, thus raising the detection limit.

The highest levels of TBT in the sediment samples were found at Falmouth Dockyard, Penryn River, Mylor Yacht Club, and St. Mawes Harbour.

Water sampling locations are presented in Figure 2, and results are presented in Table 2. Preliminary results from the water samples (64 confirmed results to date) are summarised as follows:

Result less than laboratory limit of detection (2 ng TBT^+/l)	4.7%
Result between LOD and 10 ng TBT^+/l	68.8%
Result between 11 and 20 ng TBT^+/l	12.5%
Result greater than 21 ng TBT^+/l	14.1%

The highest levels of TBT in the water samples were found at Falmouth Dockyard and Penryn River.

The Environment Agency
Manley House Kestrel Way Exeter EX2 7LQ
DX Address 121350 Tel: (01392) 444000 Fax (01392) 444238

ln November 1996 Falmouth Dockyard Engineering Co (FDEC) was granted IPC Authorisation regarding the application and removal of organotin antifoulants. The Authorisation will minimise the release of TBT from September 1998 and FDEC is required to undertake an improvement programme to a specified timetable, resulting in a reduction in the introduction of TBT to the receiving environment. During the period leading up to the Authorisation the Agency conducted an environmental impact study to monitor inputs of TBT to the estuary from Falmouth Dockyard operations, and proposed the initiation of a long-term TBT monitoring programme of the receiving environment in the vicinity of Falmouth Dockyard and the Fal Estuary.

Study Area and Survey Objectives

The monitoring programme has been devised to target source and sink TBT areas within the Fal Estuary and includes known areas over which the EQS for TBT (2 ng TBT^{+}/l) is currently routinely exceeded. The study area includes Pennance Point to offshore of Zone Point to the south, Falmouth Docks, Carrick Roads, and the rivers and tributaries into the Fal Estuary as far north as Malpas.

There are three 'controllable' inputs - Falmouth Dockyard and the South West Water sewage discharges at Middle Point and Pennance Point. These inputs are being monitored by the companies responsible for them with assistance from the Agency, but also form the focal areas for this programme of data collection. Sampling points located throughout the Fal estuary system have been chosen to relate to locations where there is known and suspected TBT accumulation, as well as distant localities for the assessment of background levels.

The overall aim of the sampling programme is to monitor the Fal Estuary with respect to TBT for the long-term achievement of Environmental Quality Standards. Objectives for the programme are as follows:

1. Spacially Intensive Survey: To enable the Agency to extend existing information regarding the distribution and quantity of TBT present in sediments, shellfish tissue, and the water column. A spatially intensive survey has been undertaken to provide a baseline for the measurement of future improvements. Similar surveys are expected to be undertaken in the future, but the interval between such surveys has yet to be determined;

2. Trend Monitoring Survey: To monitor temporal changes in water, sediment and shellfish quality at a limited number of sites. These long-term surveys will aim to clearly demonstrate any significant trends to quantify expected future improvements.

The long term objective of the survey is to allow the Agency to assess the possibility of setting targets with respect to expected reduction levels and timescales both in the 'near field' close to the dockyard and sewage outfalls, and the 'far field', the Fal Estuary;

The Environment Agency
Manley House Kestrel Way Exeter EX2 7LQ
DX Address 121350 Tel: (01392) 444000 Fax (01392) 444238

Dogwhelks and Mussels

The toxicity of TBT to shellfish is well known, causing reduced growth and shell chambering in the Pacific oyster *Crassostrea gigas*, and imposex in the dog whelk *Nucella lapillus*. Mussels are also good accumulators of TBT, and *Mytilus edulis* has been used as the bioindicator of TBT contamination for this study.

In July, a selection of locations within the study area were surveyed for presence/ absence of dog whelks over the low water period (Figure 3). Of the 21 sites visited (many of which were where dog whelks formerly existed, ref. *Bryan et al 1986*), populations were found at only two locations - Towan Beach to the east of the study area and Gyllingvase Beach to the west. These appear to constitute the last remaining dog whelk populations in the area and will be used as long-term monitors. Further detailed studies of these populations are being conducted at present.

Also in July, 16 cages of TBT free mussels originating from Whitsand Bay were deployed throughout the study area (Figure 4) by the Agency and Dr Mike Waldock of CEFAS. These cages are being sampled monthly until October. Analysis is being conducted by CEFAS to determine the amount of TBT accumulating in the mussel tissue, along with changes in size and weight. Results of the first two of three sampling visits are presented in Table 3. We await results of background samples from Whitsand Bay.

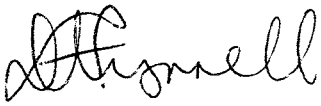
Further Survey Work

Monthly water samples are being collected at a selection of 'hot spot' mussel deployment sites and control sites (Figure 4) throughout the current deployment and on through the winter. Mussel cages are to be redeployed in March 1998 for a period of 6 months, with water and mussel samples to be collected monthly. Further sediment sampling is to be planned once the 1997 results have been fully evaluated.

A full report is currently being prepared which includes background information, sampling methodologies, analysis details, and interpretation of the results to date.

We hope this information is of use to you. Please contact either myself or Norman Babbedge, and we will be pleased to discuss the data in more detail. We would also be interested to see results from your oyster studies and would be grateful if these could be made available to us.

Yours sincerely,



DEBORAH TYRRELL
Tidal Waters Scientist

The Environment Agency
Manley House Kestrel Way Exeter EX2 7LQ
DX Address 121350 Tel: (01392) 444000 Fax (01392) 444238

TABLE 1 Fal Estuary TBT Monitoring - Sediment Sampling

No.	Location	Easting	Northing	Time (GMT	TBT+ (ug/kg)	TBT+ (ug/kg)	Mean TBT+ (ug/kg)	Notes
	Inshore Sediment Samples (24/6/97)							
1	Islington Quay - Penryn	178700	34500	12:34	1626	1945	1786	Mud
2	Town Quay coal stores - Penryn	178870	34350	12:54	1549	1358	1454	Mud
3	Penryn Marina	179000	34210	13:14	988	1185	1087	Mud
4	Between Penryn Marina and Ponsharden	179370	34370	15:24	1144	341	743	Mud
5	Ponsharden Boatyard - Penryn	179500	34000	13:24	998	677	838	Mud
6	Falmouth Boatyard	179700	33800	14:04	5417	5261	5339	Mud
7	Falmouth Marina	179760	34000	13:55	3206	2938	3072	Mud
8	Penryn River near Flushing	180430	34020	15:44	336	328	332	Coarse sand, some mud
9	Royal Cornwall Yacht Club	180600	33500	14:24	1028	854	941	Mud
10	Port Pendennis	181318	32482	14:45	24623	16687	20655	Coarse sand, some mud
11	Carrick Roads western shore	182556	34196	13:33	<91		<91	12/06/97
12	Pontoons at Mylor Yacht Club	182150	35330	12:32	2470	2280	2375	Mud
13	Boat grids at Mylor Yacht Club	182020	35350	12:42	2990	1810	2400	Mud
14	Hammerhead Wharf at Mylor Yacht Club	181890	35370	12:52	24205	7010	15608	Mud
15	Mill Quay slipway - Mylor Creek	180560	35930	13:12	402	536	469	Mud
16	Carrick Roads between Mylor and Restronguet	182150	36130	13:05	<139		<139	12/06/97
17	Restronguet Point	181660	37100	14:12	<66	<66	<66	Mud
18	Restronguet Quay	181440	37460	13:32	781	<66	781	Mud
19	EA Routine Site at Restronguet Creek - Devoran	179560	38850	13:42	<66	<66	<66	Mud
20	Loe Beach	182500	38050	14:32	<72	<66	<72	Fine sand
21	King Harry Ferry	184070	39500	14:42	659	521	590	Mud
22	Coombe Creek	184035	40281	15:22	<66	<66	<66	Mud
23	Malpas	184423	42723	15:53	<66		<66	Mud
24	Deer Park	185006	41027	08:20	271		271	03/07/97
25	EA Routine Site at Penperth	184207	38981	08:15	220	734	477	03/07/97
26	Turnaware Point	183500	38300	15:10	<521	<603	<603	Mud
27	Carrick Road between Turnaware and Messack	183810	36920	13:17	<98		<98	12/06/97
28	Messack Point	184108	35740	11:57	<104		<104	12/06/97
29	Just Creek - St Just in Roseland	184800	35800	14:40	<128	<274	<274	Mud
30	St Mawes Bank Northernmost Buoy	183815	34095	11:31	<103		<103	12/06/97 - 1 sample only
31	St Mawes Castle	184151	32611					No sample
32	St Mawes Harbour	184880	32988	14:00	723	2276	1500	Mud
33	Percuil River - upper estuary	186220	34680	13:30	<325	<383	<383	Mud
34	Percuil River - mid estuary	185780	34030	13:10	3340	3329	3335	Mud
35	Pelyn Creek - Percuil	186200	33900	13:00	237	<66	237	Mud
36	Cellars Beach -Percuil	185500	32300	12:40	<66	972	972	Mud
37	Carricknath Point	184546	32097	12:20	<66	<66	<66	Fine sand
38	Pendennis Point	182708	31469					No sample
	Dockyard Sediment Samples (12-13/5/97, and)							
1	Channel Centre	182463	33006	11:55	339		339	13/05/97
2	Channel Edge	182413	32952	10:50	< 83		< 83	13/05/97
3	Docks Basin	181942	32804	12:00	22300		22300	04/08/97
4	Docks Basin	182028	32856	15:45	12430		12430	12/05/97
5	Docks Basin	182080	32965	17:20	2120		2120	12/05/97
6	Docks Basin	181961	32989	18:00	10800		10800	12/05/97
7	Docks Basin	181865	32956	19:00	9470		9470	12/05/97
8	Northern Wharf East	181871	33104	13:15	4300		4300	13/05/97
9	Northern Wharf West	181787	33089	14:00	5360		5360	13/05/97
10	Duchy Wharf East	181462	32731	15:10	9360		9360	13/05/97
11	Duchy Wharf West	181618	32743	15:45	10200		10200	13/05/97
12	County Wharf East	181423	32640	17:10	1520		1520	13/05/97
13	County Wharf West	181466	32546	17:40	1180		1180	13/05/97
	Offshore Sediment Samples (12/6/97)							
51	Old Middle Point Outfall - 1000m SE of discharge	183160	31240					No sample
52	Old Middle Point Outfall - 500m SE of discharge	182890	31595	14:00	<69		<69	(182630,318311)
53	Old Middle Point Outfall - 250m SE of discharge	182760	31805					No sample
54	Old Middle Point Outfall	182700	32000					No sample
55	Old Middle Point Outfall - 250m North of discharge	182655	32245					No sample
56	Old Middle Point Outfall - 500m North of discharge	182635	32500					No sample
57	300m East of Eastern Breakwater	182610	32827	11:14	<88		<88	1 sample only
58	Southern Carrick Roads - mid channel	182978	33283					No sample
59	New Middle Point Outfall - 250m North	183160	32490					No sample
60	New Middle Point Outfall	183160	32240	10:52	<97		<97	
61	New Middle Point Outfall - 250m South	183160	31990	11:40	<85		<85	
62	New Middle Point Outfall - 250m East	183410	32240					No sample
63	St Mawes Buoy	184106	32328					No sample
64	Pennance Point Outfall - 500m NE of discharge	180780	30825					No sample
65	Pennance Point Outfall - 250m NE of discharge	180615	30625					No sample
66	Pennance Point Outfall	180500	30450	12:40	<89		<89	
67	Pennance Point Outfall - 250m SW of discharge	180130	30315	12:35	<87		<87	
68	Pennance Point Outfall - 500m SW of discharge	180060	30135	12:27	<86		<86	(180004, 30131)
69	Pennance Point Outfall - 250m SE of discharge	180540	30295	12:52	<78		<78	(180739, 30522)
70	Pennance Point Outfall - 500m SE of discharge	182143	30085	13:05	<81		<81	(181020, 30211)
71	Mid Channel off Restroguet Point	183000	37250	13:22	373		373	
72	EA Routine Site at Carrick Roads - Mid Channel	183000	36330	13:12	<133		<133	
73	Mid Channel between Messack Pt. and Mylor	183078	35576	12:06	<103		<103	
74	North Bank Buoy	183348	34653	11:42	<111		<111	
75	EA Routine Site at Vilt Buoy	183135	34023					No sample
76	Black Rock Buoy	183675	31568					No sample
77	EA Routine Site at Middle Point Network Site	183500	31000					No sample
78	Falmouth Bay	181500	30500	12:15	<88	<72	<88	
79	500m South of Zone Point	185000	30500	13:25	<88		<88	Mud (184769,30983)

