



Dover Terminal 2 Environmental Statement

Non Technical Summary

Dover Harbour Board

December 2009

Final Report

9S6529



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1 INTRODUCTION

1.1 Background

In the last thirty years the Port of Dover has seen a 530% increase in freight vehicles, a 200% increase in tourist vehicles and the establishment of important cruise, aggregate and fresh produce trades. Prior to the current economic slowdown, the port experienced rapid growth in Roll On – Roll Off (Ro-Ro) freight traffic, which is forecast to increase by two thirds by 2037. These forecasts already account for the traffic growth that will be taken up by other local ports in the area and by the Channel Tunnel and is therefore a reflection only of the Port of Dover market share. It is consequently imperative that the increase in traffic is accommodated in the operations of the Port and that action is taken to ensure that the future capacity and facilities are capable of managing the increase in traffic in a successful and efficient manner.

Recent master planning undertaken by the Port of Dover identified the Western Docks as providing the best opportunities for expanding the ferry operations to meet the forecasted increase in demand and provide for continued economic growth in the region. Redevelopment of the Western Docks to provide expansion to the existing facilities is planned and has been termed the 'Dover Terminal 2' development. This document is a Non Technical Summary (NTS) of the Environmental Statement (ES) which has been produced for the proposed development and which should be referred to for detailed information relating to the predicted environmental issues associated with the scheme.

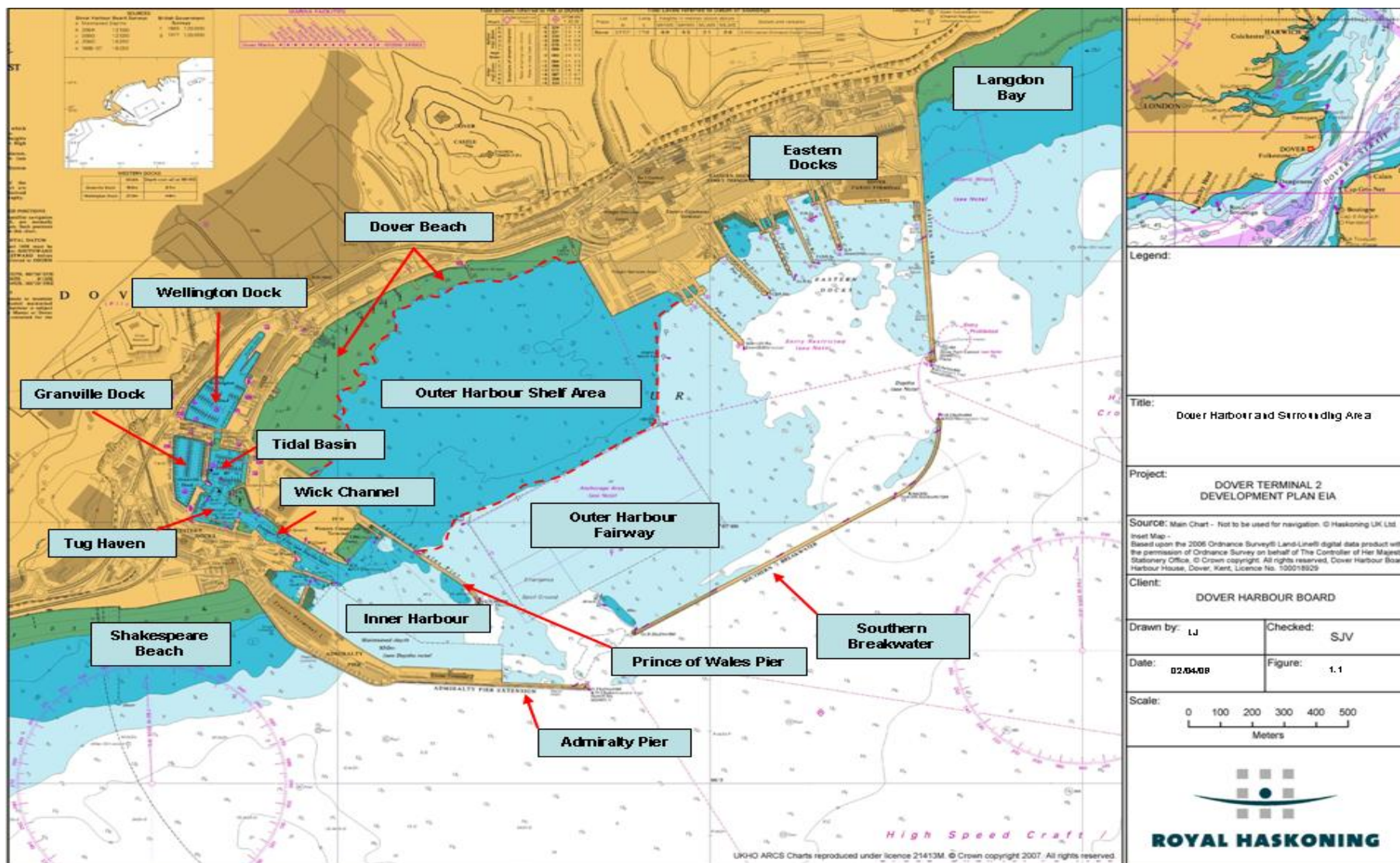
1.2 The Proposed Development

Dover Harbour Board (DHB) is proposing to construct four additional Ro-Ro ferry berths in the Western Docks of Dover Harbour. This will involve extensive redevelopment of the Western Docks site including reclamation of land by infilling of the Granville Dock and Tidal Basin. **Figure 1.1** shows the existing layout and structures within Dover Harbour. Operational infrastructure (i.e. freight parking, assembly lanes, border control facilities, etc) to facilitate the operation of the new terminal will be created on the existing and reclaimed land. The loss of the existing marina facilities will be replaced by the creation of a new marina with facilities for up to 370 berths. To maintain navigational access to the Wellington Dock, a new channel will be created to link the dock with the Outer Harbour via the new marina.

To accommodate vessel manoeuvres to the new berths and aid navigational safety, capital dredging of the Outer Harbour will be required. The Admiralty Pier quay wall will be extended by 100m, whereas the Prince of Wales Pier will be shortened by 80m. Signalised at-grade junction modifications at the Prince of Wales roundabout on the A20 public highway will provide access to and from the new terminal.

DHB's application for consent for the works will take the form of a Harbour Revision Order (HRO) under DHB's statutory powers to operate the port, and a number of additional consents and licences will also be required to enable the development to proceed (see **Section 1.4.2**).

