

# **1 INTRODUCTION**

## **1.1 Background**

The PLA has a statutory responsibility for maintaining safe navigation within its port limits, as shown in Figure 1. In practice this responsibility is met by a navigational Safety Management System, which includes state of the art Vessel Traffic Services (VTS), Port Control Centres, hydrographic surveys, chart production, the provision of pilotage, and where necessary, the maintenance of sufficient channel depth to permit safe access.

The Thames Estuary is a dynamic environment with sand banks formed of mobile sand. The PLA manages navigation in this environment by monitoring and moving the buoys that mark the channels and providing up to date information to pilots, ships' masters and berth operators. However there will inevitably be situations where depths in the channels have reduced to an extent where dredging is required to restore navigational safety. Occasionally, in cases where hydrodynamic processes lead to the accumulation of sufficient material in an existing channel, it may be necessary to seek an alternative route for vessels by opening up a new approach channel. In the case of the southern access routes to the port, the shallowing of the North Edinburgh Channel and, more recently, the potential instability in the Fisherman's Gat, together with navigational safety considerations, have led the PLA to consider providing improved access to the Port of London, from the south, via the more stable yet shallower Princes Channel.

## **1.2 Project Overview**

### **1.2.1 Princes Channel Development**

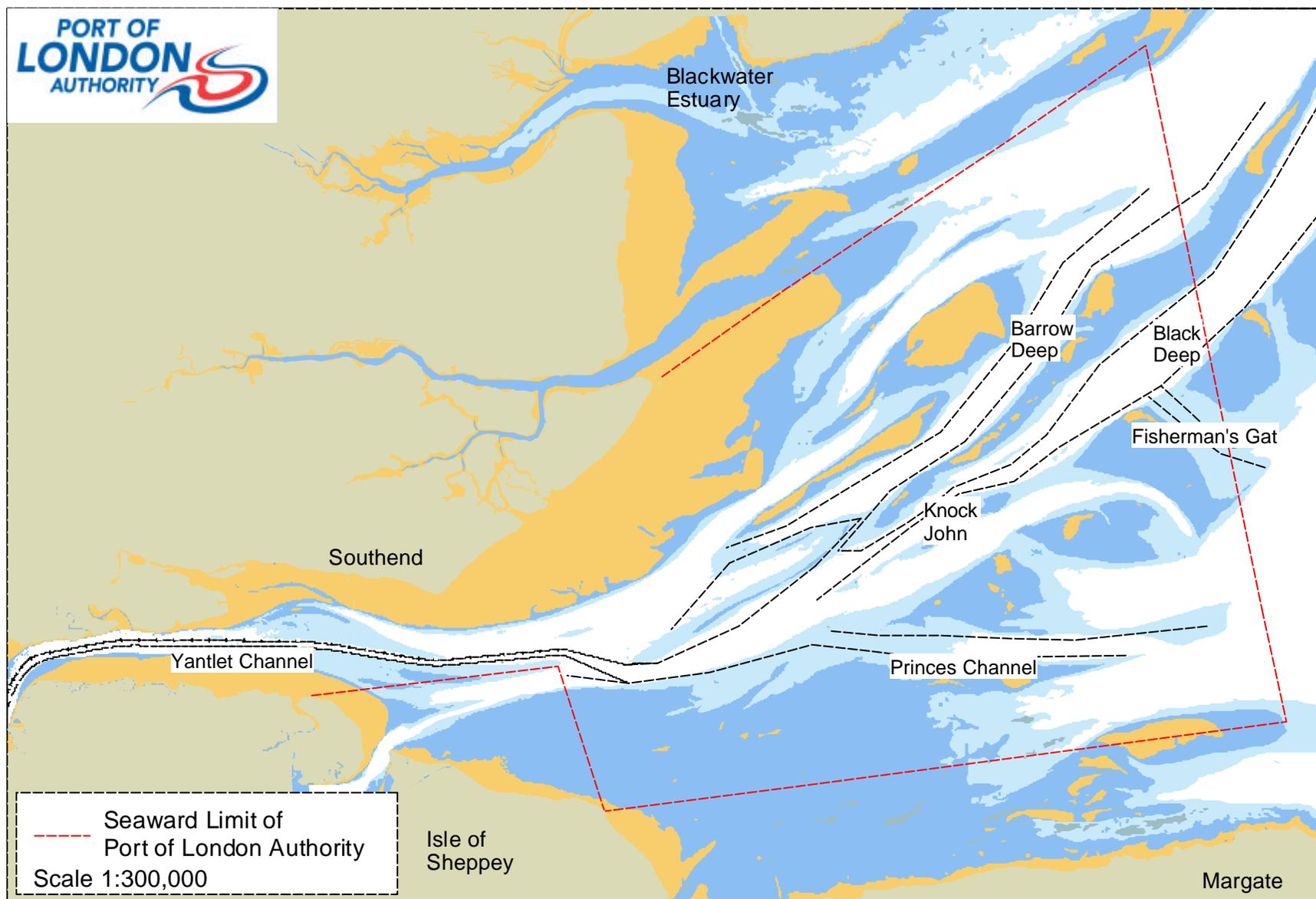
Princes Channel forms part of the southern approaches to the Port of London. Figure 1 shows the main approaches to the Port. Following recommendations from a navigational risk assessment that studied these approaches, the PLA is proposing to deepen part of Princes Channel to a depth of -8.0m CD. The deepening is proceeding in two phases with Phase I, undertaken as a trial, now complete. The objective of the trial was to deepen a narrow part of the western section of the Channel to approximately -7.0m CD, which is marginally below the regime depth at this location, and then to study the channel stability and rate of infill. Phase I was carried out in summer 2003 and frequent bathymetric surveys have been undertaken to monitor the response of the channel. These surveys have demonstrated that the deepened channel is sustainable and, as a result, it is the PLA's intention to proceed to deepen the channel to the target depth of -8.0m below CD, thus providing an alternative but safer and more stable access from the south than is presently available.