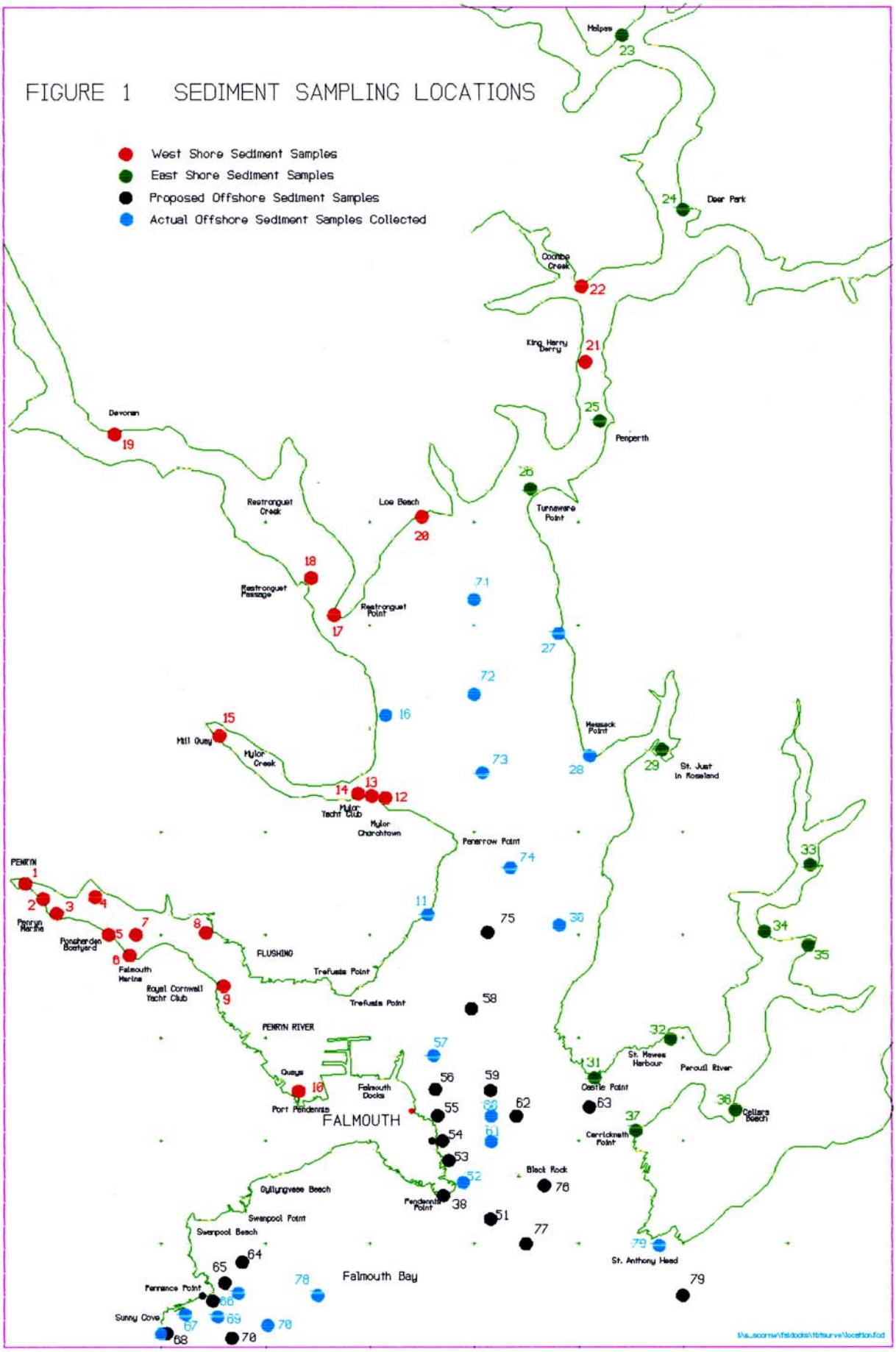


FIGURE 1 SEDIMENT SAMPLING LOCATIONS
West Shore Sediment Samples
East Shore Sediment Samples
Proposed Offshore Sediment Samples
Actual Offshore Sediment Samples Collected
Malpas
23
24
Deer Park
Coombe Creek
22
King Harry Ferry
21
25
Penperth
Devoran
19
26
Tunnewere Point
Restronguet Creek
Loe Beach
20
18
Restronguet Passage
Restronguet Point
17
71
27
72
16
Massack Point
28
29
St. Just in Roseland
15
Mill Quay
Mylor Creek
73
14
13
12
Mylor Yacht Club
Mylor Churchtown
Penarrow Point
74
33
PENRYN
1
2
3
4
Penryn Marina
Ponsharden Boatyard
5
7
8
6
Falmouth Marina
FLUSHING
11
75
36
34
35
Trefusis Point
Royal Cornwall Yacht Club
9
Trefusis Point
58
PENRYN RIVER
57
32
St. Mawes Harbour
Percuil River
31
Castle Point
Quays
10
Falmouth Docks
56
59
55
60
62
63
36
Cellars Beach
Port Pendennis
FALMOUTH
37
Carricknath Point
54
61
53
52
Black Rock
76
Gyllyngvase Beach
Pendennis Point
38
51
Swanpool Point
77
Swanpool Beach
64
65
St. Anthony Head
79
Falmouth Bay
78
Pennance Point
66
79
Sunny Cove
67
69
70
68
70

DAS 5021 - Challenger marine

DLN	BLR	DAS	SITE	AS PPM	CD PPM	CR PPM	CU PPM	HG PPM	M PPm	PB PPM	TS %	ZN PPM	DBT PPM	TBT PPM	SUMBT PPM
1996/4086/1	5752	5021	1	29	0.49	22	172	1.2	16	104	41.7	254	0.281	1.48	1.76
1996/4087/1	5752	5021	2	26	0.46	19	154	1.1	14	97	37.9	244	0.311	1.63	1.94
1996/4088/1	5752	5021	3	26	0.43	18	146	0.99	13	98	36.5	290	0.437	2.59	3.03
				27	0.46	19.7	157.3	1.1	14.3	99.7	38.7	262.7	0.343	1.9	Dry
													0.133	0.735	Wet

A = Eastern Boundary of Site
B = Mid Boundary of Site
C = Western Boundary of Site

Environment Agency Data Licence

1 This licence applies to the data or information, in any format, we provide to you (called "Data"). In return for our granting you this licence, you agree with us only to use the Data on the following terms.

2 All intellectual property and other rights in the Data and copies of the Data will continue to be owned by the Environment Agency. You accept that you will not acquire any of those rights in the Data or those copies.

3 You may use the Data only for your own personal or internal business purposes. This means that you must not use any part of the Data in any way for commercial gain, for example by rental, licence, sale or for providing commercial services.

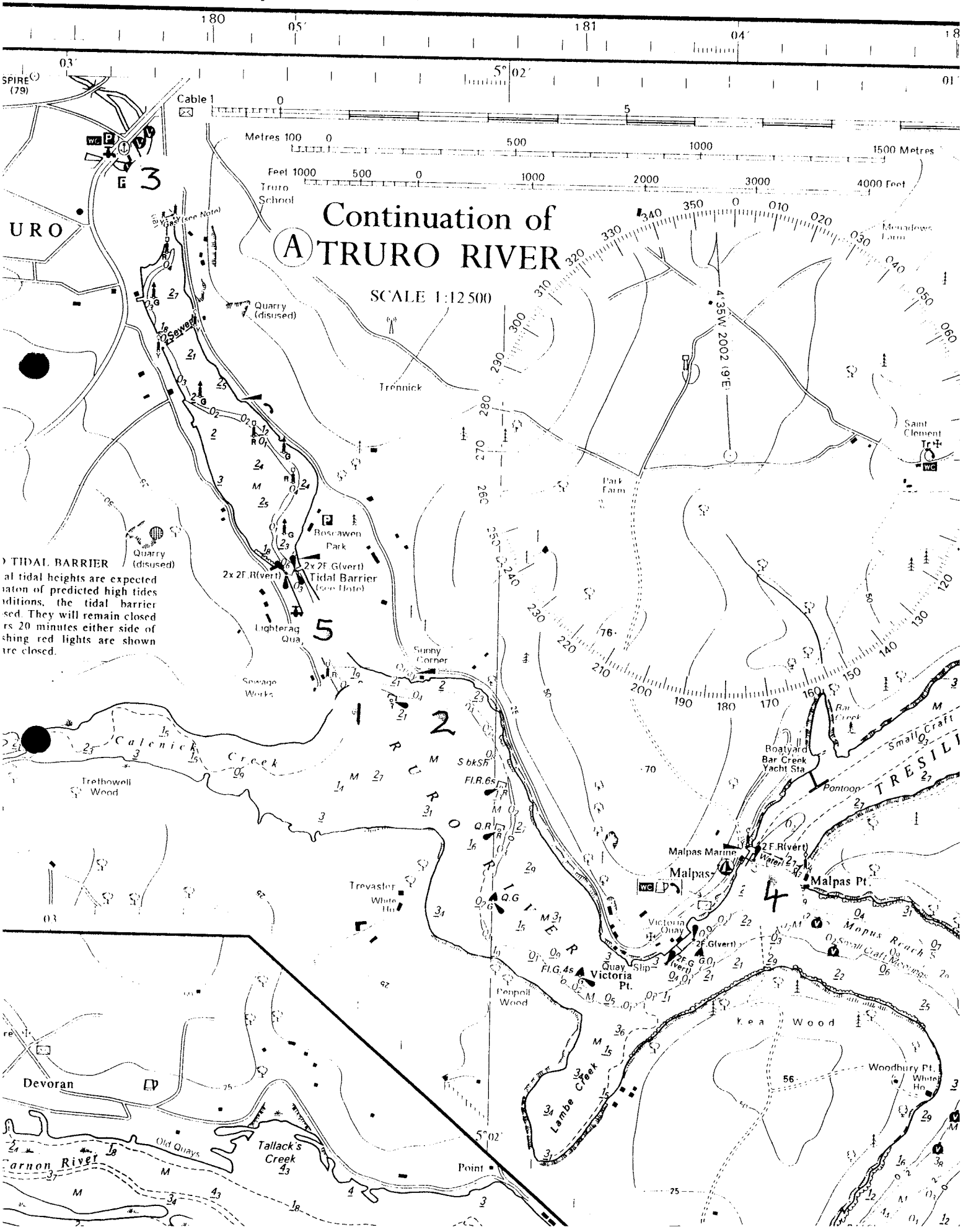
4 You may provide copies of the Data to anyone else, but you must then do so free of charge and ensure that any recipient from you of the Data enters into a licence on these terms.

5 Unless you have our written approval beforehand, you must not, and must not allow anyone else to, combine the Data with, or incorporate the Data into, any other data, information or product, or reformat or otherwise modify, add to or enhance, the Data. We may, at our discretion, make it a condition of giving our approval that you enter into a further agreement with us. That agreement may include commercial terms, including that you make further payment to us.

6 You accept that the Data have not been prepared to meet your or anyone else's individual requirements and that it is responsibility to ensure that the Data meet your needs. We are not liable if the Data fail to provide any particular facility or function or are otherwise not useful to you. Likewise, we cannot ensure that the Data will always be accurate, complete or valid and you accept that we are not liable if the Data are not accurate, complete or valid.

WGS 84 POSITIONS

can be plotted directly on this chart



Details of Sampling Positions

Name / Location :	**(1) Turning Berth, Truro River**			
Lat/Long:	50° N	14.97	05°W	02.31
Date sampled:	22/07/02			

Name / Location :	**(2) Sunny Corner**			
Lat/Long:	50°N	14.93	05°W	02.05
Date Sampled:	22/07/02			

Name / Location :	**(3) Upper River, Truro**			
Lat/Long:	50°N	15.70	05°W	02.81
Date Sampled:	22/07/02			

Name / Location :	**(4) Malpas Marine**			
Lat/Long:	50°N	14.72	05°W	01.34
Date Sampled:	22/07/02			

Name / Location :	**(5) Lighterage Quay**			
Lat/Long:	50°N	15.08	05°W	02.44
Date Sampled:	22/07/02			

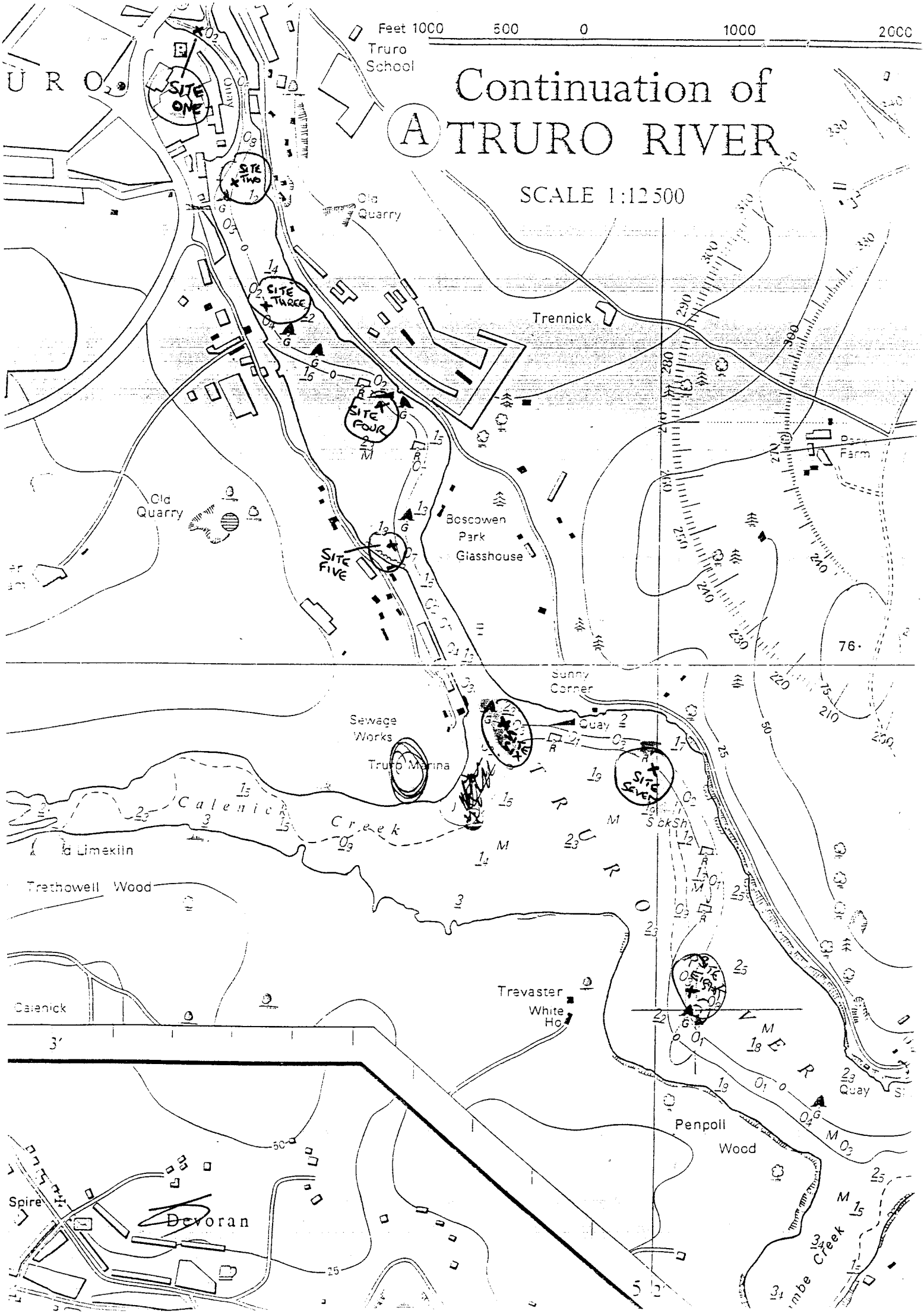
DEFRA/DAS : 31726
DC : 6609
Samples Taken 2002

			mg/kg/ppm wet weight										dry weight	dry weight
Site Number	**Site**	**TS%**	**AS**	**CD**	**CR**	**Cu**	**HG**	**NI**	**PB**	**ZN**	**DBT**	**TBT**	**DBT**	**TBT**
2002/2241	1	41.5	43	0.58	20	139	0.19	10	66	332	0.01951	0.02822	0.047	0.068
2002/2242	2	42.3	65	0.6	21	152	0.15	12	81	336	0.00719	0.01481	0.017	0.035
2002/2243	3	42.8	35	0.59	21	153	0.2	12	66	329	0.01113	0.02226	0.026	0.052
2002/2244	4	36.8	33	0.35	16	109	0.13	9.3	36	214	0.00699	0.01693	0.019	0.046
2002/2245	5	45.1	42	0.61	15	148	0.12	11	73	377	0.01128	0.02886	0.025	0.064
Mean (wet)		**41.7**	**43.6**	**0.546**	**18.6**	**140.2**	**0.158**	**10.86**	**64.4**	**317.6**	**0.01122**	**0.02221**	**0.0111756**	**0.022101**

Metal results are shown s parts per million (ppm) wet weight
TBT and DBT results are shown as parts per million (ppm) dry weight