Figure 1.1 Dover Terminal 2 location within Dover Harbour Western Docks



1.3 Overview of the Existing Port

Due to its unique strategic position, Dover Harbour has been an invaluable gateway to continental Europe for hundreds of years. The port is Europe's busiest ferry port, handling nearly 14.3 million passengers and five million vehicles in 2007 including a record 2.3 million freight vehicles. Dover is also the UK's second busiest cruise port and the third busiest gateway for imports of palletised fresh produce in deep sea vessels. In addition, the port also handles general cargo and aggregates, and provides marina facilities for pleasure craft.

The port facilities at Dover are divided across three adjacent sites: the Eastern Docks, the Western Docks, and the seafront. The Eastern Docks are located to the east of the town and are the principal focus of ferry and cargo operations. The Eastern Docks contain the main ferry service routes to Calais, Dunkerque, Boulogne and Dieppe. The Western Docks are located to the south of the town centre. They contain two terminals for cruise liners, a former Hoverport (which has been out of service since 2000), a fast craft berth alongside the Prince of Wales Pier (which has been out of service since November 2008), a marina, an aggregates berth and freight clearance facilities. The seafront area, located between the dock facilities, contains administrative buildings, recreation and parking facilities.

Access to the port is provided by the A20 trunk road, which separates much of the town from the docks and seafront. The A20 handles 70% of all the traffic entering the port and is prone to congestion when ferry services are delayed by bad weather or other unforeseen incidents. This can lead to extensive queuing through the town of Dover.

1.4 Legislation and Requirement for EIA

1.4.1 Requirement for EIA

In November 2007, a formal Screening and Scoping Opinion was requested from the Department for Transport (DfT) Ports Division to determine whether the proposed Dover Terminal 2 project would require the production of an Environmental Statement (ES) to accompany the application for an HRO. This request was accompanied by an Environmental Scoping Report.

A response to the above request was received from the DfT in March 2008. This response stated that the Secretary of State has decided that the proposed application relates to a project that falls within Annex II to the European Council Directive on the assessment of the effects of certain public and private projects on the environment 85/337/EEC (as amended by Council Directive 97/11/EC) being a construction of a harbour or port installation where the area of the works exceeds 1 hectare. Therefore, an ES to accompany the application is required.

1.4.2 Other applicable legislation/requirements

The proposed scheme requires a number of consents and permissions to be obtained and the application process for these permissions requires that an EIA is undertaken, with the production of an ES. This NTS represents the findings of the EIA process and accompanies the ES. In summary, the following applications for consents, permissions and licences are required:

- An application for a Harbour Revision Order (HRO) under the Harbours Act 1964;
- Licences for construction and disposal of dredged material at sea will be required under the Food and Environmental Protection Act 1985 Part II (as amended) (FEPA);
- Orders under section 14 and section 278 of the Highways Act 1980 (as amended) will be required for the alterations to the road network; and
- Listed Building consent for the works to shorten the Prince of Wales Pier.

1.5 Planning and Policy Context

A review of current planning policies and guidance relevant to the assessment of DHB's proposal for the Dover Terminal 2 development was undertaken as part of the ES. In England, Planning Policy Statements (PPSs) and their predecessors Planning Policy Guidance Notes (PPGs) set out the Government's policies on a variety of different aspects of planning and provide guidance for all those involved in the planning determination process. In addition to these guidance documents being used in determining planning applications, are frequently referred to during the application process where other forms of consents or permissions (such as HROs) are being sought.

In addition to the PPG notes and PPSs the Planning policies and proposals applicable to the southeast region and the Dover District locality are set out in the following documents and which have formed part of the review:

- The South East Plan (Regional Spatial Strategy; Government Office South East) – May 2009);
- The Regional Planning Guidance (RPG) 9 – the current Regional Spatial Strategy for the South East (March 2001);
- The Kent and Medway Structure Plan 2006;
- The Regional Economic Strategy 2006 – 2016; A Framework for Sustainable Prosperity; SEEDA (South East England Development Agency);
- Dover District Local Plan Adopted 2002 (the elements that have been saved); and
- Draft Local Development Framework (LDF) Core Strategy Document for Submission January 2009.

1.5.1 Assessment

The overall policy direction taken in the above is one of support for the Port of Dover, while protecting and enhancing the heritage and environmental elements that are affected by this proposal.

1.6 Sustainability

Sustainability Appraisal (SA) is a method of assessing the extent to which a plan, programme or strategy contributes to sustainable development. The provision of SA for an individual development proposal, however in contrast to a plan, programme or strategy, is not a requirement. Nevertheless, an appraisal of the Dover Terminal 2

development proposals against regional and local sustainability objectives has been undertaken to determine the extent to which the proposals for the Terminal 2 development address sustainable development objectives. The appraisal provided a 'Sustainability Framework' within which the project proposals can be developed.

The scheme proposals are in harmony with the sustainability objectives which have been collated as part of this review. The proposed development is compatible with the parameters that contribute towards a stable economic base, management of natural resources, and the monitoring of new technology with which to implement strategies for enabling positive effects.

The Port of Dover is accredited to ISO 14001 Environmental Management System which will assist DHB in ensuring continued improvement and contributing towards sustainable development.

2 THE NEED FOR DOVER TERMINAL 2

The Port of Dover has a unique location which allows the ferry operators to provide the fastest crossings of the English Channel and a high frequency “turn-up-and-go” service, that is particularly attractive to shippers and road hauliers that need to transport high value freight on a ‘just in time’ basis, for efficient functioning of the European Single Market.

Forecasts produced for the DfT and published in the Ports Policy Review Interim Report suggest that long-term growth in Ro-Ro freight traffic to and from Great Britain (GB) is likely to be 2.8% per annum up until 2030 (MDS Transmodal, 2009) thus indicating that there is likely to be a national need for Ro-Ro capacity in the medium to long-term. The Ports Policy Review Interim Report (DfT, 2007) also suggests that in the absence of new development or large efficiency improvements in port capacity over the coming decade, one of the constraints would be in Ro-Ro terminal capacity in the South East, serving short-sea routes to the Continent. **Table 2.1** illustrates the balance of demand and capacity between 2007 and 2034. Trends in the UK economy have led to steady rises in demand for Ro-Ro passenger and freight traffic through the Port of Dover.

Table 2.1 Balance of demand and capacity 2007 – 2034 in PCUs¹ (in millions)

		2007 Actual	2024 Forecast	2034 Forecast
Forecast traffic volumes	Cars	2.8	2.9	2.9
	Coaches/buses	0.1	0.1	0.1
	Freight units	2.4	3.2	4.0
PCUs	Cars	2.8	2.9	2.9
	Coaches/buses*	0.5	0.5	0.5
	Freight units*	12.0	16.0	20.0
	Total	15.3	19.4	23.4
Port capacity utilisation**		100%	127%	153%

*Assumes 1 HGV/coach = 5 PCUs

** Assumes port at “full” effective capacity in 2007

Source: MDS Transmodal

The existing ferry operators on the Dover Straits are deploying larger ships to accommodate greater volumes of traffic, while securing economies of scale in the long-term.