The PLA has been advised that the southern approach should be operational prior to any further significant increase in shipping traffic at the Port of London or the Port of Medway. On this basis, the Princes Channel development should be complete by the end of 2006.

In line with Government regulations, and in accordance with the London Convention and OSPAR requirements, all the dredged material from Phase I, some 350,000m<sup>3</sup>, has been used beneficially in a construction scheme on the east coast. Despite the difficulties in coordinating the timescales of disparate projects the PLA is continuing to seek beneficial uses for the material from Phase II of the project but it recognises that this may not be achievable. Beneficial use can include such schemes as reclamation, maritime construction, coastal protection and environmental enhancement.

However, in the event of the PLA being unable to secure beneficial use within the identified timescale, it will be considered necessary to place the dredged material at a marine disposal site. The nearest existing site to the Thames Estuary is South Falls but the PLA has suggested the designation of a new sand placement site, in the North Edinburgh Channel, within the dynamic regime of the estuary. This report details the characterisation process for the proposed sand placement site.

A detailed description of the project is given in Section 2.



PLA Hydrographic Service

Figure 1: Approaches to the Port of London

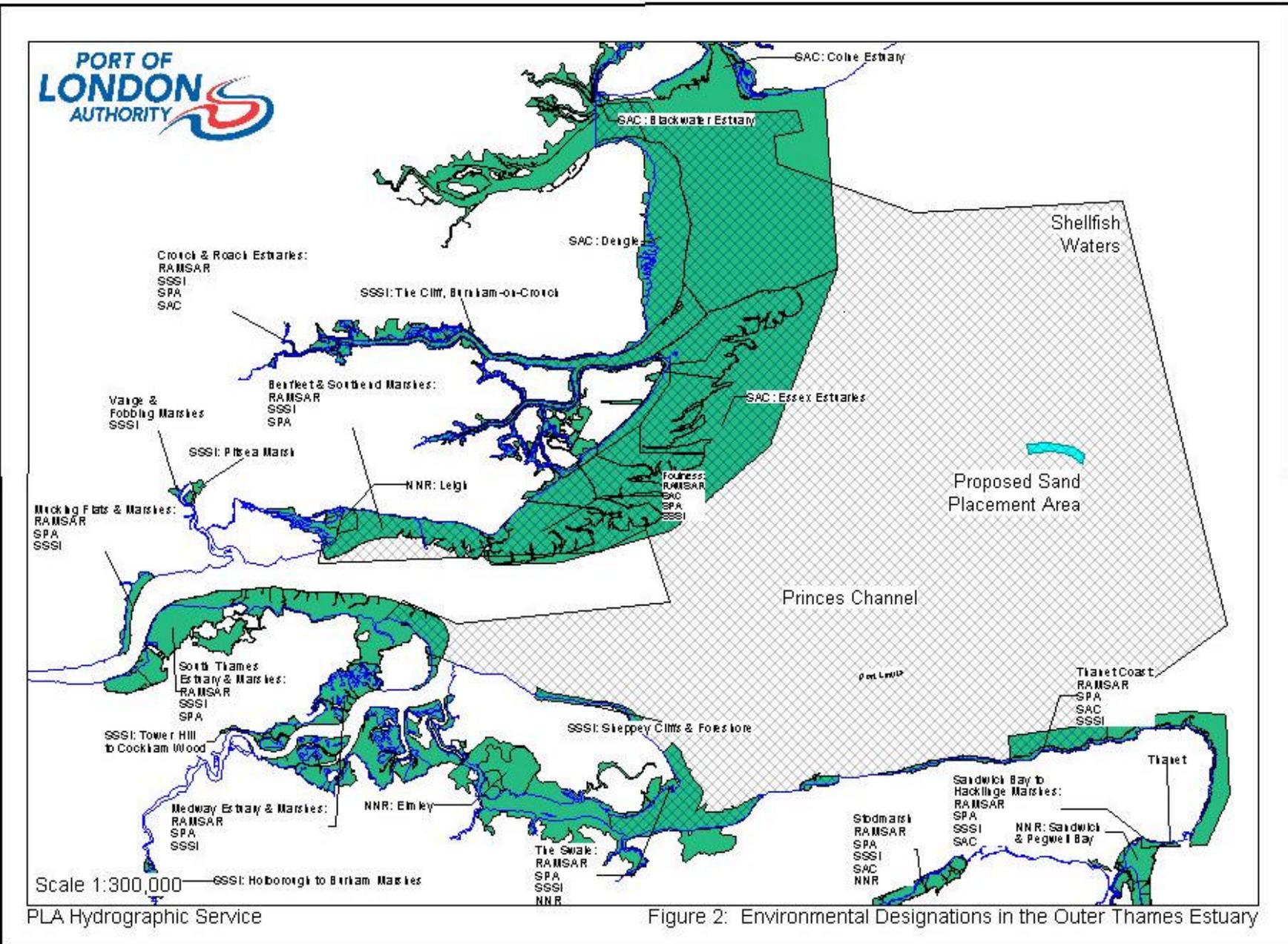
## 1.3 Study Area

### 1.3.1 The Thames Estuary

The Thames Estuary is a dynamic environment with highly mobile sandbanks intersected by deep channels. Numerous studies that have been carried out on the movement of the sandbanks and historical charts show clearly how the banks and channels have moved over time. The main channels are generally oriented in the direction of the prevailing currents (with speeds of  $1\text{ms}^{-1}$ ) and are thus relatively stable. There exist, however, many “swathways” which run across the prevailing currents and are thus very unstable. These “swathways” are formed, in part, by the complex interaction of tides from both the North Sea and the English Channel. Seabed sediments vary from fine sand and silt to coarse gravel depending on the energy levels in any individual location.

Despite the dynamic regime, the Thames Estuary hosts important shellfisheries including cockles, flat oysters and mussels and the area is designated as Shellfish Waters. Figure 2 shows the environmental designations in the outer Thames estuary. The area also provides shelter for juvenile fish and is a recognized spawning ground for commercial species such as sole and herring. Consultation with local fishermen and their representatives has indicated that Princes Channel and North Edinburgh Channel are not important fishing grounds but that banks and channels nearby are trawled for sole.