CEFAS

The Centre for Environment, Fisheries & Aquaculture Science


Feet 1000 500 0 1000 2000
Continuation of A TRURO RIVER
SCALE 1:12 500
Truro School
SITE ONE
SITE TWO
SITE THREE
SITE FOUR
SITE FIVE
SITE SIX
SITE SEVEN
SITE EIGHT
Old Quarry
Trennick
Boscawen Park Glasshouse
Sunny Corner
Quay
Sewage Works
Truro Marina
Calenick Creek
Old Limekiln
Trethowell Wood
Calenick
Trevaster
White Ho
Penpoll Wood
Devoran
Spire
76

Site	Latitude			Longitude		
1	50º	15.73	N	005º	02.83	W
2	50º	15.54	N	005º	02.78	W
3	50º	15.40	N	005º	02.73	W
4	50º	15.32	N	005º	02.53	W
5	50º	15.18	N	005º	02.53	W
6	50º	15.0	N	005º	02.36	W
7	50º	14.95	N	005º	02.06	W
8	50º	14.70	N	005º	00.00	W

CSM Associates Limited

ANALYTICAL SERVICES

Name: **Mr Brigden, Harbour Master** Date: **27 May 1993**

Type of sample: **River Sludge** Analysis required: **As shown below**

Sample of toxicity or other hazard: **none**

ANALYSIS

All results epressed as mg/kg air-dried sludge

Site Number	Copper	Nickel	Zinc	Mercury	Phenols	Total Cyanide	Polycyclic Aromatic Hydrocarbons
1	428	36	767	0.5	2	DLT 1	DLT 1
2	406	35	648	0.2	DLT 1	DLT 1	DLT 1
3	410	46	763	0.2	-	-	-
4	497	44	890	0.1	-	-	-
5	864	33	875	0.5	1	DLT 1	DLT 1
6	432	37	810	0.4	-	-	-
7	424	41	745	0.2	-	-	-
8	417	22	581	0.1	1	DLT 1	DLT 1
Cert	142	40	493	0.3	-	-	-

DLT = Detected Less than

- = Analysis not requested

Date completed: **27 May 1993** Analyst: **D.A. Welsh**

CSM Associates Limited

ANALYTICAL SERVICES

Name: **Mr Brigden, Harbour Master** Date: **27 May 1993**

Type of sample: **River Sludge** Analysis required: **As shown below**

Sample of toxicity or other hazard: **none**

ANALYSIS

All results epressed as mg/kg air-dried soil

Site Number	Arsenic	Selenium	Cadmium	Chromium	Lead
1	**112**	**0.5**	**1.0**	**6.5**	**192**
2	**105**	**0.7**	**0.8**	**11.0**	**184**
3	**103**	**DLT 0.5**	**2.3**	**12.5**	**208**
4	**97**	**0.6**	**1.2**	**7.6**	**197**
5	**232**	**0.9**	**1.2**	**17.9**	**416**
6	**100**	**DLT 0.5**	**1.1**	**5.5**	**175**
7	**115**	**DLT 0.5**	**1.6**	**4.5**	**175**
8	**188**	**0.6**	**1.0**	**15.7**	**193**
Cert	**409**	**1.5**	**0.5**	**117.4**	**550**

DLT = Detected Less than

Date completed: **27 May 1993** Analyst: **D.A. Welsh**

CSM Associates Limited

ANALYTICAL SERVICES

Name: **Mr Brigden, Harbour Master** Date: **27 May 1993**

Type of sample: **Cert. Soil** Analysis required: **Cert. Values**

Sample of toxicity or other hazard: **none**

ANALYSIS

The Certified values for the Laboratory of the Government Chemist (cert.) sample are as follows, and are expressed as mg/kg air dried soil.

Arsenic	**412 + 8**
Selenium	**1.56 + 0.12**
Cadmium	**0.45 + 0.05**
Chromium	**118 + 3**
Lead	**552 + 14**
Copper	**144 + 3**
Nickel	**40 + 1**
Zinc	**494 + 11**
Mercury	**0.29 + 0.02**

Date completed: **27 May 1993** Analyst: **D.A. Welsh**

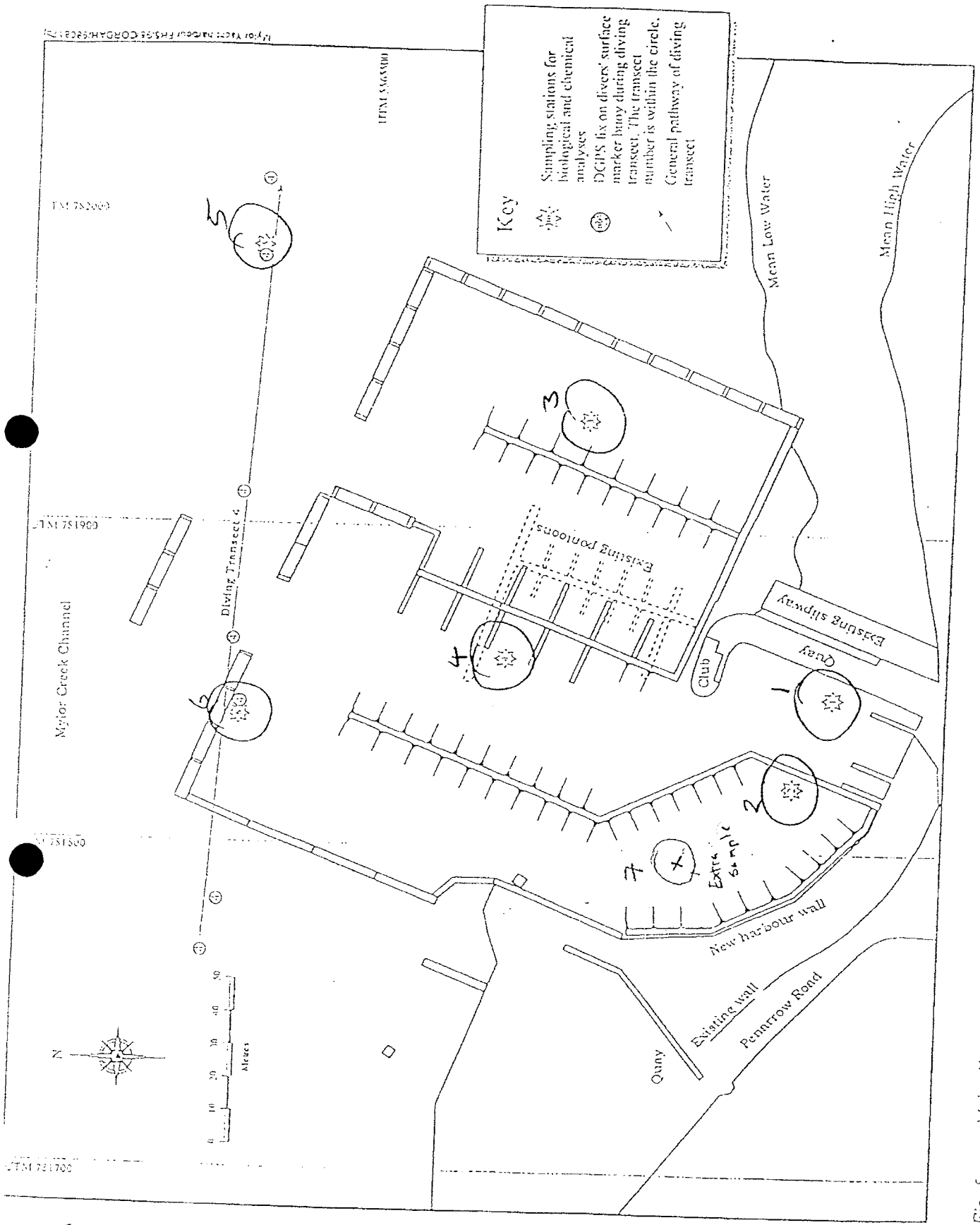


Fig. 5 *Mylor Yacht Harbour - Planned developments and locations of sampling stations and diving transects undertaken on the 28th and 29/07/98 (produced from development plan provided by the client).*

50° 11.900N
005° 03.60W.

MAFF/DAS 30476
LICENSEE: Mylor Yacht Harbour

			dry weight	dry weight
LSN	**Sample No.**	**TS%**	**TBT**	**DBT**
99/341	1	36.93	7.01	1.04
99/342	2	36.16	30.36	2.02
99/343	3	39.81	1.85	0.39
99/344	4	37.96	0.36	0.08
99/345	5	37.99	0.17	0.03
Mean (wet)		**37.77**	**3.002715**	**0.2689224**

Date **22/02/00**

Produced by: **CMW**

MAFF/DAS 30476
LICENSEE: Mylor Yacht Harbour

(mg/kg ppm)
wet weight

LSN	Site No.	TS%	AS	CD	CR	CU	HG	NI	PB	ZN
99/341	1	36.93	73	0.39	17	296	0.48	11	61	305
99/342	2	36.16	77	0.55	17	333	0.76	11	77	378
99/343	3	39.81	76	0.35	20	320	0.48	12	54	301
99/344	4	37.96	84	0.35	18	311	0.47	12	46	291
99/345	5	37.99	101	0.35	18	362	0.27	11	48	303
Mean (wet)		37.77	82.2	0.398	18	324.4	0.492	11.4	57.2	315.6

Date **17/2/99**

Produced by: **CMW**

Site No. 1 = Station 1 Surface
Site No. 2 = Station 1 Depth
Site No. 3 = Station 2 Surface
Site No. 4 = Station 3 & 4 Surface only
Site No. 5 = Station 5 & 6 Surface only


Prince of Wales Pier
2 F.R(vert)
Fish Strand Quay
Small Craft Moorings
(summer only)
Steps
Slips
2F.R(vert)
20m(2000)
15m(2000)
Visitors Yacht Haven
North Quay
Church (37) Clock Tr
LB Store
Town Quay
Custom House Quay
Port Pendennis Marina
Grove Place Boatpark
OLD OBSERVATORY TOWER (69)
National Maritime Museum
Under const (2001)
Swing Bridge
Challenger Quay
Slip
CG & Lifeboat Station
Port Pendennis Harbour Village
Dock Master's Office
Northern Arm
Jetty
Empire Jetty
King's Jetty
Kings Steps
Duchy Wharf (25t)
FAL FISH / IPS Ltd.
A & P (Falmouth) Ltd
County Wharf (25t)
DOCKS BASIN
The Western
Fish Berth
No 4 Dock
No 3 Dock
No 2 Dock
No 1 Dock
Slipway
Pendennis Shipyard Ltd.
Station
Cliffs 27m high
Swimming Pool
FALMOUTH HOTEL
4°45'W
09·0

DEFRA/DAS : 31374
DC : 6434
Samples Taken 2002

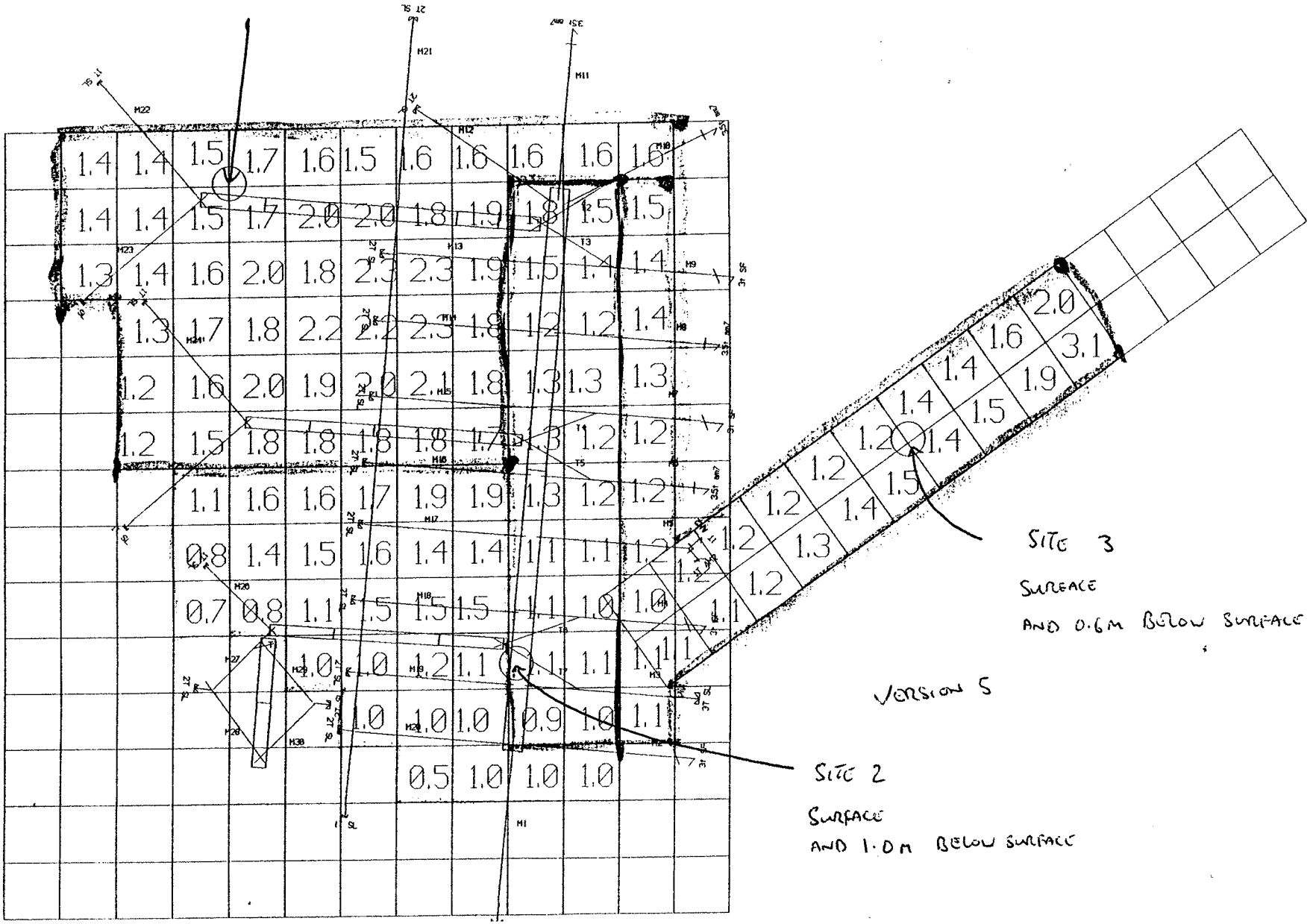
			mg/kg/ppm wet weight										dry weight	dry weight
Sample No.	**Site**	**TS%**	**AS**	**CD**	**CR**	**Cu**	**HG**	**NI**	**PB**	**ZN**	**DBT**	**TBT**	**DBT**	**TBT**
1	A	65.7	20	0.11	21	38	0.51	17	68	100	0.0005	0.012	0.007	0.018
2	A	66.2	6.5	0.21	30	30	5.4	20	33	91	0.013	0.062	0.019	0.094
3	A	72.2	4.2	0.2	29	9.9	0.01	22	11	71	<0.00100	<0.00100	<0.00100	<0.00100
4	A	69.9	9.7	0.07	20	61	0.4	16	36	137	0.052	0.224	0.075	0.32
5	A	67.5	7.4	0.14	20	26	0.15	16	21	71	0.017	0.155	0.025	0.23
6	A	68.4	11	0.17	22	11	0.02	18	11	55	<0.00100	<0.00200	<0.00100	<0.00200
7	B	71	3	0.13	22	78	0.78	14	53	144	0.067	0.312	0.094	0.439
8	B	76	8.2	0.13	22	42	0.59	16	35	82	0.003	<0.00100	0.004	<0.00100
9	B	87.4	13	0.22	30	62	0.07	28	35	86	<0.00100	<0.00100	<0.00100	<0.00100
10	B	72.2	10	0.07	20	71	0.55	13	56	121	0.062	0.275	0.086	0.381
11	B	79	2.3	<0.0400	22	15	0.13	16	14	57	0.004	<0.00100	0.005	<0.00100
12	B	61.3	3.7	0.18	28	8.2	0.02	20	10	57	<0.00100	<0.00100	<0.00100	<0.00100
Mean (wet)		74.833	8.36667	0.146	24	46.0333	0.35667	17.8333	33.8333	91.1667	0.03396	0.29339	0.0351934	0.305817