Both the Port of Calais and the Port of Boulogne are developing, or planning to develop, additional capacity to accommodate expected market growth. It has been demonstrated that the Port of Dover is critical to the success of its “partner port” Calais, as all the UK/Europe bound traffic passing through Calais has Dover as its port of origin or destination.

Dover’s Ro-Ro freight traffic has been growing at an annual average rate of 5.0% over the last five years and reached circa 2.34 million units in 2007, as shown in **Table 2.2**. Between 2007 and 2024 the GB–Continent unit load freight market is forecast to double in size to about 15.9 million units.

¹ PCU = passenger car unit

Table 2.2 GB – Continent Ro-Ro freight market 2002 – 2007 (in thousand units)

	2002	2004	2006	2007	Growth 2002-07	CAGR 2002-07
Dover	1,854	1,980	2,325	2,364	27.5%	5.0%
Other Short Straits ²	1,364	1,424	1,447	1,563	14.6%	2.8%
North Sea ³	1,906	2,118	2,327	2,463	29.2%	5.3%
Western Channel ⁴	393	417	396	384	-2.3%	-0.5%
Total	5,517	5,939	6,495	6,774	22.8%	4.2%

Source: DfT Maritime Statistics & Eurotunnel

Dover has gradually increased its market share of the GB–Continent passenger traffic between 2002 and 2008 as illustrated in **Table 2.3**.

Table 2.3 GB – Continent Ro-Ro passenger cars 2002 – 2008 (MDS Transmodal, 2009)

	2002	2003	2004	2005	2006	2007	2008
Dover – Ferry	2,677	2,633	2,527	2,550	2,647	2,836	2,843
Eurotunnel – Shuttle	2,336	2,279	2,101	2,047	2,022	2,142	1,907
North Sea – Ferry	620	549	535	491	461	422	429
Western Channel – Ferry	1,412	1,337	1,286	1,097	1,009	1,039	1,055
Total	7,045	6,798	6,449	6,185	6,138	6,438	6,234

Source: MDS Transmodal, base on Passenger Shipping Association data

Passenger traffic is forecast to rise by 1% by 2010 compared to 2008 while coach and bus volumes are forecast to rise by 1.3%. Passenger traffic volumes have been assumed to remain stable until 2034. The forecasted increases in passenger traffic indicate that the economic recession may have a marginally positive effect on Dover's passenger traffic.

Supporting studies by Halcrow have shown that the Eastern Docks are reaching capacity due to constraints related to navigational water space, land assembly space and check-in processes. Furthermore it identified that there is no significant opportunity to expand operations at the Eastern Docks, due to these constraints.

If the expansion did not take place, there would be a risk that the jobs currently supported by the port's activities may be displaced to a competing facility. As a minimum, the expansion would safeguard these jobs, as well as generating an opportunity for job creation. There is also likely to be traffic and associated problems for Dover Town.

² The Short Straits between Kent and Nord Pas de Calais; this includes services to/from the ports of Dover and Ramsgate and the Eurotunnel Shuttle services.

³ The North Sea between the GB east coast and the continental mainland.

⁴ The Western Channel between South/South West England and Northern/Western France and Northern Spain.

3 THE PROPOSED SCHEME AND ALTERNATIVES CONSIDERED

3.1 Description of the Proposed Works

The layout of the proposed Terminal 2 is shown in **Figure 3.1**, whilst the footprint of the capital dredging and future maintenance dredging regime is shown in **Figure 3.2**.

3.1.1 Location and site layout

The new Terminal 2 development will be located at the existing Western Docks within Dover Harbour. The Terminal 2 development will require the following works to be undertaken:

- A retaining wall to be constructed across the Wick Channel and the infilling and reclamation of so much of the Wick Channel and Tidal Basin as lies behind that wall together with the infilling and reclamation of the Granville Dock.
- A retaining wall to be constructed across the Hoverport apron and the raising and levelling of the Hoverport apron.
- The construction of a quay wall faced in part with wave attenuation materials extending into the bed of the Outer Harbour and incorporating part of the Prince of Wales Pier and enclosing an area of 4.5 hectares of the bed of the Outer Harbour.
- The construction of a pier partly of solid construction extending for a distance of 330m in a north easterly direction into the Outer Harbour to be used on the south eastern side as a berth for ferry vessels and on the north western side in part as berths for tugs, dredgers and other large work boats and a fuel berth.
- The construction of a pier partly of solid construction forming a spur off the above pier including the relocation and reconstruction on the north west end of the proposed pier of the lighthouse from the east end of the Prince of Wales Pier.
- The construction of a pier partly of solid construction extending for a distance of 320m in a north easterly direction into the Outer Harbour to be used on either edge as a berth for ferry vessels.
- The demolition of the eastern end of the Prince of Wales pier and provision of sheet piled toe protection and abutments to support fenders on the south side of part of the Prince of Wales Pier and an elevated concrete deck extending for a distance of 290m along that pier and the provision of a new roundhead at the eastern end of the remaining part of the Prince of Wales Pier.
- Dredging of the harbour to remove silt and chalk to provide berthing and manoeuvring space for ferries and other craft. The total volume of material that will arise from the capital dredging will be approximately 2,275,000m³.
- Provision of mechanically and hydraulically operated double or triple deck bridgeworks with stairs and lift towers and elevated passenger walkway together with a series of dolphins forming berthing and mooring lines to provide access to and egress from vessels.
- Construction of an elevated four lane road to provide egress from new Berths 10 - 12.
- The construction of an elevated four lane road to be access to and egress from the proposed terminal.
- The construction of a new marina comprising:

- a) a pier of solid construction commencing on the foreshore of the Outer Harbour and extending for a distance of 532m in an easterly direction into the Outer Harbour including the relocation and reconstruction on the western end of the pier of the Clock Tower and Clock Tower Building following the removal of that tower and building from the west end of the Prince of Wales Pier; and
 - b) piled moorings with a pontoon system connected to the south face of that pier by a series of link bridges.
- A retaining wall to be constructed at the Union Street end of the Wellington Dock and the infilling and reclamation of the small portion of the Wellington Dock that lies behind that wall.
 - A retaining wall to be constructed enclosing an area of the Spur Pier Basin and the infilling and reclamation of so much of the Spur Pier Basin as lies behind that wall to provide hard standing for a boatyard and the provision of an enclosed area of water with a boat hoist.
 - The construction of a channel to be used by vessels navigating to and from the Wellington Dock having lock gates and an opening bridge over the channel.
 - An extension of solid construction of the Admiralty Pier extending for a maximum distance of 105 metres in an easterly direction including the relocation and reconstruction on the east end of the proposed extension of the lighthouse following the removal of that lighthouse from the east end of the Admiralty Pier.
 - The provision of security fences comprising:
 - (a) A fence to comply with TRANSEC having a height not exceeding 3.25m.
 - (b) A fence having a height not exceeding 2.75m.
 - The removal of the Prince of Wales roundabout and the construction in its place of an at grade signalised junction between Union Street, the A20 Snargate Street and the A20 Limekiln Street.
 - The construction of six single storey buildings with a canopy over to be used for outbound border control and security checks.
 - The construction of a single storey building to be used for security checks of tourist vehicles and passengers.
 - The construction of a single storey building to be used for security checks of freight vehicles and occupants.
 - The construction of seven single storey buildings with a canopy over to be used for security checks of outbound freight and tourist vehicles and bicycles.
 - The construction of a single storey building to be used as a drivers' reception facility.
 - The construction of a single storey building to be used for border control and security checks of tourist vehicles.
 - The construction of a single storey building to be used for border control and security checks of coach passengers.
 - The construction of a single storey building to be used for border control and security checks of tourist vehicles.

- The construction of a single storey building to be used for border control and security checks of freight vehicles.
- The construction of a single storey building to be used for border control and security checks of freight vehicles.
- The construction of a single storey building to be used for scanning vehicles
- The construction of a single storey building for border control and security checks including the offloading of freight vehicles.
- The construction of a double storey terminal building to be used for passenger and baggage handling, management offices and for the provision of retail, refreshments and toilet facilities for passengers and other members of the public.
- The construction of a single storey building to be used for the customs clearance of goods.
- The construction of a two storey building to be used as the machinery house and control room for the operation of the lock gates and opening bridge (if necessary).
- The construction of a two storey building comprising a marina office, facilities for the users of the proposed marina and the general public to be constructed on the New Prince of Wales Pier.
- The construction of a two storey building comprising retail, refreshment and toilet facilities for members of the general public to be constructed on the New Prince of Wales Pier.
- The construction of a two storey building comprising facilities for use as a lifeboat station to be constructed on the New Prince of Wales Pier.
- The construction of a two storey building comprising a workshop, offices and stores for the new dredger /Tug Haven.
- The construction of a single storey building to be used as an office and pump house for the fuel berth.
- The construction of a two storey building and lifeboat davit to be used as a safety training facility.
- The removal of the existing York Street roundabout and the construction in its place of an at grade signalised junction between the A256 York Street, the A20 Townwall Street and the A20 Snargate Street.

Note:

The alteration of the York Street roundabout by converting it to a signalised junction had not been proposed when the impact assessment was carried out; these works now form part of the scheme. However, the Transport Assessment undertaken by Halcrow Group Ltd (refer to the ES **Section 17**) includes the changes to York Street roundabout, and the traffic link flow numbers which have been used for modelling the impact assessment for Air Quality and Noise and Vibration are inclusive of the proposed changes to the roundabout.

Figure 3.1 Proposed layout of Dover Terminal 2 development in the Western Docks within Dover Harbour

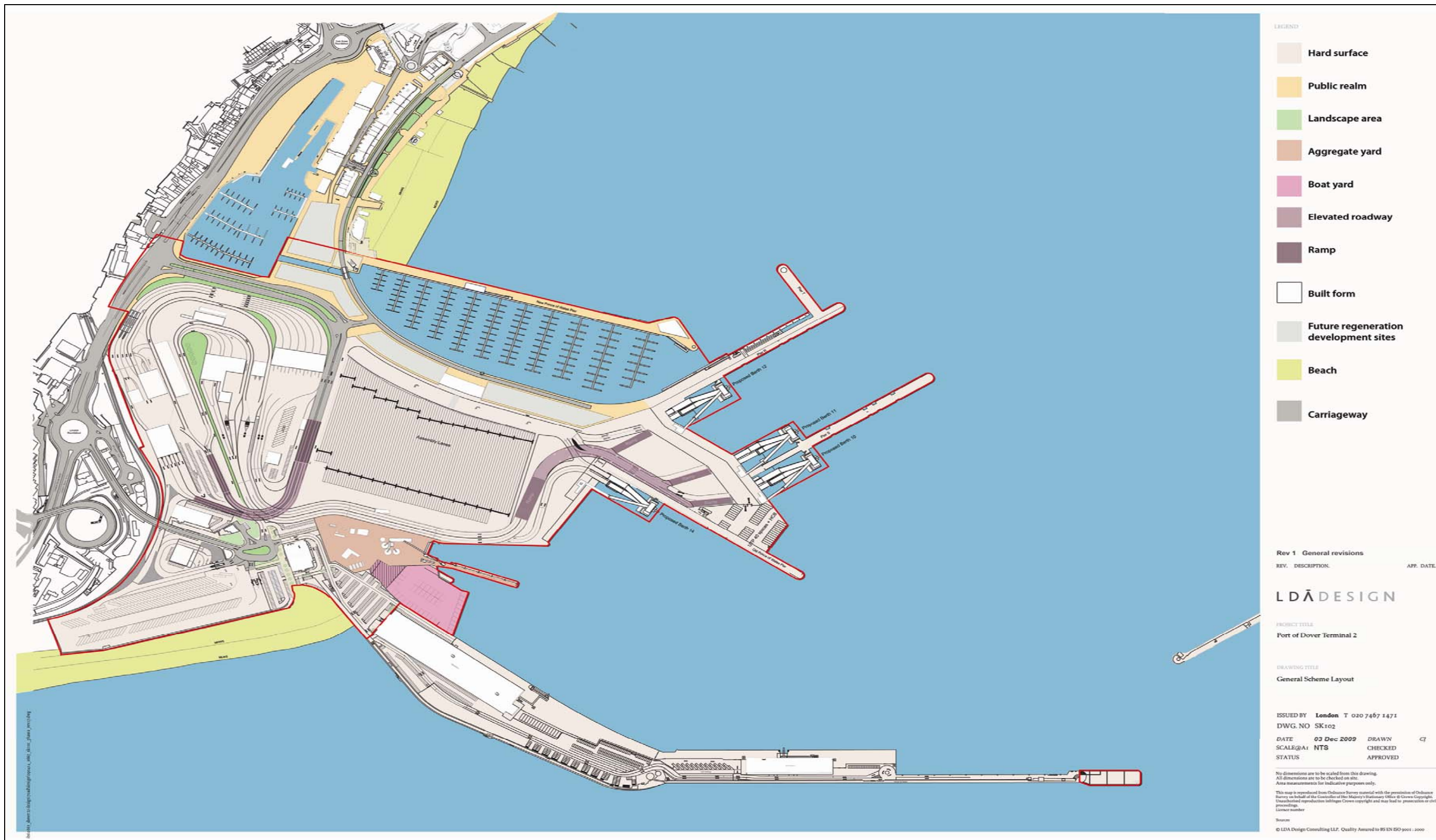


Figure 3.2 Existing maintenance dredge area, proposed capital dredge area and proposed operational phase maintenance dredge area



