2. **Project Need and Alternatives**

2.1 This chapter discusses and assesses the need for the proposed Marchwood Widening and identifies the alternatives to the works that have been considered by ABP as part of the assessment exercise. In order to understand the need for the proposed works, however, it is first necessary to place the project within the context of the Port's activities and operations.

### The Port of Southampton

2.2 The Port of Southampton, owned and operated by Associated British Ports (ABP), is located at a strategic position on the central south coast of England in close proximity to the international shipping lanes and mainland Europe. In 2011, the Port handled approximately 40 million tonnes of cargo making it the fourth largest port in the UK by tonnage. The Port is a premier global gateway for international trade and is of national strategic importance to the UK. The Port accommodates a range of trades of national importance, including containers and cruise, which are described in more detail below:

- **Containers:**
  The DP World Southampton container terminal is the UK’s second largest container terminal, handling approximately 40–45% of the UK's deep-sea trade with the important economies of the Far East. The Terminal handled 1.6 million container units (TEU) in 2011. In this context, it should also be noted that for the global container lines and alliances that use the Port, fuel represents a major part of their operating costs. A port of call at Southampton requires the minimum deviation from the main shipping channels through the English Channel, and thus the least time and lowest fuel cost for a UK port of call, by ships on the Europe/Far East liner services. This is a major consideration for the shipping lines when choosing the Port of Southampton as opposed to a different UK port. A further option, of course, would be for operators to drop the UK from shipping routes altogether and instead rely on containers being transhipped to the UK from mainland Europe.

- **Cruise:**
  The Port is the North European capital for the cruise passenger industry, which continues to experience strong year on year growth. The Port has four dedicated cruise terminals and handled a record 1.2 million international cruise passenger movements in 2011 with 360 cruise ship calls. The number of cruise calls is predicted to exceed 400 in 2013. Cunard, P&O Cruises, Royal Caribbean International, Fred Olsen Cruise Line, Saga Cruises, Norwegian Cruise Line and Thomson Cruises regularly use the Port.

  - **Other trades:**
    In addition, the Port also handles over 650,000 ro-ro vehicles (the majority of which are British-manufactured vehicles for export); some 1.2 million tonnes of dry bulks per annum; fresh produce and perishables and liquid bulks through the independently-owned Exxon Mobil and BP terminals. The Port is also home to a number of independent wharf operators and the Ministry of Defence activities at the Marchwood Sea Mounting Centre. The Red Funnel freight and passenger
service is an important link to the Isle of Wight, whilst White Horse Ferries connects the New Forest village of Hythe with Southampton.

**Associated British Ports (ABP)**

2.3 In addition to being the owner and operator of the Port of Southampton, ABP is the statutory Harbour Authority, the Competent Harbour Authority for the provision of pilotage services, the Vessel Traffic Services (VTS) Authority and Local Lighthouse Authority for Southampton.

2.4 ABP’s statutory powers and duties include:

- The discharge of its statutory duties of a Harbour Master;
- The safety of navigation and regulation of all vessel traffic including the provision of VTS services;
- The provision of pilotage services;
- The conservancy of the harbour area (provision of navigational aids and the maintenance of obstruction free navigational channels);
- Responsibility for response to oil pollution incidents; and
- The regulation of dangerous goods in transit through the harbour area.

**Description of Harbour Area**

2.5 The statutory harbour area of the Port of Southampton comprises the central Solent, Southampton Water and the Test and Itchen Estuaries. The Southampton VTS management activities and pilotage areas extend beyond the statutory harbour area, through the Eastern Solent, to the south of the Nab Tower and to the east of the Isle of Wight. The navigational approach channel used by commercial vessels to safely access the commercial Port (Eastern and Western Docks), extends from the Nab Channel to the east of the Isle of Wight, through the central Solent into the Thorn Channel and Southampton Water, extending as far as the most northerly berth of the container terminal in the Test Estuary, a distance of twenty-five nautical miles (nm). The jurisdiction of the harbour authority is illustrated in Figure 2.1.

**Development of Southampton Sea Trade**

2.6 International shipping companies, including the cruise passenger, Ro-Ro, oil/petrochemical and container lines, are continually seeking to achieve economies of scale in the transportation of goods, particularly on the long distance deep-sea shipping routes. Their success has resulted in a reduction in real terms in the unit cost of delivering goods from many parts of the world, contributing to a reduction in the price of many consumer goods in the high street. This has been achieved, in part, through the introduction of larger vessels with greater cargo and passenger carrying capability.

2.7 The UK is reliant on ports for the movement of 95% by volume of goods consumed or produced\(^1\). The Eddington Transport Study published in 2006 notes that 28% of the UK’s national income is traded by sea and the UK economy is becoming increasingly reliant on those deep-sea ports that can serve the economies of the Far East (DfT, 2006).