Metal results are shown s parts per million (ppm) wet weight
TBT and DBT results are shown as parts per million (ppm) dry weight

CEFAS

The Centre for Environment, Fisheries & Aquaculture Science

SAMPLING SITES



Site	Latitude			Longitude		
1	50º	09.28	N	005º	03.96	W
2	50º	09.23	N	005º	03.90	W
3	50º	09.24	N	005º	03.87	W

Metal and Tin results for Falmouth Harbour

Metal Results									
		(mg/kg ppm) wet weight							
SAMPLE	**TS%**	**AS**	**CD**	**CR**	**CU**	**HG**	**NI**	**PB**	**ZN**
1 Surface	47.2	21	<0.300	18	127	1.3	14	62	172
1 Depth	56.8	21	<0.260	17	95	0.21	14	33	70
2 Surface	44.9	23	<0.250	22	113	0.91	20	61	163
2 Depth	56.6	4.9	<0.210	16	16	0.12	15	9.5	34
3 Surface	43.2	24	<0.240	21	133	0.98	13	69	186
3 Depth	51.3	13	<0.210	14	45	0.44	11	32	67
Mean (wet)	49.74	18.78	#DIV/0!	18.8	96.8	0.704	15.2	46.9	125

Tin results

		dry weight	dry weight
SAMPLE	**TS%**	**TBT**	**DBT**
1 Surface	47.2	1.36	0.28
1 Depth	56.8	0.01	0.01
2 Surface	44.9	1.43	0.33
2 Depth	56.6	0.05	0.01
3 Surface	43.2	1.61	0.29
3 Depth	51.3	0.06	0.03

PCB results for Falmouth Harbour 1998

DAS	Site No.	CB#101 PPB	CB#105 PPB	CB#110 PPB	CB#118 PPB	CB#128 PPB	CB#138 PPB	CB#141 PPB	CB#149 PPB	CB#151 PPB	CB#153 PPB	CB#156 PPB
5458	1 Surface	4.7	<0.150	9.2	5.4	1.6	7.8	1.3	5.4	1.4	6.5	1.1
5458	1 Depth	<0.140	<0.150	0.2	<0.180	<0.150	<0.180	<0.140	<0.310	<0.150	<0.170	<0.0900
5458	2 Surface	5.1	2.4	9.9	5.7	1.6	7.6	1.3	5.4	1.4	6.9	1
5458	2 Depth	0.2	<0.150	0.5	0.3	<0.150	0.4	<0.140	<0.310	<0.150	0.2	<0.0900
5458	3 Surface	3.2	<0.150	4.9	3	0.8	4	0.6	3.4	0.9	4.1	0.5
5458	3 Depth	4.8	<0.150	8.8	5.1	1.5	7.4	1.3	5.9	1.5	7.4	1

DAS	Site No.	CB#158 PPB	CB#170 PPB	CB#18 PPB	CB#180 PPB	CB#183 PPB	CB#187 PPB	CB#194 PPB	CB#28 PPB	CB#31 PPB	CB#44 PPB	CB#47 PPB
5458	1 Surface	0.9	1.9	<0.130	3.6	1.1	2.2	0.6	0.6	0.4	0.9	0.3
5458	1 Depth	<0.0800	<0.160	<0.130	<0.160	<0.140	<0.170	<0.0600	<0.160	<0.110	<0.130	<0.150
5458	2 Surface	0.9	2.2	<0.130	4.4	1.3	2.6	0.7	0.8	0.5	1.9	0.5
5458	2 Depth	<0.0800	<0.160	<0.130	<0.160	<0.140	<0.170	<0.0600	<0.160	<0.110	<0.130	<0.150
5458	3 Surface	0.4	1.2	<0.130	2.4	0.7	1.5	0.4	0.3	<0.110	0.6	0.3
5458	3 Depth	0.8	2.2	0.3	4.5	1.4	2.7	0.7	0.9	0.6	1.4	0.5

DAS	Site No.	CB#49 PPB	CB#52 PPB	CB#66 PPB	OT25CB PPM	TOTICES7 PPM
5458	1 Surface	0.9	1.6	<0.100	0.0594	0.0302
5458	1 Depth	<0.130	<0.230	<0.100	0.0002	0
5458	2 Surface	1.6	2.8	2.5	0.071	0.0333
5458	2 Depth	<0.130	<0.230	<0.100	0.0018	0.0011
5458	3 Surface	1	1.1	1.2	0.0365	0.0181
5458	3 Depth	1.5	2.3	2.2	0.0667	0.0324

Licensing Sample Analysis Form

DAS No.	5458
Sample No.	6 Below surface site 3
Bliss No.	98/612

Location: **Falmouth**

Date received: **26/2/98**

Results required by: **19/3/98**

Analysis required:

Particle Size Analysis ✓

Visual Description ✓

	Gravel	Sand	Silt/Clay
Actual weight (g)	3.25	8.19	27.36
% Weight	8.38	21.11	70.52

Visual description:
Thick anoxic black mud containing finely broken shells, with some larger complete shells of limpets and bivalves. Lithothanium present in large quantities.

Licensing Sample Analysis Form

DAS No.	5458
Sample No.	5 Surface site 3
Bliss No.	98/611

Location: **Falmouth**

Date received: **26/2/98**

Results required by: **19/3/98**

Analysis required:

Particle Size Analysis ✓

Visual Description ✓

	Gravel	Sand	Silt/Clay
Actual weight (g)	22.82	27.01	41.82
% Weight	24.90	29.47	45.63

Visual description:
Dark brown mud densely packed with shell fragments.
Large quantities of Lithothanium present.

Licensing Sample Analysis Form

DAS No.	5458 Site 2
Sample No.	4 Below surface
Bliss No.	98/610

Location: **Falmouth**

Date received: **26/2/98**

Results required by: **19/3/98**

Analysis required:

Particle Size Analysis ✓

Visual Description ✓

	Gravel	Sand	Silt/Clay
Actual weight (g)	24.22	22.75	27.17
% Weight	32.67	30.69	36.65

Visual description:
Brown mud, densely packed with shells, with a small amount of silicious sand. Whole big shells, including oyster shells as well as tiny complete gastropod shells. A small number of schist rock fragments are present. Lithothanium present in large proportions.

Licensing Sample Analysis Form

DAS No.	5458 Site 2
Sample No.	3 Surface Site 2
Bliss No.	98/609

Location: **Falmouth**

Date received: **26/2/98**

Results required by: **19/3/98**

Analysis required:

Particle Size Analysis ✓

Visual Description ✓

	Gravel	Sand	Silt/Clay
Actual weight (g)	4.54	23.07	40.97
% Weight	6.62	33.64	59.74

Visual description:
Black fluid mud containing a small amount of shell fragments and fine sand. Complete gastropod shells as well as some lithothanium present.

Licensing Sample Analysis Form

DAS No.	5458 Site 1
Sample No.	2 Below surface
Bliss No.	98/608

Location: **Falmouth**

Date received: **26/2/98**

Results required by: **19/3/98**

Analysis required:

Particle Size Analysis ✓

Visual Description ✓

	Gravel	Sand	Silt/Clay
Actual weight (g)	13.61	29.46	75.54
% Weight	11.47	24.84	63.69

Visual description:
Thick brown mud with small proportion of sand. Whole gastropods and mixed broken shell, and lithothanium coral present.

Licensing Sample Analysis Form

DAS No.	5458 Site 1
Sample No.	1 Surface
Bliss No.	98/607

Location: **Falmouth**

Date received: **26/2/98**

Results required by: **19/3/98**

Analysis required:

Particle Size Analysis ✓

Visual Description ✓

	Gravel	Sand	Silt/Clay
Actual weight (g)	3.38	22.55	34.16
% Weight	5.62	37.53	56.85

Visual description:
Thick mud with some fine sand and finely broken shells, with some broken fragments of larger shells. Lithonium present in small quantities.

Results of Metal and TBT Analysis Performed on Samples Provided by Carrick District Council, Port of Truro
DC: 5676

Samples taken 09 November 1998

Sample No.	TS%	Aa	Cd	Cr	Cu	Hg	Ni	Pb	Zn	TBT	DBT
A	44.4	63	1	21	152	0.15	12	80	420	0.21	0.03
B	49.3	71	1.6	25	193	0.19	14	91	660	0.07	0.03
C	44.3	49	1.1	25	164	0.21	14	90	449	0.07	0.03

Metal results are shown s parts per million (ppm) wet weight
TBT and DBT results are shown as parts per million (ppm) dry weight

a) Turning Circle: Latitude 50 14.9' North, Longitude 005 0.2.2' West
b) Latitude 5014.9' North, Longitude 005 02.05' West
c) Upper Quays: Latitude 50 15.7' North, Longitude 005 02.75

CEFAS

The Centre for Environment, Fisheries & Aquaculture Science

DEFRA/DAS : 31374
DC : 6434
Samples Taken 2002

			mg/kg/ppm wet weight										dry weight	dry weight
Sample No.	**Site**	**TS%**	**AS**	**CD**	**CR**	**Cu**	**HG**	**NI**	**PB**	**ZN**	**DBT**	**TBT**	**DBT**	**TBT**
1	A	65.7	20	0.11	21	38	0.51	17	68	100	0.0005	0.012	0.007	0.018
2	A	66.2	6.5	0.21	30	30	5.4	20	33	91	0.013	0.062	0.019	0.094
3	A	72.2	4.2	0.2	29	9.9	0.01	22	11	71	<0.00100	<0.00100	<0.00100	<0.00100
4	A	69.9	9.7	0.07	20	61	0.4	16	36	137	0.052	0.224	0.075	0.32
5	A	67.5	7.4	0.14	20	26	0.15	16	21	71	0.017	0.155	0.025	0.23
6	A	68.4	11	0.17	22	11	0.02	18	11	55	<0.00100	<0.00200	<0.00100	<0.00200
7	B	71	3	0.13	22	78	0.78	14	53	144	0.067	0.312	0.094	0.439
8	B	76	8.2	0.13	22	42	0.59	16	35	82	0.003	<0.00100	0.004	<0.00100
9	B	87.4	13	0.22	30	62	0.07	28	35	86	<0.00100	<0.00100	<0.00100	<0.00100
10	B	72.2	10	0.07	20	71	0.55	13	56	121	0.062	0.275	0.086	0.381
11	B	79	2.3	<0.0400	22	15	0.13	16	14	57	0.004	<0.00100	0.005	<0.00100
12	B	61.3	3.7	0.18	28	8.2	0.02	20	10	57	<0.00100	<0.00100	<0.00100	<0.00100
Mean (wet)		74.833	8.36667	0.146	24	46.0333	0.35667	17.8333	33.8333	91.1667	0.03396	0.29339	0.0351934	0.305817

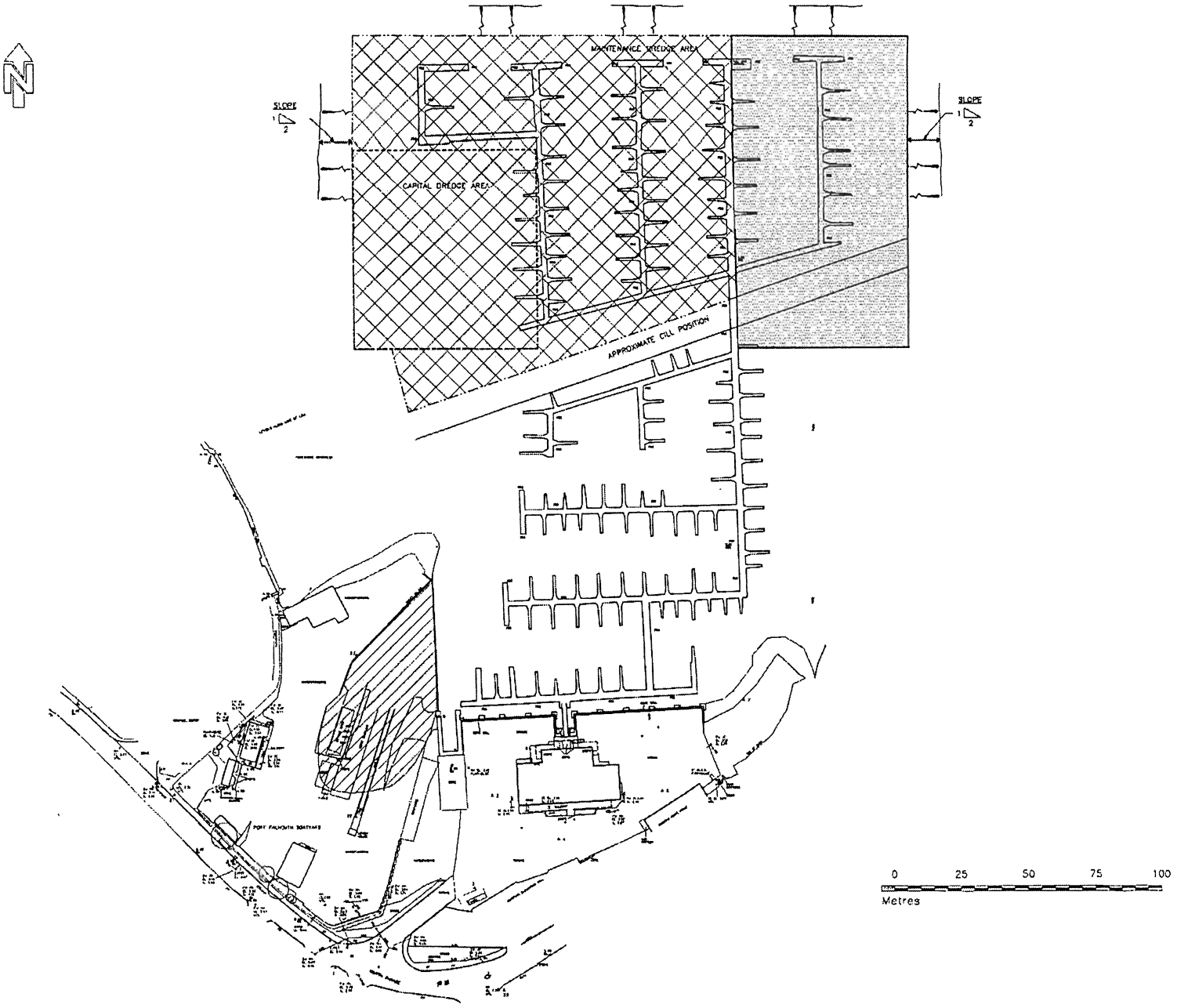
Metal results are shown s parts per million (ppm) wet weight
TBT and DBT results are shown as parts per million (ppm) dry weight

Latitude 50º 14.9 N
Longitude 005º 01.35 W

Believed to be the entrance to Tresillian Creek, adjacent to Malpas Marina

CEFAS

The Centre for Environment, Fisheries & Aquaculture Science



GENERAL NOTES

Original Survey Drawing Provided by:

David J Powell Surveys Ltd.
Land and Building Surveying
Boundary Dispute Consultation

NB:
Land levels are related to OS datum
Marine bed levels are related to Chart Datum

INCLUDES PREVIOUS SURVEY 96183

LEGEND:

APPROXIMATE DREDGE AREA A DREDGE TO 2m BELOW CHART DATUM.