Much of the Essex and north Kent coasts are designated as Sites of Special Scientific Interest (SSSI), Special Protection Areas (SPA) and Ramsar sites for their bird interest but the protected areas do not extend significantly offshore (see Figure 2). To the north, the designation of the Essex Estuaries SAC protects eelgrass and sandflat habitats. There are presently no designated conservation sites in the subtidal parts of the estuary.



### 1.3.2 Navigation

The Port of London is in the top three ports in the country in terms of tonnage and the Thames estuary correspondingly has a very high density of shipping with more than 30,000 movements per annum. Of these movements, 60% are via Princes Channel and include arrivals and departures to both London and the Medway ports; (Polaris, Drewry 2003). Deep draught vessels, such as VLCC and large container vessels, use Black Deep (the main deep water channel). The diversity of shipping using the port is wide and, in addition to the two types previously mentioned, includes oil tankers, Ro-Ro, aggregate dredgers and many more. Vessel movements in Princes Channel are predominantly general cargo ships, RoRo ferries and small tankers. Many of these vessels have draughts in excess of 5m and thus are only able to use the Princes Channel at higher states of the tide. Those so constrained must either wait for the tide to rise, or divert via the Fisherman's Gat with its inherently more complex vessel traffic problems, or increase significantly their journey length and enter from the north via the Black Deep and Knock John Channel.

Recreational navigation is also an important activity in the study area as evidenced by the many sailing and yacht clubs on the Essex and Kent estuarial coastlines. Other waterborne activities including windsurfing and personal water craft (PWC) are confined to designated inshore waters.

The archaeological heritage of the Thames Estuary is of great importance in terms of the hundreds of shipwrecks giving further evidence to both the challenging navigational environment and previous maritime conflict. It is also important because in the past much of the Estuary was dry land and probably inhabited, thereby providing the potential for artefacts and remains of early human activity.

### 1.3.3 Dredge Area

Princes Channel is located in the southern part of the Thames Estuary approximately 13km off the north Kent coast. Princes Channel is oriented in an east-west direction and runs parallel to the coast between Margate and Herne Bay. The Channel is bordered by drying sand banks and shallow waters typical of the Thames Estuary. Existing water depths in Princes Channel range from more than -20.0m in the east to the much shallower western section with ruling depths of -5.0 to -6.0m. The proposed Phase II dredging is to deepen further the shallow western section of the Channel and over a wider area than Phase I.

### 1.3.4 Sand Placement Area

The proposed sand placement site is located in the north-western part of the North Edinburgh Channel, as shown on Figure 2. The North Edinburgh Channel is in one of the most dynamic areas in the Thames Estuary and borders the large sandbank known as

Long Sand. Seabed sediments comprise mobile sands with low levels of fine sediment with biological communities representative of seabed disturbance (EMU, 2004).

## 1.4 Report Structure

This report presents the conclusions of the environmental characterisation of a sand placement site in the North Edinburgh Channel. The report comprises 17 sections. Sections 1 and 2 introduce the project and set the context for the development. Section 3 outlines the characterisation process and the legislative framework applicable to the project. Sections 4 to 15 describe the existing environment and discuss the predicted impacts upon the features listed in List 1. Section 16 considers the cumulative and in-combination effects of the placement site with the dredging of Princes Channel and other developments in the Thames Estuary. Finally, Section 17 provides a summary of the conclusions, impacts and mitigation measures.

### List 1 Topics Considered in the Characterisation Process

- Section 4 Coastal Processes
- Section 5 Sediment Quality
- Section 6 Water Quality
- Section 7 Marine Biology
- Section 8 Natural Fisheries and Marine Mammals
- Section 9 Birds
- Section 10 Designated Conservation Sites
- Section 11 Marine Archaeology
- Section 12 Commercial Fishing
- Section 13 Navigation
- Section 14 Recreational Activity
- Section 15 Other Seabed Uses