\(^1\) www.ukmajorports.org.uk accessed 24 May 2012.
2.8 Shipping lines are increasingly utilising larger vessels, and Southampton currently handles the largest vessels in the world for each category on a regular basis. Container vessels now employed on the important Far East to Europe routes, which include a UK port of call, can be of the order of 370m overall length, greater than 50m in beam (width) with a theoretical loaded draught of 15.5m and capable of transporting over 13,000 TEU (Twenty-foot Equivalent Units, the industry standard measure for container vessel capacity). In recent years, the average number of containers transferred during a port call per vessel has increased, whilst the number of overall calls has decreased slightly — providing evidence of the need for the container lines to seek efficiencies in their operations.

2.9 Cruise ships have experienced a similar increase in the size of vessels with all the major cruise operators introducing new ships to the market in recent years. For example, Cunard’s Queen Mary 2, built in 2004, is over 150,000 gross tonnes; 345m in length and 40m beam, capable of accommodating over 2,600 passengers, whilst Royal Caribbean’s Independence of the Seas constructed in 2008 is approximately 340m in length and 39m beam and capable of accommodating 4,370 passengers.

The Need for the Proposed Works

2.10 As predicted by ABP in 2008 when submitting its application for the SACD and as noted in Chapter 1, larger ships have now entered both the cruise and container markets and are regularly visiting the Port of Southampton and other UK ports. When approaching and leaving the Southampton Container Terminal, the container vessels have to manoeuvre in a 180m-wide channel through the Western Docks whilst, at times, passing large passenger (cruise) vessels berthed at the Mayflower Cruise Terminal. It is the responsibility of the Harbour Master to consider the implications of vessel safety, passing and turning, whilst in Port. These matters are discussed in more detail below.

Safety

2.11 The proposed dredging will widen the channel to allow an increased passing distance between vessels transiting the Western Docks, and those vessels alongside, particularly at Berth 106 (Mayflower Cruise Terminal). The effect of the dredging will be to increase the cross-sectional area of the main navigation approach channel, such that the width of the channel available for the water flow created by the passage of the vessels will increase. Widening the channel will largely, albeit not completely, allow energy to dissipate without causing the safety risks noted above in that it will reduce the potential for interaction with vessels berthed at the Mayflower Cruise Terminal. The widening of this part of the channel will also increase the ease with which large container vessels can initiate their swing on approach and entry to the Upper Swinging Ground and, hence, further improving safety margins.

2.12 In this context, it should be noted that with some of the larger vessels visiting the Port, it is becoming increasingly necessary to consider the imposition of restrictions on berth/terminal use or vessel movements in order to maintain navigational safety. It is already the case that at times, the arrival time of larger container vessels has to be bought forward, which means an increased steaming speed for the vessels so that they can arrive at the Port prior to the arrival of a cruise vessel at the Mayflower Cruise Terminal. Increased steaming speed increases fuel
consumption and drives up operating costs, making the Port less attractive commercially. Additionally, in order to maintain service levels for the container trade, it has been necessary from time to time, to relocate a cruise vessel from the Mayflower Cruise Terminal whilst the container vessel transits the Western Docks. Targeted passage planning and restrictions described above are likely to become more commonplace in the future as an even greater number (proportion) of larger vessels enter both the container and cruise markets unless the proposed works can be undertaken.

2.13 As cruise vessels are on the berth for approximately 10 hours, this can significantly delay the arrival or the departure of a container vessel by up to 16 hours, factoring in the time and status of the tide. The Marchwood Widening, therefore, is urgently required in order to maintain the efficient use and attractiveness of the Port and the berths in the Western Docks, as well in the interests of port navigational safety generally.

Passing vessels

2.14 As a vessel moves through a narrow channel (such as in the Western Docks), it exerts various hydrodynamic forces — referred to here as interaction forces — on any vessels moored at the edge of the channel. These forces are created by the displacement and movement of water around the vessels. The effect of the interaction forces could cause the moored vessel to pull away from or move along the quay wall and disconnect its gangways or airbridges.

Turning vessels

2.15 This part of the approach channel is also the turning position for vessels entering or leaving the container terminal. Some container vessels have a turning point situated in the first third part of the vessel which means that the stern of these vessels will swing and pass extremely close to any vessel at Berth 106 (Mayflower Cruise Terminal); increasing the interaction effects highlighted above. Container vessels have a large windage area (freeboard and/or cargo decks) and, consequently, the strength and direction of the wind when manoeuvring is taking place can have a significant effect on a vessel’s ability to manoeuvre in the space available.

2.16 As confirmed in the MMO scoping Opinion, the proposed dredging works will have no effect on the throughput of the container terminal or the cruise terminals. For further information, please refer to Chapter 7.