APPROXIMATE LOCATION OF NEW SHEET PILED WALL.

APPROXIMATE AREA TO BE BACKFILLED

MAINTENANCE DREDGE AREA

CAPITAL DREDGE AREA

EXCLUSION ZONE (NOT TO BE DREDGED)

REV.	DATE	DESCRIPTION	BY
A02	23/3/04	TEXT DELETED FROM EXCLUSION ZONE	MC

AMENDMENTS

PROJECT:- **FALMOUTH MARINA**

TITLE:- PROPOSED DREDGE AREA AND ADJACENT EXCLUSION ZONE

CLIENT:- Premier Marinas (Falmouth) Ltd

ARCHITECT:- -

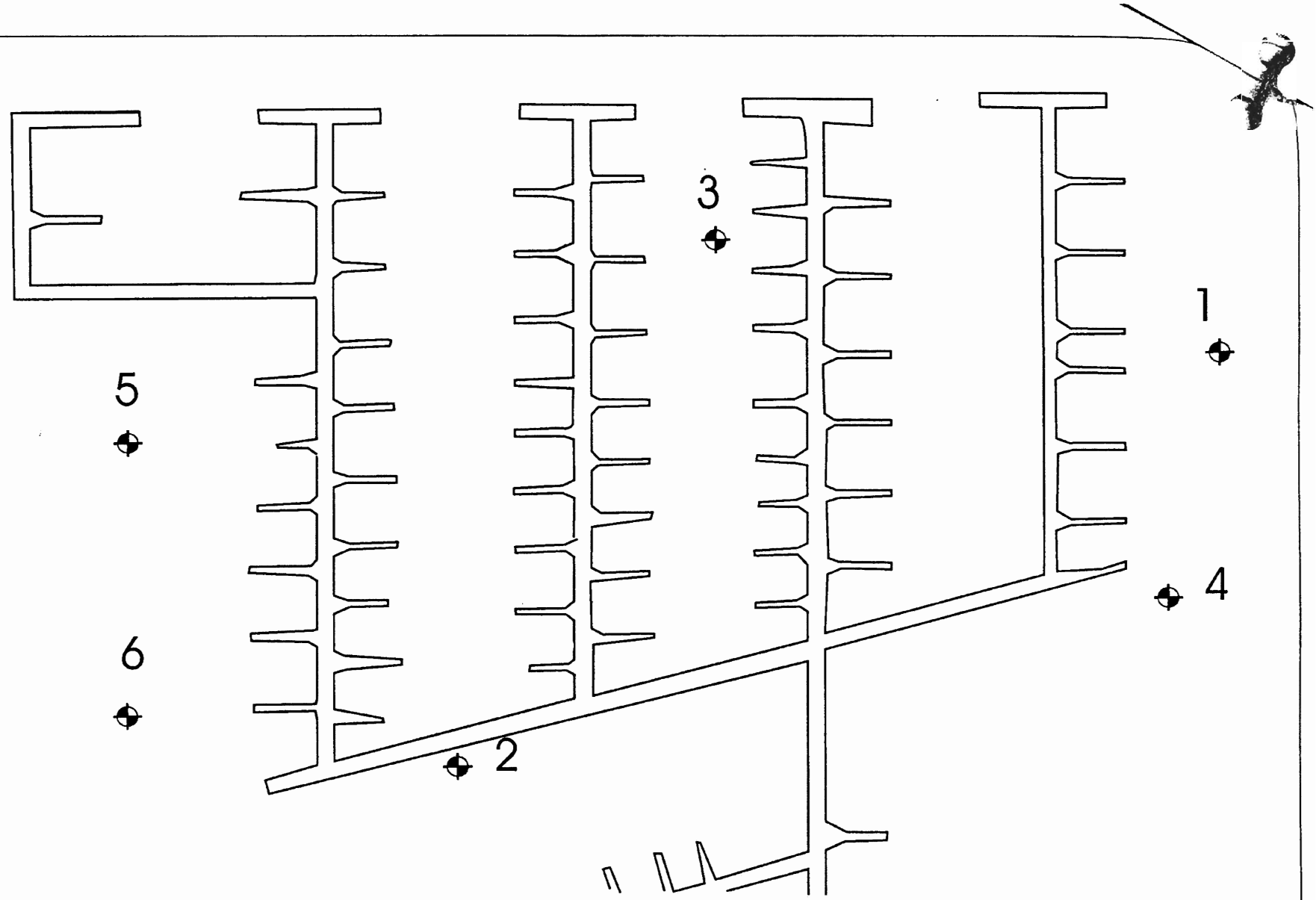
Waterman Environmental
Consulting Engineers & Scientists

YEOMANS COURT 3 PARK GARDEN LONDON SE1 9HD
Telephone: 020 7928 7888 Fax: 020 7928 0944
www.watermanenvironmental.co.uk

PRELIMINARY

Designed by: NR	Checked by:	Paper size:	
Drawn by: MC	Date: 02/12/03		EN1986
Scale: 1:750 (@A1)		Original file no.:	

Project no.	Zone	Category	Number	Revision
WE	SA	87	05	A02



Key

⊕ Waterman Environmental BH

Waterman Environmental
Consulting Engineers and Scientists
VERSAILLES COURT 3 PARIS GARDEN LONDON SE1 8ND
Telephone 0171 928 7888 Fax 0171 928 0656

Job No :- EN 1986	Figure No :-
Title :- FALMOUTH OUTER MARINA Silt Core sample locations in Outer Marina	
Date :- Oct 2001	Scale :-NTS

Metals and Tin Results for Defra/DAS: Falmouth Marina

DC: 6422

Date Sampled: 16/11/01

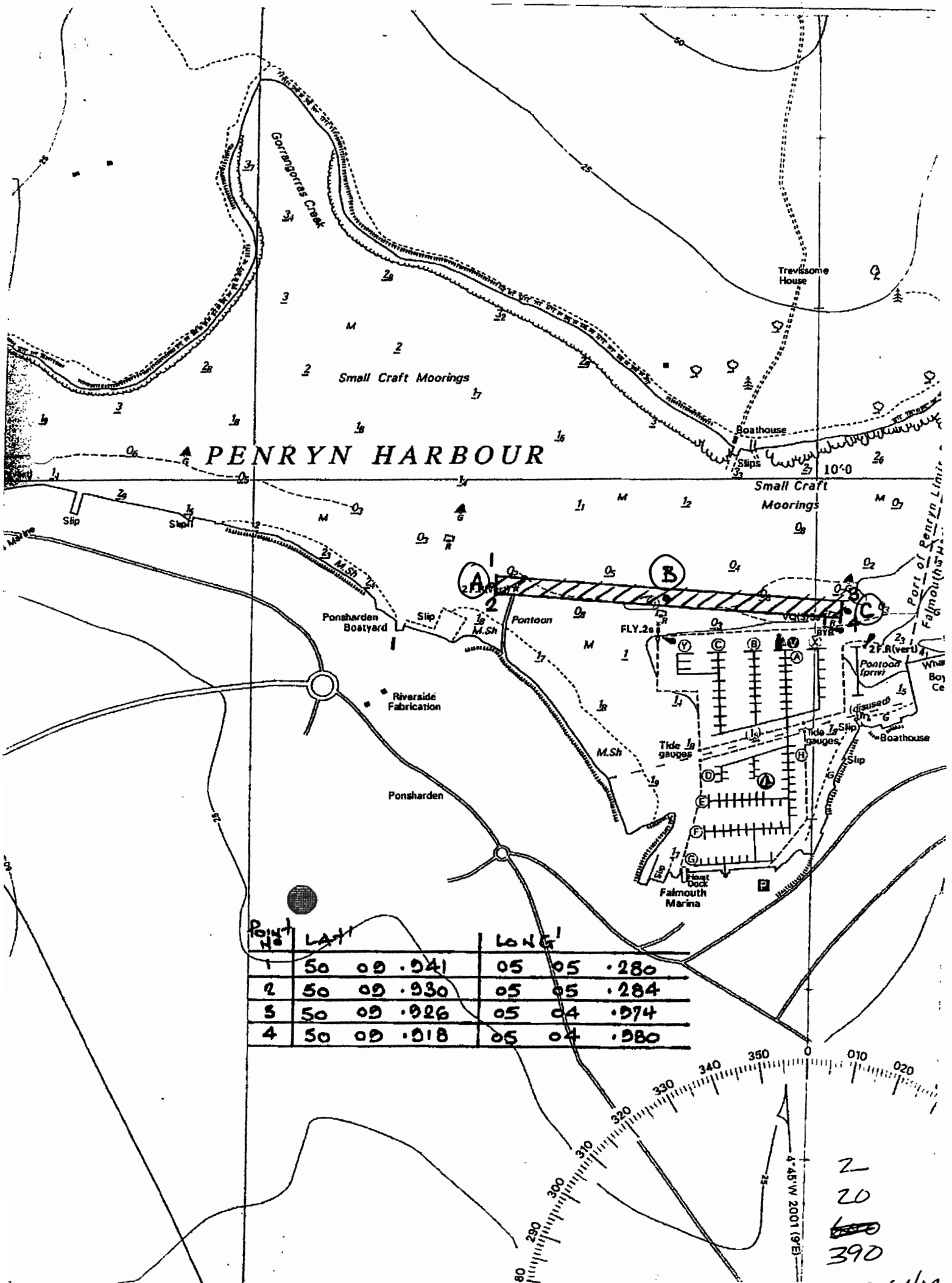
mg/kg (ppm)
Dry weight

LSN	Depth	Sample No.	Location	TS%	AS	CD	CR	CU	HG	NI	PB	ZN	DBT	TBT
2001/2853	1m	1a	BH01	45.50	13.20	0.18	13.65	115.57	1.96	9.10	85.09	132.86	0.007	0.015
2001/2854	1.5m	1b	BH01	45.70	12.80	0.18	12.80	100.08	1.60	9.60	94.14	140.76	<0.00200	0.017
2001/2855	2m	1c	BH01	49.50	17.33	0.59	201.47	108.90	1.29	19.80	115.83	3791.70	<0.00500	<0.00600
2001/2856	1m	2a	BH02	50.90	2.60	0.19	15.78	7.64	<0.01	11.20	9.67	31.56	<0.00200	<0.00300
2001/2857	1.5m	2b	BH02	52.90	2.43	0.17	17.99	7.94	<0.01	12.17	10.05	35.44	<0.00200	<0.00200
2001/2858	2m	2c	BH02	54.90	3.95	0.17	29.10	9.33	0.02	18.67	14.27	41.18	<0.00200	<0.00200
2001/2859	1m	3a	BH03	70.20	5.69	0.13	21.76	9.83	<0.01	14.74	14.04	47.74	<0.00100	<0.00200
2001/2860	1.5m	3b	BH03	52.40	4.77	0.14	14.67	16.24	0.05	11.00	14.15	38.78	0.007	0.018
2001/2861	2m	3c	BH03	57.70	3.40	0.12	16.73	8.08	<0.01	13.85	9.23	36.93	<0.00200	<0.00300
2001/2862	1m	4a	BH04	64.80	12.31	0.19	20.74	50.54	0.53	14.90	62.86	112.10	0.050	0.376
2001/2863	1m	5a	BH05	48.90	2.89	0.11	11.74	10.76	0.04	8.80	9.78	32.27	0.025	0.090
2001/2864	1.5m	5b	BH05	56.90	4.04	0.16	19.35	6.83	0.02	11.95	9.10	39.83	0.006	0.015
2001/2865	2m	5c	BH05	58.50	4.39	0.16	19.31	7.61	0.02	12.29	9.36	43.29	<0.00200	<0.00200
2001/2866	1m	6a	BH06	43.20	3.24	0.13	16.85	15.98	0.03	10.37	12.10	34.56	<0.00300	<0.00400
2001/2867	1.5m	6b	BH06	51.20	2.25	0.13	28.67	7.17	<0.01	21.50	9.22	30.21	<0.00200	<0.00300
2001/2868	2m	6c	BH06	52.90	2.96	0.12	19.04	7.41	<0.01	11.64	9.52	32.80	<0.00200	<0.00300
			Mean	53.51	6.14	0.18	29.98	30.62	0.55	13.22	30.53	288.87	0.019	0.089

DATE: **05/07/2005**

Produced by M.Cassap

CEFAS
The Centre for Environment, Fisheries & Aquaculture Science



POINT No	LAT	LONG
1	50 09 ·241	05 05 ·280
2	50 09 ·230	05 05 ·284
3	50 09 ·226	05 04 ·274
4	50 09 ·218	05 04 ·280

2
20
~~600~~
390
8710 CH/M

Metals and Tin Results for Defra/DAS: 32457 Penryn Harbour

DC: 7087

Date Sampled: 18/08/04

mg/kg (ppm)

Dry weight

LSN	Sample No.	Location	TS%	AS	CD	CR	CU	HG	NI	PB	ZN	DBT	TBT
)04/08413/2	Bulk 1-3	Ferry Turning Zone	66	65	0.30	16	152	0.26	16	72	308	<0.003	0.036
)04/08414/2	Bulk 4-6	Mid Dredge Channel	59	49	0.33	13	121	0.30	11	48	248	<0.004	0.025
)04/08415/2	Bulk 7-9	E.end Dredge channel	60	61	0.64	14	132	0.15	12	51	350	<0.004	0.027
		Mean	62.0	58.3	0.42	14	135	0.24	13	57	302	#DIV/0!	0.030

DATE: 22/04/2005

Produced by: M. Cassap

CEFAS

The Centre for Environment, Fisheries & Aquaculture Science

Polychlorinated Byphenyl Results for Defra/DAS:

Licensee:
DC:
Date Sampled:

mg/kg (ppm)
Dry weight

LSN	Sample No.	Location	CB 101	CB 105	CB 110	CB 118	CB 128	CB 138	CB 141	CB 149	CB 151	CB 153	CB 156
2004/08413	Bulk 1-3	Ferry Turning Zone	<0.0002	<0.0002	0.0002	0.00024	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	0.00038	<0.0002
2004/08414	Bulk 4-6	Mid Dredge Channel	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	0.0003	<0.0002
2004/08415	Bulk 7-9	E.end Dredge Channel	0.00022	<0.0002	0.0003	0.00032	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	0.00032	<0.0002

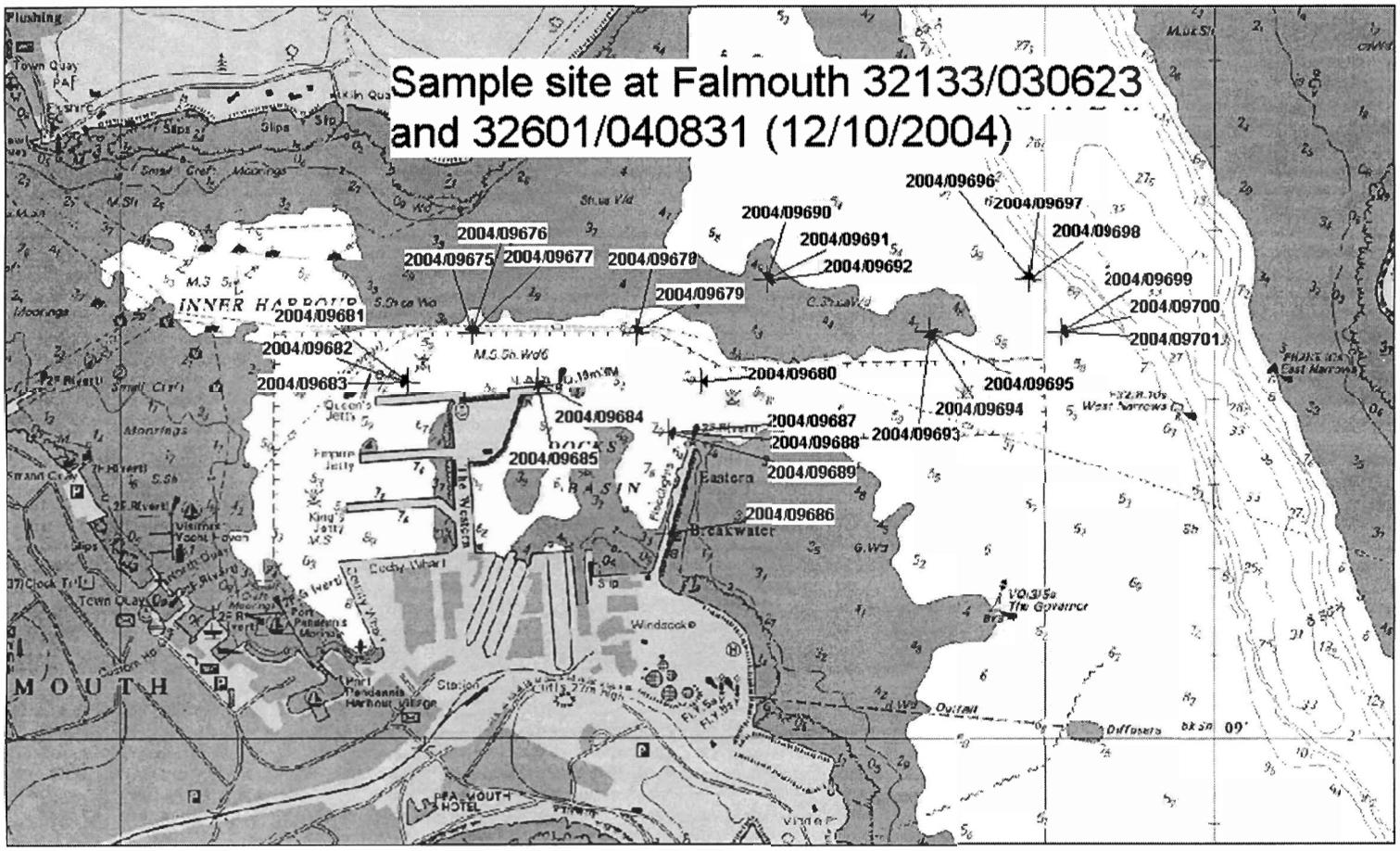
mg/kg (ppm)
Dry weight

LSN	Sample No.	Location	CB 158	CB 170	CB 18	CB 180	CB 183	CB 187	CB 194	CB 28	CB 31	CB 44	CB 47
2004/08413	Bulk 1-3	Ferry Turning Zone	<0.0002	0.0002	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
2004/08414	Bulk 4-6	Mid Dredge Channel	<0.0002	<0.0002	<0.0002	0.00022	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
2004/08415	Bulk 7-9	E.end Dredge Channel	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

mg/kg (ppm)
Dry weight

LSN	Sample No.	Location	CB 49	CB 52	CB 66								sum of 25 congen
2004/08413	Bulk 1-3	Ferry Turning Zone	<0.0002	<0.0002	<0.0002								0.00197
2004/08414	Bulk 4-6	Mid Dredge Channel	<0.0002	<0.0002	<0.0002								0.00087
2004/08415	Bulk 7-9	E.end Dredge Channel	<0.0002	<0.0002	<0.0002								0.00153

CEFAS
The Centre for Environment, Fisheries & Aquaculture Science


Sample site at Falmouth 32133/030623
and 32601/040831 (12/10/2004)
2004/09696
2004/09697
2004/09690
2004/09698
2004/09676
2004/09691
2004/09675
2004/09677
2004/09678
2004/09692
2004/09699
2004/09679
2004/09700
2004/09681
2004/09701
2004/09682
2004/09680
2004/09683
2004/09695
2004/09694
2004/09684
2004/09687
2004/09693
2004/09688
2004/09685
2004/09689
2004/09686
INNER HARBOUR
BASIN
Eastern
Breakwater
MOUTH
Flushing
Town Quay
Slips
Moorings
Queen's Jetty
Prince Jetty
King's Jetty
Custom House
Town Quay
Windsock
Diffusers
PRINCE OF WALES PIER
West Narrows
East Narrows

Metals and Tin Results for Defra/DAS: 32601 Falmouth Docks

DC: 7189

Date Sampled: September 2004

mg/kg (ppm)
Dry weight

LSN	Sample No.	Location	Depth	TS%	AS	CD	CR	CU	HG	NI	PB	ZN	DBT	TBT
04/09675/2	1	Area 1 - Site 1	Surface	56	38	0.14	24	183	1.50	21	87	295	0	1.664
04/09676/2	2	Area 1 - Site 1	1	44	3	0.26	22	11	0.14	21	12	56	<0.001	<0.002
04/09677/2	3	Area 1 - Site 1	1.8	63	4	0.14	21	7	<0.01	16	9	42	<0.001	<0.002
04/09678/2	4	Area 1 - Site 2	Surface	69.02439	17	0.08	11	77	1.1	13	41	175	0.128597	0.753872154
04/09679/2	5	Area 1 - Site 2	1	89.10076	11	<0.01	18	13	0.02	18	15	43	<0.001	<0.001
04/09680/2	6	Area 1 - Site 3	Surface	*	*	*	*	*	*	*	*	*	0.326747	1.650601091
04/09681/2	7	Area 2 - Site 1	Surface	43.54497	88	0.5	45	404	7.2	39	373	622	0.018063	0.097075657
04/09682/2	8	Area 2 - Site 1	1.5m	64	15	0.28	39	28	0.24	37	27	128	<0.001	<0.002
04/09683/2	9	Area 2 - Site 1	3.0m	65	13	0.20	35	17	0.06	35	18	81	<0.001	<0.002
04/09684/2	10	Area 2 - Site 2	Surface	60	42	0.22	35	329	2.10	38	244	882	1	3.466
04/09685/2	11	Area 2 - Site 2	1.5	*	*	*	*	*	*	*	*	*	<0.001	<0.001
04/09686/2	12	Area 3 - Site 1	Surface	61.84902	75	0.82	65	908	14	75	825	4583	1.07442	16.60769869
04/09687/2	13	Area 3 - Site 2	Surface	66.29363	51	3.2	45	823	7.4	66	467	3037	1.449058	18.52024509
04/09688/2	14	Area 3 - Site 2	2	56.6129	12	0.32	39	21	0.12	42	28	112	<0.002	0.051186311
04/09689/2	15	Area 3 - Site 2	4	79.46179	6.6	0.06	40	28	0.05	34	33	113	<0.001	0.034535476
04/09690/2	16	Area 4 - Site 1	Surface	*	*	*	*	*	*	*	*	*	<0.001	<0.002
04/09691/2	17	Area 4 - Site 1	1	72.20725	<0.22	0.02	1.3	0.3	<0.01	0.76	0.64	4.2	<0.001	<0.002
04/09692/2	18	Area 4 - Site 1	2.5	*	*	*	*	*	*	*	*	*	<0.001	<0.002
04/09693/2	19	Area 4 - Site 2	Surface	66.47992	1.8	<0.09	6.5	6.6	0.04	4.8	4.9	154	<0.001	<0.002
04/09694/2	20	Area 4 - Site 2	1	71.67355	0.27	<0.08	2.9	0.79	<0.01	2.4	1.1	9.3	<0.001	<0.002
04/09695/2	21	Area 4 - Site 2	2.5	66.7495	0.85	<0.08	6.7	2.3	<0.01	6	2.3	19	<0.002	<0.002
04/09696/2	22	Area 4 - Site 3	Surface	*	*	*	*	*	*	*	*	*	<0.002	0.013570805
04/09697/2	23	Area 4 - Site 3	1	74.0796	0.25	<0.07	3.6	1.1	<0.01	2.6	1.4	9.9	<0.001	<0.002
04/09698/2	24	Area 4 - Site 3	2.5	64.46674	2.5	<0.09	8.3	3.9	0.01	9	4.1	27	<0.002	<0.002
04/09699/2	25	Area 4 - Site 4	Surface	46.93291	5.2	<0.13	15	15	0.03	15	9.3	47	<0.002	<0.002
04/09700/2	26	Area 4 - Site 4	1	*	*	*	*	*	*	*	*	*	<0.002	<0.002
04/09701/2	27	Area 4 - Site 4	2.5	60.8	10	0.29	43	19	0.05	44	21	94	<0.002	0.014281157
			Mean	65.1	16.8	0.60	26	147	2.19	27	112	620	1.020	5.530

DATE: 06/03/2005

Produced by: Matthew Cassap

CEFAS
The Centre for Environment, Fisheries & Aquaculture Science

Polycyclic Aromatic Hydrocarbon Results for Defra/DAS: 32601 Falmouth Docks

Licensee:Falmouth Harbour commissioners
DC: 7189
Date Sampled: September 2004

mg/kg (ppm)
Dry weight

LSN	Sample No.	Location	23BA	ACENAPH	ACENAPT	ANTHRAC	BAA	BAP	BBF	BENZGHI	BEP	BKF	C1N	C1PHEN
2004/09702	ulk sites 1-	Area 1 - Surface	0	0.015	0.078	0.319	0.784	1.009	1.368	0.719	0.624	0.578	0.871	1.102
2004/09703	ulk sites 1-	Area 1 - 1.0m												
2004/09704	ulk sites 1-	Area 2 - Surface	0	0.038	0.431	0.487	1.665	2.381	3.359	1.505	1.731	1.201	0.458	1.678
2004/09705	ulk sites 1-	Area 2 - 1.5m	0	0.0016	0.024	0.0036	0.0085	0.0029	0.0065	0.0034	0.0028	0.0026	0.035	0.023
2004/09706	ulk sites 1-	Area 3 - Surface	0	0.06	0.439	1.651	3.268	4.169	6.216	1.468	2.888	2.037	0.643	4.886
2004/09707	ulk sites 1-	Area 4 - Surface	0	0.0006	0.0013	0.0038	0.0056	0.0039	0.0046	0.0017	0.0042	0.0014	0.039	0.042
2004/09708	ulk sites 1-	Area 4 - 1.0m												
2004/09709	lk sites 1-4	Area 4 - 2.5m												
		Mean	<0.100	0.0207333	0.1547667	0.5528	1.0940333	1.391933	2.0757	0.491033	0.965	0.680333	0.239	1.650333

mg/kg (ppm)
Dry weight

LSN	Sample No.	Location	C2N	C3N	CHRYSEN	DBENZAH	FLUORAN	FLUOREN	INDPYR	NAPTH	PERYLEN	PHENANT	PYRENE	THC
2004/09702	ulk sites 1-	Area 1 - Surface	0.929	1.162	0.768	0.255	1.224	0.1	0.989	0.207	0.237	1.043	1.031	1056
2004/09703	ulk sites 1-	Area 1 - 1.0m												
2004/09704	ulk sites 1-	Area 2 - Surface	0.705	1.586	1.824	0.442	3.56	0.258	1.894	0.558	0.595	2.507	3.792	2621
2004/09705	ulk sites 1-	Area 2 - 1.5m	0.021	0.04	0.029	0.0018	0.0066	0.013	0.0027	0.094	0.0006	0.012	0.006	17
2004/09706	ulk sites 1-	Area 3 - Surface	1.088	2.415	3.308	0.45	8.035	0.719	1.755	0.436	1.097	9.06	8.824	3764
2004/09707	ulk sites 1-	Area 4 - Surface	0.073	0.127	0.018	0.0006	0.0044	0.0015	0.0022	0.011	0.0021	0.021	0.006	24
2004/09708	ulk sites 1-	Area 4 - 1.0m												
2004/09709	lk sites 1-4	Area 4 - 2.5m												
		Mean	0.5632	1.066	1.1894	0.22988	2.566	0.2183	0.92858	0.2612	0.38634	2.5286	2.7318	1496.4