3.2 Alternatives Considered

A series of generic alternative options/scenarios have been identified and were examined during the EIA process and as part of the feasibility study for the scheme carried out by DHB. These are:

- 1) The “Do Nothing” scenario.
- 2) Use of other locations within the port for Ro-Ro operations; i.e. are there any existing harbour facilities that could be transferred to Ro-Ro use, using criteria relating to size, shape, proximity to deep water and road access.
- 3) Intensification of use of existing Ro-Ro facilities within the port; i.e. improvement of the current Ro-Ro operations and facilities.
- 4) Creation of additional Ro-Ro facilities elsewhere within Dover Harbour other than the proposed scheme area.
- 5) Other possible locations for Ro-Ro facilities outside Dover Harbour.
- 6) Alternative expansion of other Kent Ports and the Channel Tunnel.
- 7) Other locations for new ports in Kent.
- 8) The proposed development – operational design alternatives.

3.2.1 Findings

1 - The “Do Nothing” scenario

Forecasts for both passenger and freight Ro-Ro traffic demonstrate that there is both a national need and regional need for Dover Harbour to expand capacity to minimise the potential for future capacity constraints. Consequently, doing nothing is inappropriate.

2 - Use of other locations within the Port for Ro-Ro operations

Due to the large areas of land that would be required to facilitate and expand Ro-Ro facilities within Dover Harbour, there are no land parcels adjacent to the Eastern Docks where expansion could occur. Additional constraints are related to availability of navigational water space, land assembly space and check in processes.

3 - Intensification of use of existing Ro-Ro facilities within the Port

There is a lack of available space within the Eastern Docks which is almost operating at full capacity. No further intensification can take place and this option is therefore inappropriate.

4 - Creation of additional Ro-Ro facilities elsewhere within Dover Harbour other than the proposed scheme area

Due to the significantly greater reclamation and dredging requirement, as well as significant loss to public and recreational space, this option is not considered appropriate.

5 - Other possible locations for Ro-Ro facility expansion outside Dover Harbour

The availability of alternative locations as sites for the development and construction of Ro-Ro port facilities has not been examined in detail, because the inherent significant cost implications and impacts on the hydrodynamic environment and ecology that would arise from creating a new port area make it unrealistic.

6 - Alternative expansion of other Kent ports and the Channel Tunnel

Although some expansion is planned at other ports, the forecasts already account for traffic growth at these ports and the Channel Tunnel and there appears to be no additional capacity development for existing ports in the Greater South East. In addition, the planned expansion is for Lo-Lo (Load on - Load off) freight traffic as opposed to the Ro-Ro required for accompanied freight or passenger ferries.

7 - Other locations for new ports in Kent

The availability of alternative locations in Kent as suitable for the development of and construction of Ro-Ro port facilities has not been examined in detail due to the potentially significant increase in scale of financial, environmental and social impacts associated with a new port. In addition, Dover's strategic position makes it particularly attractive for ferry operators being the shortest distance from mainland Europe, a benefit which alternative locations around the Kent coast would not be able to offer.

8 - The proposed development and operational design alternatives

The design of the development has been refined during the EIA process to address operational feasibility of the port and environmental impacts. Options were excluded on the grounds that they did not provide effective separation of traffic, did not reduce traffic delays, did not provide alternative egress from the terminal in the event of accidents or obstructions, constrained potential rail connection or they resulted in significant landscape and visual impact.

The scheme incorporates a new marina, maintained navigational access into Wellington Dock and 'at grade' access to the port. These alternative aspects were designed into the scheme in order to replace for the loss of marina and yacht mooring within Granville Dock and the Tidal Basin, as well as ensuring that Wellington Dock remains as an operational dock and also reducing the visual impact on Dover's historic setting.

4 ENVIRONMENTAL IMPACT ASSESSMENT

4.1 The EIA Process

EIA is a tool for systematically considering and assessing the potential impacts of a proposed development on the environment. Broadly, the resultant ES typically contains the following information:

- A description of the proposed scheme and alternative options considered by the developer;
- A definition of the study area for the EIA;
- A description of the existing (baseline) environment that the proposed scheme has the potential to affect (both directly and indirectly);
- Prediction of potential impacts (during construction and the operational phases) on the existing environment and assessment of their significance;
- A description of any mitigation measures that would avoid or reduce potential impacts; and
- A non technical summary (NTS).

In order to classify the significance of predicted impacts, and in an effort to provide a consistent framework for considering and evaluating impacts on various environmental parameters, the terminology presented in **Table 4.1** has been adopted.

Figure 4.1 Terminology for classifying and defining environmental impacts

Impact	Definition
Negligible	The impact is not of concern
Minor adverse	The impact is undesirable but of limited concern
Moderate adverse	The impact gives rise to some concern but is likely to be tolerable (depending on its scale and duration)
Major adverse	The impact gives rise to serious concern; it should be considered as unacceptable
Minor beneficial	The impact is of minor significance but has some environmental benefit
Moderate beneficial	The impact provides some gain to the environment
Major beneficial	The impact provides a significant positive gain

Where adverse impacts have been identified, potential mitigation measures are recommended where possible. These aim to reduce the impact, as far as possible, to environmentally acceptable levels. The remaining impact to the environmental parameter is then assessed as the residual impact.

4.2 Consultation

Consultation has been undertaken throughout the entire EIA process and was initiated early in the scoping phase through the preparation of a Stakeholder Management Plan (SMP) which was prepared in liaison with DHB.

Consultation and information exchange throughout the EIA process has been facilitated by meetings with the following key groups of consultees:

- **Regulators Group:** For those with a statutory and legal remit with regard to consents, licences and approvals; and
- **Stakeholder Groups:** Topic Group Meetings were held relating to the historic environment and landscape, the Transport Assessment, traffic / air quality / noise and vibration and the natural environment.

Prior to the commencement of the EIA, consultation was already underway by DHB with various groups such as the Port Consultative Committee (PCC) which meets quarterly and comprises in the region of 50 organisations. Stakeholder engagement by DHB has continued throughout the EIA process and the views of which have been taken onboard in the preparation of the ES. In addition, DHB held a public exhibition in May 2008, at which displays were produced on the EIA and its findings to date. A brochure was produced for the exhibition, which formed the Port of Dover's third round consultation document.