Consideration of Alternatives

2.17 The Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended) and the Conservation of Habitats and Species Regulations 2010 (as amended) require the applicant to consider alternatives to the proposed scheme. An alternative must be able to meet the identified need. The alternative options considered fall broadly into three broad areas. The first consists of an assessment of the options available in the context of the existing land-side facilities so as to avoid the issues identified above, namely the relocation of the Mayflower Cruise Terminal. Secondly, in formulating these proposals ABP has also reviewed the alternatives available in the context of the manner and location of the proposed dredge. It should be noted in the context of both, as discussed in detail below, it has been concluded that there are no alternatives available which will not have a discernibly greater detrimental
environmental impact. The only remaining and third option is the ‘zero option’ or ‘do nothing’ scenario (paragraphs 2.18–2.20) — in other words, maintaining the channel at its present width with existing maintenance dredging commitments. As also discussed below, this would have a significant negative impact on the future operations of the Port of Southampton and is also, therefore, unacceptable.

Zero Option

2.18 One alternative to the proposals the subject of this application would be to maintain the status quo – the zero option. To adopt this course, however, would simply lead to, at the very least, the commercial stagnation of the Port of Southampton, with serious consequences for both employment and commerce in the local community.

2.19 If it continues to be the case that vessels cannot access their berths or pass safely within the Port, the Harbour Master will have to consider the imposition of restrictions on the movement of vessels or on the use of berths/Terminals. As has been noted above, it is already the case that from time to time, specific arrangements have to be made to secure both vessel movements and navigational safety. It is self-evident, however, that the imposition of restrictions on the movement of vessels in an international port such as Southampton, will inevitably lead to a delay in vessels arriving or departing the Port but it will also as a consequence, make the Port far less attractive in the eyes of both existing shipping and cruise lines operating at the Port and any new customers contemplating a move to Southampton for whom the commercial imperative will simply mean that they will seek an alternative port where no such restrictions are in place. It follows that ports that cannot adapt to accommodate the requirements of the shipping and cruise lines and which cannot provide the required level of service will cease to be a commercially cost-effective port of call. Ultimately, an inability by any port to be able to service properly the needs of its customers will lead to a decline in the appeal of that port with the loss of trade, potentially to other ports on mainland Europe.

2.20 The zero option, therefore, would inevitably lead to commercial stagnation of the Port, loss of trade and reduction in revenue, particularly with respect to container and cruise traffic. Such an impact will clearly have a detrimental impact on employment on employment within the port and commerce in the local community, thereby reducing the potential for private investment in the national, regional and local transport infrastructure. It would also follow that ABP and other port-related customers (such as terminal operators, rail freight operators etc.) would not be able to justify the continued substantial private investment in the Port — a key prerequisite and commercial imperative for any major international port operation. These implications are amplified in Chapter 18, which deals with socio-economic effects.

Extent of Channel Widening

2.21 The location and extent of the proposed channel widening has been determined and optimised from analyses of vessel simulation studies, consultation with shipping lines (the operators of the vessels), the Harbour Master and marine pilots. The conclusions drawn from this exercise are now embodied in this application.

2.22 An important part of the exercise undertaken was to establish whether the dredging proposals, as now formulated in this application, constituted the best environmental option in terms of achieving a balance in terms of the least environmental impact whilst delivering the project’s
objectives. The dredging proposals now being promoted are considered to be the minimum that can be achieved consistent with navigational safety requirements. Further information and assessment of the dredging proposals are contained in later chapters which deal with such matters as dredging methodology, commercial shipping and sediment dispersion.

2.23 It should be noted in this context, that a further alternative to the proposal could be to widen the channel by more than 30m. This would be advantageous for the purposes of manoeuvring vessels, but, by definition, is likely to have a greater environmental impact, including an increase in the quantity of material to be removed from the estuary. As a consequence, on environmental grounds alone, this option has been dismissed.

Relocation of Mayflower Cruise Terminal

2.24 Consideration has been given to the option of changes to the land-side infrastructure which might assist in avoiding the current problems now being experienced by cruise and container vessels.

2.25 The only realistic option would be the relocation of Mayflower Cruise Terminal within the current port estate. Although it is the case that this option would have the immediate effect of reducing the potential for navigational incidents, it has nevertheless been discounted for a number of reasons. First, as a cursory examination of a plan of the port estate illustrates, there are in fact no opportunities to provide sufficient berth space (approximately 400m with safety margins) within the Port which would have available depth of water together with a sufficient land footprint adjacent to the quayside, without significantly compromising another existing trade or current development proposals.

2.26 The discontinuance of the use of the Mayflower Cruise Terminal is clearly not an option as there is a pressing need for cruise facilities within the Port, and the consequence of such a step would be that the Port would have to turn away customers as it would no longer be able to accommodate and service the needs of the cruise lines.

2.27 In addition, it should be noted that even if it were possible to identify a suitable area of land in which to relocate the terminal, the design and construction costs of building the necessary infrastructure to support cruise operations would be in the order of £25–30 million. This would clearly be prohibitively expensive. By comparison, the cost of the proposed dredging is estimated at approximately £8–10 million (subject to tender).

References

Figure 2.1

Guide to Navigational Channel