Produced by: Matthew Cassap
Date: 06/01/2005

CEFAS
The Centre for Environment, Fisheries & Aquaculture Science

Polychlorinated Byphenyl Results for Defra/DAS: 32601

Licensee: Falmouth Harbour Commissioners
DC: 7189
Date Sampled: September 2004

CEFAS
The Centre for Environment, Fisheries & Aquaculture Science

mg/kg (ppm)
Dry weight

LSN	Site	CB 101	CB 105	CB 110	CB 118	CB 128	CB 138	CB 141	CB 149	CB 151	CB 153	CB 156
2004/09702	Area 1 - Surface	0.0061	0.002	0.0058	0.0056	0.0014	0.008	0.0015	0.0054	0.0015	0.0073	0.001
2004/09703	Area 1 - 1.0m	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
2004/09704	Area 2 - Surface	0.022	0.0057	0.022	0.016	0.0046	0.029	0.0061	0.025	0.0075	0.032	0.0029
2004/09705	Area 2 - 1.5m	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
2004/09706	Area 3 - Surface	0.028	0.0086	0.03	0.024	0.0065	0.034	0.0066	0.024	0.0062	0.03	0.004
2004/09707	Area 4 - Surface	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
2004/09708	Area 4 - 1.0m	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
2004/09709	Area 4 - 2.5m	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

mg/kg (ppm)
Dry weight

LSN	Site	CB 158	CB 170	CB 18	CB 180	CB 183	CB 187	CB 194	CB 28	CB 31	CB 44	CB 47
2004/09702	Area 1 - Surface	0.001	0.0025	0.0002	0.0045	0.0011	0.0022	0.0009	0.0006	0.0005	0.0011	0.00029
2004/09703	Area 1 - 1.0m	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
2004/09704	Area 2 - Surface	0.0032	0.012	0.0017	0.026	0.0059	0.012	0.0052	0.0028	0.0031	0.0051	0.0015
2004/09705	Area 2 - 1.5m	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002
2004/09706	Area 3 - Surface	0.0039	0.0097	0.001	0.019	0.0041	0.0077	0.0031	0.0019	0.002	0.0056	0.0014
2004/09707	Area 4 - Surface	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
2004/09708	Area 4 - 1.0m	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
2004/09709	Area 4 - 2.5m	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

mg/kg (ppm)
Dry weight

LSN	Site	CB 49	CB 52	CB 66							ICES 7	sum of 25 congeners
2004/09702	Area 1 - Surface	0.0012	0.0025	0.0015							0.03456	0.06561
2004/09703	Area 1 - 1.0m	<0.0002	<0.0002	<0.0002							0	0
2004/09704	Area 2 - Surface	0.0057	0.0095	<0.0002							0.1373	0.2665
2004/09705	Area 2 - 1.5m	<0.0002	<0.0002	<0.0002							0.00022	0.00022
2004/09706	Area 3 - Surface	0.0057	0.012	<0.0002							0.1489	0.279
2004/09707	Area 4 - Surface	<0.0002	<0.0002	<0.0002							0	0
2004/09708	Area 4 - 1.0m	<0.0002	<0.0002	<0.0002							0	0
2004/09709	Area 4 - 2.5m	<0.0002	<0.0002	<0.0002							0	0

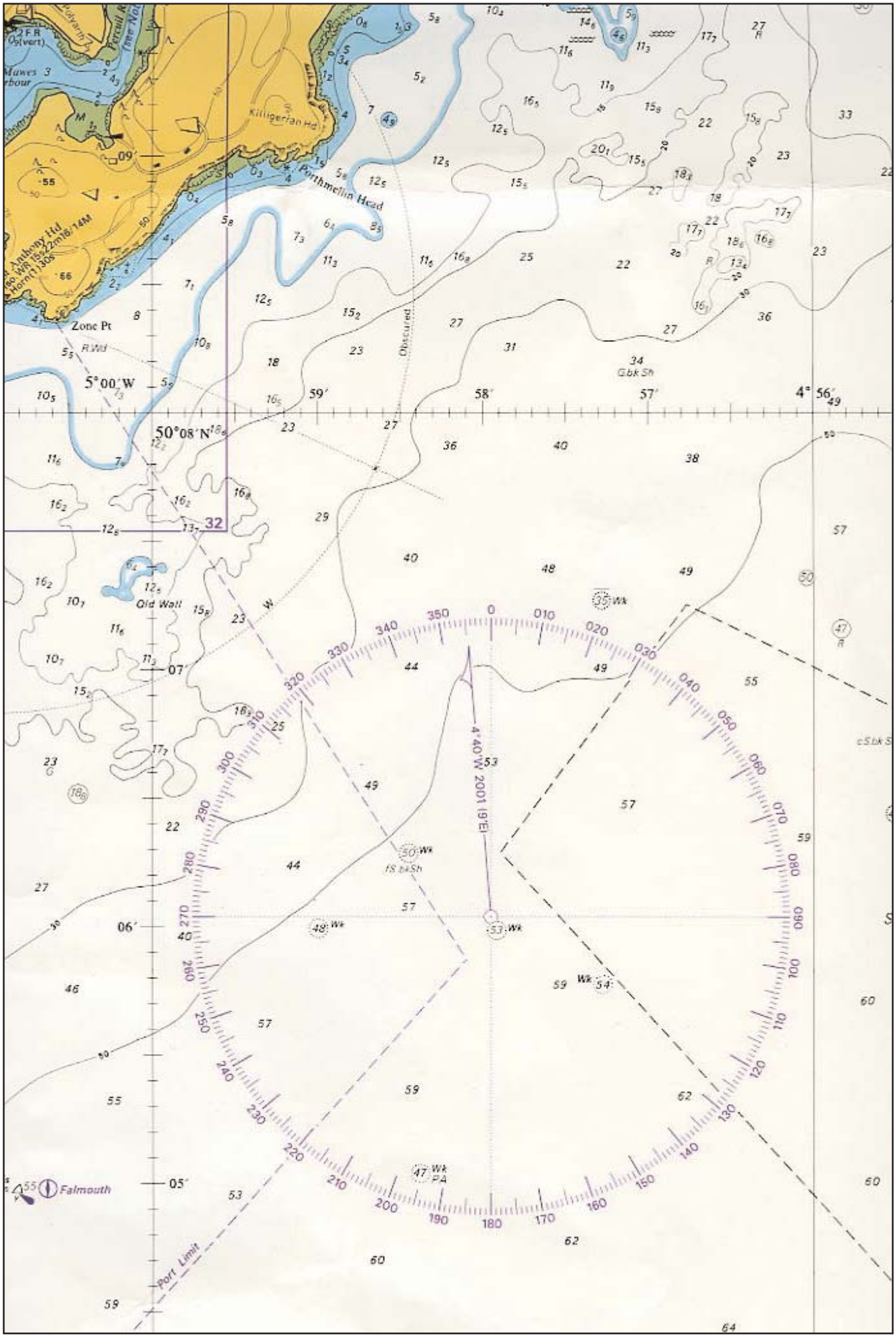
Enclosure 3

Licenses for the dumping of spoil

5458/98/0	Falmouth Harbour Commissioners	14.10.98 - 13.10.99	8,400 tonnes deposit
30758/00/0	Mylor Yacht Harbour Ltd	01.08.00 - 31.07.01	Installation of floating breakwater, extensive Pontoon mooring structure, Infill of Quay.
30476/99/0	Mylor Yacht Harbour Ltd	01.08.00 - 31.07.01	46,000 tonnes deposit
31374/02/0	Castlematter Ltd Port Pendennis Marina	23.10.02 - 22.10.03	34,900 tonnes deposit
31374/03/0	Castlematter Ltd Port Pendennis Marina	22.10.03 - 22.01.04	Varied
31726/02/1	Carrick District Council	16.11.02. - 11.09.05	25,350 tonnes deposit
308765/00/0	Carrick District Council	01.04.00 - 3`.03.01	8,540 tonnes deposit
30356/99/0	Carrick District Council	29.03.99 - 31.12.99	6,500 tonnes deposit
30356/98/0	Carrick District Council	01.01.99 - 31.12.99	6,500 + deposit
5021/96/0	Challenger Marine	1996	4,000 tonnes
32133/04/0	Premier Marinas (Falmouth) Ltd	25.11.04 - 24.11.07	82,650 tonnes
32457/05/0	Cornwall Ferries Ltd	01.02.05 - 31.01.08	46,539 tonnes deposit

Enclosure 4

Location of Spoil Ground



Spoil Ground

Enclosure 5

Exemption

ENVIRONMENT AGENCY

Our Ref: CON/E/L/CAR012
Grid Ref SW82-44
November 12, 1997

Capt. A. Brigden
Carrick District Council (Maritime)
Harbour Office
Town Quay
Truro
TR1

Dear Sir,

ENVIRONMENTAL PROTECTION ACT 1990 WASTE MANAGEMENT LICENSING REGULATIONS 1994 - REGULATIONS 17 & 18

You have notified this authority that you carry out the activity shown below on land as shown overleaf, and that this activity is exempt from the licensing requirements of Section 33 to 44 of the Environmental Protection Act 1990.

The details have now been included in the public register maintained by this authority under Regulation 18 of the waste Management Licensing Regulations 1994.

I must inform you that any waste recovery or disposal activity will only be exempt from the licensing requirement provided that the activity is carried out within the parameters of the exemption contained in Regulations 17 & 18 and schedule 3 of the Waste Management Licensing Regulations 1994 and that the activity is not carried out in contravention of the relevant objectives of the Waste Framework Directive contained in paragraph 4(1) of schedule 4 of the regulations. That is that the activity is carried out without:-

(i) risk to water, air, soil, plants or animals; or
(ii) causing nuisance through noise or odours; or
(iii) adversely affecting the countryside or places of special interest.

The keeping, treating or disposal of waste other than in accordance with the Regulations would constitute an offence for which this authority may prosecute.

The provision of an exemption under regulation 17 does not exclude the activity from the requirements of Section 33(1)(c) of the Environmental Protection Act 1990 which states that a person shall not treat, keep of dispose of controlled waste in a manner likely to cause pollution of the environment or harm to human health.

ACTIVITY CARRIED OUT:

25(1) Deposit of waste from dredging inland waters

Please note that this letter does not convey any approval under the Planning Act. A copy of this letter is being passed to the Local Planning Authority and you are advised to check whether any planning permission is required.

Yours faithfully,

S. Perry

Sue Perry
Asst. Tactical Planning Officer

Environment Agency
Sir John Moore House Victoria Square Bodmin Cornwall PL31 1EB Tel: Bodmin (01208) 78301 Fax 01208 78321

Enclosure 6

Habitats regulations guidance note

ENGLISH NATURE

Habitats regulations guidance note

HRGN 1

Issued by Greg Smith, Environmental Impacts Team, English Nature. Tel: 01733 455210

The Appropriate Assessment (Regulation 48) The Conservation (Natural Habitats &c) Regulations, 1994

Introduction

1. This Guidance Note has been prepared to assist competent authorities and English Nature staff when undertaking the *"appropriate assessment"* required by Regulation 48 of the *Habitats Regulations 1994* implementing Article 6(3) of the *Habitats Directive* (92/43/EEC). Only the Courts can provide authoritative interpretation of the Regulations, but these notes have been developed in the light of practical experience and a close examination of the Regulations, the Habitats Directive and central government guidance, particularly in PPG 9.

When Does An 'Appropriate Assessment' Need To Be Undertaken?

Types of Proposal

2. Under Regulation 48(1), an appropriate assessment needs to be undertaken in respect of any plan or project which:

a. either alone or in combination with other plans or projects would be likely to have a *significant effect* on a European Site, and
b. is not directly connected with the management of the site for nature conservation.

3. Appropriate assessment is required by law for all European Sites (Regulation 48). A European Site is any classified SPA and any SAC from the point where the Commission and the Government agree the site as a Site of Community Importance. Appropriate assessment is also required, as a matter of Government policy, for potential SPAs, candidate SACs and listed Ramsar Sites for the purpose of considering development proposals affecting them. (PPG 9 paras 13 and C7).

Timing of the Assessment

4. An appropriate assessment needs to be undertaken in respect of a plan or project described above **before** any *"competent authority"*:

a. decides to undertake the plan or project, in cases where no consent, permission or other authorisation is required. (Reg. 48(1));
b. decides to give any consent, permission or other authorisation for the plan or project. (Regs. 48(1) *et al*);
c. reviews the decision to undertake a plan or project or reviews consents, permissions or other authorisations for plans or projects that are incomplete. (Regs. 50(2) *et al* - see also EN Habitats Regulations Guidance Note No. 2);
d. decides whether to approve an application for development that would otherwise be permitted development. (Reg. 62(6)).

Significant Effects

5. The plan or project does not have to be located within the designated area. Significant effects may occur even if the plan or project is some distance away and even outside any consultation area defined by English Nature (PPG 9 paras 30-32). The effects may be direct or indirect, temporary or permanent, beneficial or harmful to the site, or a combination of these.

6. The initial determination of likely significance is intended to ensure that all relevant plans and projects likely to have a material effect on these internationally important sites are subject to an appropriate assessment. In all but the most clear cut cases, competent authorities are likely to need advice. English Nature will advise, on request, as to whether any particular plan or project may be likely to have a significant effect on any of these sites. If the decision as to whether or not the development would have a significant effect on the designated site is inconclusive, on the information available, the competent authority should make a fuller assessment; in doing so they may ask the developer or other parties for more information. (PPG 9 para C10).

Who Undertakes the Appropriate Assessment?

7. The appropriate assessment must be undertaken by the *competent authority*, as defined in Regulation 6(1) of the Habitats Regulations, which includes any Minister, Government Department, public or statutory undertaker, public body of any description or person holding a public office. The developer or proposer of the plan or project is required to provide relevant information. English Nature must be consulted, during the course of the assessment, but it is the duty of the competent authority to undertake the assessment itself.

8. Most competent authorities will not have the technical expertise "in house" to assess the effects of the plan or project on the international nature conservation interests. Most will need to rely heavily on the advice, guidance and recommendations of English Nature, at each stage, including the scope and content of the assessment, the site's conservation objectives, the information required from the developer or proposer and the effects on the integrity of the site, all of which are discussed below. The appropriate assessment, in many cases, is likely to be an iterative process. In the simplest cases a general statement in a single consultation response from English Nature may suffice to enable the competent authority to complete the assessment. However, in most cases, it is envisaged that a more detailed response from, and dialogue with, English Nature is likely to be necessary.

What is an 'Appropriate Assessment'

9. It is a self contained step in a wider decision making process, required by the Habitats Regulations and described more fully in PPG 9, Annex C. Its conclusions must be based only on the scientific considerations under steps laid out in the Habitats Regulations. The assessment should not be influenced by wider planning or other considerations.

10. The Regulations do not specify how the assessment should be undertaken but describe it simply as "an appropriate assessment". This is taken to mean that the assessment must be appropriate to its purpose under the Regulations (and also the Directive, which originated the use of the term). Its purpose is to assess the implications of the proposal in respect of the site's *"conservation objectives"*. The conclusions of the assessment should enable the

competent authority to ascertain whether the proposal would adversely affect the integrity of the site.

Scope and Content

11. PPG 9 indicates that the scope and content of an appropriate assessment will depend on the location, size and significance of the proposed plan or project (PPG 9 box C10). The PPG indicates that English Nature will advise on a case-by-case basis. According to the nature conservation interests of the site, English Nature will identify particular aspects that the appropriate assessment should address. Examples given are hydrology, disturbance and land-take, but there are clearly many other potential matters that may need to be addressed in particular cases.

12. Procedures under the Habitats Regulations should be confined to the effects on the internationally important habitats or species for which the site is or will be internationally designated or classified, including any indirect effects on these interests, for example, via their supporting ecosystems and natural processes. Notwithstanding a favourable assessment in respect of the plan or project's effects on the international nature conservation interests for which the site was classified or designated, decisions to undertake or give consent to the plan or project may need to take account of other international, national, regional or local nature conservation interests in the light of other policy and legislative provisions. (PPG 9 paras 4, 18 and 27).