5 ASSESSMENT OF HYDRODYNAMIC AND SEDIMENTARY IMPLICATIONS OF THE DOVER TERMINAL 2 DEVELOPMENT

5.1 Overview of Predictive Modelling

Predicted changes to the hydrodynamic and sedimentary regime that could result from the development, both within Dover Harbour and the larger regional Strait of Dover study area, have been identified and determined using information on the existing baseline environment, which has been provided by DHB. This information has been supplemented with data collected through baseline surveys and numerical and physical modelling by HR Wallingford.

Computational models were used to simulate hydrodynamic flows within the study area, to determine likely effects on sediment transport (fine muds and sands) and to study the implications of the proposed scheme on wave conditions. A 1:100 scale 3D physical model of Dover Harbour was commissioned to confirm the effects on the harbour hydrodynamic regime and to determine methods of mitigation where possible. Flow modelling was also undertaken to assess the effects of freshwater stratification as a result of the redirection of the River Dour outflow from the Wellington Dock into the Outer Harbour via the new marina.

It is not appropriate to assess the predicted effects of the Terminal 2 development on the hydrodynamics and sediment regime in terms of impact significance as it is the effect of change in hydrodynamics on other parameters which can be deemed either significantly beneficial or adverse. Therefore, the predicted effects of the construction and operation of scheme is assessed as a magnitude of change and associated impacts will be assessed in the respective sections of the ES (e.g. water quality, marine ecology, navigation).

5.1.1 Overview of the main potential effects

Changes to the sediment concentrations and deposition resulting from capital dredging

An estimated 2,275,000m³ of materials will need to be dredged from the contemporary seabed comprising 92% silt and 8% chalk. The total area to be dredged within the Shelf area and Inner Harbour is currently estimated to be 520,000m². This results in the excavation to an average depth of approximately 4.2m below the existing seabed. The total area of the Inner Docks (the Granville Dock, Tidal Basin, Tug Haven and Wick Channel) to be dredged equates to an area of some 70,000m². This results in the excavation of the seabed to an average depth of 1.4m below the existing seabed.

It is expected that dredging will take place over 30 weeks and because of the relatively shallow nature of the area, is likely to be carried out using a backhoe dredger. This is liable to release a total of approximately 14,000 tonnes of silt material back into the harbour, or 67 tonnes per day. This will lead to increased deposition of between 0.65 – 3.6mm per week depending upon the location of dredge, the predominant wave approach and stage of tidal cycle.

Effect of the completed development on wave energy

Without any mitigation, the proposed capital dredging and a vertical face on the proposed reclamation area for Berths 10 – 12 has a significant effect on the way that waves propagate through the harbour area. The Eastern Docks will become energetically 'livelier'; with average increases between 17%-3% (average 10%) for

waves incident from the south south-west and 25% for waves incident from the north-east.

The physical modelling showed the increase in north-easterly waves could be mitigated by a wave absorbing slope along the face of the reclamation. This could reduce the increase in wave heights in the Eastern Docks to 10%. Similarly, by extending the Admiralty Pier by 75m, wave incident from the south south-west could be reduced by 34% giving an overall reduction of 24%. The completed development is therefore anticipated to lead to an increase in wave energy from the north north-east but a significant reduction in wave energy from the prevailing wind direction of south south-west.

Effect of the completed development on tidal current speeds

Minor changes to tidal current speeds are predicted in the location of the harbour entrances and within the harbour. Computational modelling predicts a decrease in tidal current velocity compared to the existing conditions of up to 0.07m/s during spring tide and less than 0.03m/s during neap tide.

Changes to current direction are also predicted for the entrances to the harbour with the direction of the jet stream at the Western Entrance being slightly deflected to the west by the pier extension.

Effect of the completed development on freshwater flows towards Dover Beach

Computational modelling work concluded that in the absence of significant winds to blow river water towards the beach, the river water will generally be deflected toward the beach. However, when the model was run with wind included, it illustrated that there was a greater tendency for the wind to cause vertical mixing within the water column. At neap tides freshwater flows would be diluted by a factor of 20-50 and between 50-100 times during spring tide conditions. The effect of wind would be to further increase any dilution due to the tendency of the wind to mix surface waters through the water column.

Effect of the completed development on sediment deposition and maintenance dredging

The proposed development has the potential to influence the sedimentary regime of the Outer Harbour due primarily to the deepening of the harbour. To address this influence numerical modelling was undertaken to predict changes to the sedimentation rate within the harbour as a consequence of the proposed development.

There is a clear trend for increased mud deposition and decreased sand deposition. This is explained by the fact that the extension of Admiralty Pier reduces the ability of south south-westerly waves to penetrate the harbour. This reduces the amount of sand brought into the harbour by these waves but also reduces the amount of silt that is re-suspended by the agitation of these waves and carried back outside the harbour. Under these conditions there is a 50% increase in the predicted mud deposition in the central area of the Outer Harbour which equates to an additional 46,800m³ of additional materials deposited annually within the harbour.

6 OVERVIEW OF POTENTIAL IMPACTS ON THE BIOLOGICAL AND PHYSICAL ENVIRONMENT

6.1 Marine Water and Sediment Quality

6.1.1 Background

The impacts on water and sediment quality have been assessed based on information from a variety of sources including DHB's environmental monitoring programme and data collected during commissioned surveys.

The water within Dover Harbour is not designated as bathing water, however due to recreational activities that occur in the harbour and at Dover Beach, the quality of the water is monitored by DHB and the Environment Agency. DHB's Environmental Monitoring Programme has demonstrated that in the last five years, water is generally of good quality. Sediment quality in Dover Harbour has been investigated as part of the applications for disposal of the ports' dredged material. Data collected in the last two decades indicate that sediment quality in Dover Harbour is generally good, with metal concentrations in sediments within the harbour to be sufficiently low for disposal at sea.

6.1.2 Construction phase

During the construction phase, land reclamation and dredging are the two activities which may have potential impacts on water and sediment quality. Both activities will potentially increase suspended sediments within the water column; however, Dover Harbour has high natural turbidity, so it anticipated that **minor adverse impacts** will be experienced, with the exception of a temporary **moderate adverse impact** arising from discharge of liquid from dewatering land reclamation material to the harbour waters as a result of the infill option 2 (using waste dredge material from the Thames Estuary) and option 3 (dredged material from the continent). Likewise, it is considered unlikely that the increased suspended sediments will contain contaminants of any concentration liable to affect the locality. Mitigation measures to limit the amount of sediments re-suspended into the water column are suggested. These include utilising appropriate infill material within the land reclamation area, with low contaminant levels and low fine sediment content, ensuring effective containment of the land reclamation area, using appropriate dredging methodology, limiting vessel movements and following best practice guidance to prevent sediment mobilisation and accidental spills during construction.

6.1.3 Operational phase

During operation, the River Dour will have been diverted from its present course to one which flows out through the newly constructed marina, by way of a newly constructed channel, with gates that will be opened following the same regime that is currently operated for the gates between the Wellington Dock and the Tidal Basin. Changes to the salinity regime of the harbour are of particular concern to the Environment Agency and thus the changes to the freshwater flows were predicted through 3D modelling by HR Wallingford. These showed that the salinity profiles in the new area would show a very similar situation to that currently existing, albeit in a slightly altered geographic location. The gradients of dilution are slightly steeper, therefore the significance of this impact is judged to be **minor adverse**, with a similar impact level of significance predicted for microbiological load at Dover Beach.

A **negligible impact** is predicted for commercial and recreational vessel waste emissions, following mitigation measures of good harbour management, with best practice in vessel waste and litter disposal and procedures to deal with accidental spills, leaks and polluting incidents. Maintenance dredging is expected to have a **minor adverse impact** due to the increase in suspended sediments during such campaigns, but will be mitigated as appropriate to fulfil the requirements for marine consent and licence applications.

6.2 Soil Quality and Geology

6.2.1 Background

The impacts on land quality have been assessed based on information collected from a site walkover conducted by Royal Haskoning as part of the Phase I Desk Study; a historical review of the land use in the area, conducted as part of the Phase I Desk Study; a review of literature and previous site investigation reports held by DHB; and a review of Envirocheck data. In addition a Phase II intrusive site investigation was undertaken targeting areas known to comprise potential sources of contamination, both current and historical. The investigation comprised analysis of soil, leachate⁵, and groundwater samples recovered from a number of boreholes and window samples across the Western Docks.

An investigation of the site identified that a layer of Made Ground or fill materials was present across the whole site in thicknesses ranging from 1.0m thick (in the Town Yard area) to 4.8m thick (in the Admiralty Pier area). Made Ground and fill materials were found to mainly comprise loose to medium dense sandy gravely fill with frequent brick, concrete rubble, clinker and ash, which is considered to be relatively permeable in nature and enable the migration of contaminants. Beneath the Made Ground, the geology was shown to comprise Storm Beach Gravel Deposits overlying chalk strata.

Chemical testing of soil, the soil leaching potential⁶ and groundwater samples were undertaken. The results showed some breaches of the guideline values for metals (chromium and lead) and organic (hydrocarbons) contaminants in the Made Ground soils. Tests on the leaching potential from the soil showed that some metals (copper and lead) and organic contaminants (hydrocarbons) are present in a form which can leach from the soil and enter the water environment.

The groundwater was found to be tidally influenced with the direction of groundwater flow being variable and the water quality impacted by the ingress of seawater.

6.2.2 Construction and operational phases

The impact of the leachable contaminants (mentioned above), reaching the water environment during the construction phase is considered to be **moderate adverse** (medium risk). Following the development, if all areas are covered with hard standing and have appropriate drainage systems to catch accidental spills, the risk of impact on the water environment could be reduced to **negligible** (low risk) during the operational phase.

⁵ Leachate refers to liquids that have percolated through a soil and that carry substances in solution or suspension.

⁶ Leachate testing is carried out to simulate the movement of liquid through soil matrix, and thus determine how much soil contamination has the potential to enter the water environment/system.

With respect to the development construction phase, the presence of elevated levels of hydrocarbons may pose a risk to construction works and sensitive receptors (e.g. surface waters, groundwater and buildings & infrastructure), particularly in the Town Yard area where there is currently no hard standing. However, should suitable mitigation, monitoring and good working practices, health and safety procedures and utilisation of correct Personal Protective Equipment (PPE) be put in place it will reduce this potential to acceptable risk levels.

It is anticipated that following construction and during the operation phase the majority of the proposed development will be covered with hard standing, particularly in areas where site users might be exposed to residual contamination present in the ground. This will serve to reduce any risk to site users. The hard standing areas will be drained using an appropriate system designed to avoid mobilisation and transportation of contaminants and will incorporate interceptor systems or similar to prevent accidental spills from reaching the watercourses. The hard standing will also reduce the potential for contaminants to leach from the soils at the site.

Utility supply and, water supply pipes and all other infrastructure items will be appropriately designed to prevent the migration of contaminants through the permeable pipe surrounds and their design undertaken in consultation with the relevant service providers. All issues and risks regarding other construction materials including piled foundations will be managed through the appropriate design measures and industry specific risk assessments to minimise risks to materials users and mitigate contaminant migration.

6.3 Marine Ecology

6.3.1 Background

The impacts on the marine ecology (seabed communities living in and on the sediment, seaweeds and planktonic communities) have been assessed from information derived from a number of existing data sources and specially commissioned surveys as part of the EIA. Existing biological information for the study area was made available from historic data and on-going surveys as part of DHB's Environmental Monitoring Programme and from commissioned surveys.

Surveys of the fauna (animals) living in and on seabed sediments within the harbour were conducted in August 2007 and July 2008. The surveys confirmed that marine sediments within the harbour are predominantly sandy muds, inhabited by faunal communities typical of disturbed areas. An intertidal seaweed survey of different hard structures and surfaces within the Western Docks was carried out in July 2007, followed by a dive survey in September 2008. Seaweed species associated with the existing footprint of the Western Docks are moderately varied and well-established, characteristic of assemblages commonly found on rocky shores and man-made structures. No protected seaweeds were identified in the surveys, although there were a number of introduced species and species rare to the Kent region.

The dive survey was conducted to assess the presence of suitable seahorse habitat within Dover Harbour. No seahorses were found during the survey. The majority of the site is heavily silted and does not comprise of any habitat suitable for seahorses. However, there were some small pockets of shallow kelp habitat within the Western Docks and Inner Harbour that could be suitable for seahorses to establish themselves.

A series of phytoplankton surveys was conducted in summer 2007 and spring 2008 to determine whether blue/green algal blooms occur within the harbour. Three main groups of phytoplankton were recorded, including blue/green algal species. Abundances of phytoplankton were generally moderate, although there were a number of occasions, particularly in July 2007, with localised growths (blooms). Four species, which are toxic to shellfish were identified in large abundances, however the waters in and around Dover Harbour are not designated shellfish waters.

6.3.2 Construction phase

The capital dredging in the harbour will result in the direct removal of significant volumes of sediment from the seabed and the fauna therein, as well as causing indirect smothering impacts from deposition of suspended sediments. Dover Harbour is currently subject to regular maintenance dredging to enable safe shipping and navigation. The fauna which live in and on permanently submerged seabed within the footprint of the proposed capital dredge area are similar to those found in DHB's current maintenance dredge area. Faunal communities that are exposed during the low tide are dominated by species typical of dynamic unstable sandy muddy environments.