Environmental Assessment

13. The appropriate assessment is not the same as an environmental assessment under the provisions of the various *Environmental Assessment (EA) Regulations* (1988-95), in compliance with the Directive 85/337/EEC. In many cases, plans or projects that will be subject to an appropriate assessment will need an Environmental Statement (ES) to be prepared under the EA Regulations. (PPG 9 paras 38 and 39).

14. The ES will address all significant environmental effects. It will be appropriate to use the information assembled for the ES when carrying out the appropriate assessment under the Habitats Regulations. In view of this it would be helpful if the relevant ES clearly identified, under a specific subject heading, the likely significant effects on the internationally important habitats and/or species.

How is an Appropriate Assessment Undertaken?

Key Steps

15. Having established that an appropriate assessment is required, the following conclusions may be drawn (from the foregoing considerations and Government guidance) in respect of how it should be undertaken.

The Key Steps in An Appropriate Assessment

The competent authority:

I

Must consult English Nature

II

May consult the general public

III

Should clearly identify and understand the site's conservation objectives having regard to the advice of English Nature

IV

Should require the applicant to provide such information as may reasonably be required for the purposes of the assessment

V

Should identify the effects of the proposal on the habitats and species of international importance and how those effects are likely to affect the site's conservation objectives

VI

Should decide whether the plan or project, as proposed, would adversely affect the integrity of the site in the light of the conservation objectives

VII

Should consider the manner in which the plan or project is proposed to be carried out, whether it could be modified, or whether conditions or restrictions could be imposed, so as to avoid adverse effects on the integrity of the site

VIII

Should conclude whether the proposal, as modified by conditions or restrictions, would adversely affect the integrity of the site

IX

Should record the Assessment and notify English Nature of the conclusions

The Key Steps Explained

These key steps are explained in more detail below.

I. Consulting English Nature

16. Under Regulation 48(3) the competent authority must consult English Nature and must have regard to any representations made by English Nature. It may be inferred from PPG 9 (box C10 and para C9) that the competent authority would be expected to follow the advice of English Nature and normally to decide the case "*in accordance with the recommendations of English Nature*". If it does not do so, the competent authority should be prepared to explain its reasons. In cases where it proposes to agree to a plan or project notwithstanding a negative assessment, the competent authority is required to notify the Secretary of State in advance of any decision.

II. Consulting the General Public

17. Under Regulation 48(4) the competent authority may (if it considers it appropriate) take the opinion of the general public, on the implications of the proposal for the site's conservation objectives, using whatever steps they consider necessary. This may usefully include taking the opinion of others with relevant knowledge or expertise.

III. The Site's Conservation Objectives

18. The Regulations do not define what is meant by the site's conservation objectives but PPG 9 box C10 describes them as:

"*the objectives.... / the reasons for which the site was classified or designated*"

English Nature will be able to give a clear statement of the site's conservation objectives in the light of its European Site Register entry (compiled by Government under Regulation 11), its citation, its reasons for recommendation, English Nature's knowledge of the site, national and international objectives for the international nature conservation interests (such as may be contained in the UK Biodiversity Action Plan) and any Management Plan or Management Statement for the site in so far as they relate to the interests for which the site was selected.

19. The site may also host habitats and/or species of Community interest (see Article 1 of the Habitats Directive) which are not mentioned in the European Site Register, the citation or the reasons for recommendation because they were not, at the time, a reason for classification or designation. Such features are not relevant to the appropriate assessment itself. Nevertheless their presence may be material to the decision as to whether or not to undertake or to consent to the plan or project.

IV. Requiring Further Information

20. The competent authority, taking the advice of English Nature where necessary, should require the applicant to provide such information as the competent authority may reasonably require for the purposes of making the assessment (Reg.48(2)). The information required may relate to any environmental information, or information about the proposal, relevant to the assessment and may include:

i. information already available, or
ii. new information from surveys that may need to be carried out, or
iii. data analysis, predictions, comparisons or assessments of a technical nature.

V. Identifying the Effects

21. Having regard to English Nature's advice and other consultation responses and, where relevant, taking account of the ES or any other information supplied by the developer/proposer, or otherwise available, the competent authority should identify what the effects of the proposal are likely to be. The effects considered should be those of the plan or project, either alone or in combination with other plans or projects, on the habitats and species of international importance and how those effects are likely to affect the site's conservation objectives. This will involve considering, for example, the nature, scale, geographic extent, timing, duration and magnitude of direct and indirect effects; considering the degree of certainty in the prediction of effects; considering all mitigating measures already contained in the proposal and the extent to which these measures are likely to avoid, reduce or ameliorate adverse effects on the international nature conservation interests. It is the residual effects, after mitigation, that are considered at this stage.

VI. Integrity of the Site

22. Having regard to English Nature's advice, other consultation responses and any other information available, the competent authority should decide whether the plan or project, as proposed, would adversely affect the integrity of the site, in the light of its conservation objectives. That is, whether the plan or project would adversely affect the "*coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and/or populations of species for which the site is or will be classified*" (PPG 9 box C10). An adverse effect on integrity is likely to be one which prevents the site from making the same contribution to favourable conservation status for the relevant feature as it did at the time of its designation.

23. The form of words used in Regulation 48(5) implies that a precautionary approach should be taken in considering effects on integrity, in line with the Government's principles for sustainable development (see *Sustainable Development: the UK strategy* page 33). Regulation 48(5) says that (subject to Regulation 49) projects may only proceed if the competent authority has ascertained that it **will not adversely affect** the integrity of the European site.

VII. Considering How To Avoid Adverse Effects

24. If the proposal would adversely affect the integrity of the site then, having regard to English Nature's advice, the competent authority should consider the manner in which it is proposed to be carried out and whether the plan or project could be modified, or whether conditions or restrictions could be imposed, so as to avoid the adverse effects. This may include, for example, changes to the siting, layout, timing or use of the proposal and the use of obligations or legal agreements. (Reg. 48(6)).

25. Compensatory measures that may be offered in the proposal at this stage, seeking to redress but not remove residual harm to the international interests (such as the provision of land for habitat creation purposes), should not be considered in the appropriate assessment, but may be considered later in the decision making process. (See Reg. 53).

VIII. Conclusion on Effects In The Light of Conditions and Restrictions

26. The competent authority should reassess the conclusions in the light of any such modifications, conditions or restrictions that may be agreed or imposed.

IX. Recording the Assessment

27. It would be advisable for this conclusion, and the reasons for it, to be recorded. English Nature should be notified of the conclusion of the appropriate assessment and the authority's decision as to the effects on the integrity of the site, before the authority undertakes the plan or project or issues any permission, consent or other authorisation (PPG 9 para 30).

28. The subsequent courses of action open to a competent authority are set out in Regulations 48(5) - (7), 49 and 54(3). The Regulations prohibit a competent authority from undertaking or giving consent to any plan or project unless the appropriate assessment concluded that it would not have an adverse effect on the integrity of the site, or specific criteria are met and the Secretary of State has been informed.

Good Practice Outline of an Appropriate Assessment Record

29. A suggested model or good practice outline record of an appropriate assessment is set out below. It may be contained in, for example, a planning officer's committee report or the minutes of a competent authority's decision. In other cases it may be a file note, clearly recording compliance with the Regulations. The record may take many different forms because each assessment needs to be appropriate to the type, scale, location and significance of the proposal and to the relevant nature conservation interests. It is provided here as a guide to assist competent authorities and English Nature staff, not as an authoritative legal formula. Any record made of an appropriate assessment should be copied to English Nature and to any other parties who were consulted on the assessment.

Title of Plan or Project/Application

Location of Plan or Project/Application

[With location plan attached showing relationship to the international designation]

International Nature Conservation Site

Nature/Description of Plan or Project/Application

[Including brief description of manner in which plan or project is proposed to be carried out]

Date Appropriate Assessment Recorded

This is a record of the appropriate assessment, required by Regulation 48 of the Habitats Regulations 1994, undertaken by [name of competent authority] in respect of the above plan/project, in accordance with the Habitats Directive (Council Directive 92/43/EEC). Having considered that the plan or project would be likely to have a significant effect on the [name of international site] and that the plan or project was not directly connected with or necessary to the management of the site, an appropriate assessment has been undertaken of the implications of the proposal in view of the site's conservation objectives.

*English Nature was consulted under Regulation 48(3) on [date] and their representations, to which this authority has had regard, are attached at Annex 1. The conclusions of this appropriate assessment * are/are not in accordance with the advice and recommendations of English Nature.*

**The applicant was required to submit further information reasonably necessary for this assessment on [date] under Reg.48(2) * and replied with the information on [date]/but did not supply the information.*

** The opinion of the general public was taken under Reg. 48(4) by way of *public advertisement/further consultation etc and the views expressed (attached at Annex 2) have been taken into account.*

The site's conservation objectives have been taken into account, including consideration of the citation for the site and information supplied by English Nature (see Annex 1). The likely effects of the proposal on the international nature conservation interests for which the site was designated may be summarised as:

[List of Effects]

The assessment has concluded that:

**a) the plan or project as proposed would not adversely affect the integrity of the site,*

or

**b) the plan or project as proposed would adversely affect the integrity of the site.*

[If (b):]

The imposition of conditions or restrictions on the way the proposal is to be carried out has been considered and it is ascertained that:

**a) conditions or restrictions cannot overcome the adverse effects on the integrity of the site.*

or

**b) the following conditions and/or restrictions would avoid adverse effects on the integrity of the site. [list conditions/restrictions]*

Signed ..... Date ..... *(* delete as appropriate)*

Annexes to also include relevant correspondence, minutes or meetings with English Nature, the applicant etc.

ENGLISH NATURE

Supplement to Habitats regulations guidance note no. 1

For English Nature staff responding to habitats regulations consultations on the appropriate assessment

Good Practice Outline of an English Nature Consultation Response

This Supplement should be read in conjunction with the Habitats Regulations Guidance Note No. 1. It is intended to help English Nature staff draw up their response to consultations under Regulation 48 of the Habitats Regulations in respect of an "appropriate assessment" being carried out by a competent authority.

General Advice:

- Consultation under Reg. 48 may be explicitly initiated by a competent authority. However it is more likely to be buried or obscured in a more general consultation over a plan or project. In such cases English Nature should respond to the consulting authority by letter/pro forma in the normal way, referring to all relevant nature conservation issues. However our specific advice under the Habitats Regulations should be clearly set out either in the letter, or in a separate Annex to it.

- If objecting to a proposal it is important to distinguish between an objection based on the international nature conservation interests for which the European Site was selected (and to which specific procedures in the Habitats Regulations apply) and one based on other nature conservation interests. If the effects on the international nature conservation interests are such that, although significant, they would not adversely affect the integrity of the site, we should say so.

- In the case of any uncertainty over the application of the Regulations, the use of terms such as "significance", "integrity", "in combination" etc, or the likely impacts of a proposal, feel free to seek further advice from the relevant individuals in English Nature's national office. Our participation in Habitats Regulations cases will come under close scrutiny and it is important that we can demonstrate that we operate within the requirements of the Regulations and take a consistent approach.

- We should involve the Regional Government Office in such cases at an early stage and keep them advised of progress. In some cases, particularly where there is a risk of damage to a European site, we should also consider informing European Wildlife Division at Bristol.

Example of a Summary of Representations

If the letter in response to a consultation under the Regulations is long, or an Annex is used for the international considerations, it may be helpful to include summary paragraph(s) early in the covering letter, perhaps along the following lines:

*This letter [and attached Annex] may be taken to be English Nature's formal consultation representations under Regulation 48(3) of the Conservation (Natural Habitats &c) Regulations 1994. English Nature *objects/ does not object to the proposal.*

*English Nature is of the opinion that the proposal *would/ would not be likely to have a significant effect on the [name and status of site] and is/ is not directly connected with the management of the site for nature conservation.*

**English Nature recommends that the applicant be required under the provisions of Regulation 48(2) to provide the following information which English Nature considers to be reasonably necessary to enable the competent authority to undertake an appropriate assessment.*

*English Nature is of the opinion that the plan or project, as proposed, *would/ would not adversely affect the conservation objectives and the integrity of the site as defined in Annex C of PPG 9.*

*English Nature is of the opinion that *the following conditions/ restrictions/ legal agreements/ planning obligations could overcome adverse effects on the integrity of the site/ conditions or restrictions could not avoid harm to the integrity of the site.*

*English Nature advises that the site *does/ does not host a priority natural habitat type/ priority species within the meaning of Article 1 of the Habitats Directive (PPG 9 p.36).*

(* delete as applicable)

Recommended Content of Detailed Representations

Our response to a consultation under the Regulations should clearly state English Nature's position and should generally follow the model response letters outlined in Appendix 4 of the Local Authorities Handbook. That part of the letter relating to the Reg. 48(3) consultation should include the points set out below:

The Conservation Status of the Site

Including all relevant designations, dates and area/extent with copy of citation (or reasons for recommendation) and maps attached.

The International Nature Conservation Importance of the Site

Including the reasons why the site was or is to be designated as a European site and drawing attention to any priority habitats or species which the site supports.

The Conservation Objectives of the Site

Clearly setting out the objectives relating to all habitats and species of Community interest / Ramsar interest etc. drawing on the citation, selection criteria, Site Objective Statement, Site Management Statement, Management Plan or Strategy, BAP targets, national or international policy objectives and other sources as relevant.

Further Information Required (if any)

Setting out, as precisely as possible:

a. what information is currently in the public domain or could be made available but which is not yet submitted to the competent authority, and how they may obtain it; and

b. what further information is required from the applicant, in your opinion, to enable the competent authority to undertake, and English Nature to further advise on, the appropriate assessment.

The Effects of the Development as Proposed

Identifying all direct/indirect, temporary/permanent effects and their significance related to their nature, scale, geographic extent, location, duration, magnitude etc.

Implications for the Conservation Objectives

Setting out all implications for the conservation objectives and identifying clearly those which would be adverse to the integrity of the site.

Conditions or Restrictions

Identifying clearly which adverse effects on integrity (if any) could be overcome by, for example, conditions, planning obligations, other legal agreements etc. (See Sections D28 and D29 and E2 of the LA Handbook).

Conclusions and Recommendations

The summary paragraphs provided as examples above.

Further Assistance

Offer to provide further explanation or clarification should this be needed. Always offer to meet with the competent authority to explain our advice and to guide them through the Regulatory procedures.

For help and advice contact:

Harbour Office
Town Quay
Truro
TR1 2HJ
Tel: 01872 224231

(weekdays between 08.30 - 17.30)

Tel: 01872 224400
(out of hours)

Other useful contacts:

Penryn Harbour Office
Exchequer Quay
Penryn
TR10 8LS

Published March 2004

Karrek Konsel
Carrick
DISTRICT COUNCIL

Harbour Office

Town Quay, Truro TR1 2HJ

Tel 01872 224231
Fax 01872 225346
email abrigden@carrick.gov.uk

www.portoftruro.gov.uk