In the locations where regular maintenance dredging by DHB already occurs, it is anticipated that faunal communities living within the sediments will completely recover and return to their pre-capital dredged state within a year (i.e. to that of a disturbed community). Outside of the current maintenance dredged area, seabed communities are also typical of dynamic and disturbed habitats accustomed to high levels of background suspended sediments. Due to the opportunistic nature and high recoverability of the species found within the sediment of the harbour, it is anticipated that there will be a high level of recolonisation following the capital dredge. It is predicted that the capital dredge activities will result in a **minor adverse impact** on local sediment communities. There is no appropriate mitigation for this activity.

In addition, the infilling of the Western Docks will result in the permanent loss of seabed communities (130,697m²) living on and in the sediments, and seaweed communities colonising the artificial structures within the docks. The creation of the new marina (69,150m²) will alter an open fully marine area to provide a similar brackish environment to that being lost through the reclamation. The overall loss and alteration of habitat will result in a **minor adverse impact**.

6.3.3 Operational phase

The main impacts arising from operation of the Terminal 2 development will be associated with local changes in sediment and water quality arising with periodic maintenance dredging and the redirection of the River Dour.

DHB's existing maintenance dredging programme within the harbour will be expanded to maintain navigable depths for the new ferry berths and the marina. This will comprise periodic disturbance and resuspension of local sediments, as well as a potential increase in scour effects from increased shipping movements. Given the high turbidity of Dover Harbour, it is not anticipated that the Terminal 2 maintenance dredging programme would result in a significant increase in suspended sediments to a level above the current conditions that would interfere with the feeding efficiency of filter-feeding organisms on the seabed. There is no feasible mitigation for these dredging activities, therefore there will remain a **minor adverse impact** on seabed communities.

The reclamation area, which consists of salinity tolerant benthic assemblages, covers an area of 74,150m², is to be replaced with a marginally smaller but similar area covering 69,150m², which results in a small net loss of 6.7% (5,000m²) of salinity tolerant benthic assemblages. Redirection of the River Dour will permanently alter the salinity regime of some areas within Dover Harbour, as disturbed sediments within the western end of Dover Beach and within the footprint of the new marina will be subject to the effects of freshwater input. Any loss of brackish seabed habitat by infilling of the Tidal Basin will be replaced by the establishment of similar brackish communities within the new marina. It is expected that the reclamation works and the redirection of the River Dour will have a **minor impact** upon the benthic communities in Dover Harbour. Plants and animals colonising artificial structures in the upper layers of the water column will also be influenced by the change in salinity conditions from the freshwater plume. The newly brackish marina will provide similar habitat for seaweed species in upper water column lost by land reclamation of the Tidal Basin, and it is therefore anticipated that there will only be **negligible impacts**.

The redirection of the River Dour is unlikely to generate any increases in the occurrence of phytoplankton blooms in the harbour. Presently, small blooms have been observed in the summer months in areas of the harbour. The redirection of the River Dour through the newly created channel into the Outer Harbour (via the new marina) is not anticipated to cause any increase in phytoplankton blooms that could be potentially harmful to humans using the bathing water off Dover Beach (adjacent to the new River Dour outflow). Overall, redirection of the River Dour will have a **negligible impact** upon the phytoplankton communities in Dover Harbour.

6.4 Marine Mammals

6.4.1 Background

The impacts on marine mammals have been assessed based on information collected from sightings within the vicinity of Dover Harbour by staff from DHB as part of their incident report protocol, from sightings recorded by the National Whale and Dolphin Watch (NWDW), and the Kent and Medway Biological Records Centre (KMBRC), as well as reports and consultation with other relevant authorities such as the Sea Mammal Research Unit (SMRU). The study area for the assessment of impact on marine mammals includes Dover Harbour and the surrounding coastal waters.

There are regular sightings of seals and dolphins off the south east coast of England, whereas whales and porpoises are rarely sighted in the south east region. Bottlenose dolphins, harbour porpoises, grey and harbour seals have been sighted within the harbour and in the surrounding waters.

6.4.2 Construction and operational phases

During the construction and operational phases, high levels of underwater noise generated during activities such as piling and dredging may adversely affect marine mammals. The semi-enclosed nature of the harbour will lead to sound reflection and therefore any impacts outside of the harbour will be reduced. Within the harbour, the silt and chalk substrata of the development footprint should expedite piling activities, and the shallow water conditions will lead to greater sound attenuation.

Given that the sightings of marine mammals in the immediate area are occasional, that the risk of disturbance will be constrained to the harbour area where underwater noise is already high due to Dover being a busy commercial shipping port, there is a low

potential for impact on marine mammals. Mitigation is suggested to minimise the potential disturbance including the use of 'soft-start' piling, the use of a vibro-hammer for pile driving where possible in soft sediments, and monitoring for the presence of marine mammals in the harbour prior to and during piling activities. Following implementation of these mitigation measures, the impact on marine mammals from construction and operational activities will be reduced to from a **moderate adverse impact** to a **negligible impact**.

6.5 Marine and Coastal Ornithology

6.5.1 Background

The impacts to marine and coastal ornithology draws upon data collected surveys for wintering birds and breeding birds carried out over the winter of 2007 and during spring 2008, respectively. Additional information was collected from DHB's Environmental Database and through consultation with various organisations such as Natural England, Dover District Council and Kent County Council. The study area comprised the boundary of the development and a 500m buffer zone for surveys and up to 5km for designated nature conservation sites.

The harbour is generally of low interest for breeding birds, with two pairs of ringed plover being of local interest. The harbour is also of relatively low interest in the winter period, the most significant feature being a small roost of purple sandpiper (a scarce species locally) and turnstone at high tide on Spur Pier. Black redstart, a Schedule 1 species given special protection is likely to be present in the area, and was found on one wintering survey visit. There is a possibility it may breed in the area.

6.5.2 Construction and operational phases

Construction of land based elements of the scheme will result in the loss of areas of breeding habitat and potential breeding habitat by important species such as ringed plover. Mitigation against this loss of breeding or potential breeding habitat includes suitably timing the demolition of buildings outside of the breeding bird season, and undertaking site inspections by a competent ecologist to ensure no active bird nests are present prior to construction. If black redstart or any other Schedule 1 species is found to be nesting at any point during the construction phase, Natural England must be consulted immediately for advice. Following enforcement of this mitigation, the residual impact on breeding birds will be **minor adverse**.

Areas used by roosting birds are likely to be lost or subject to high levels of disturbance such as piling. Due to the low numbers of birds (with the exception of gulls) and low diversity of species using the site to roost, and the adaptability of these species (gulls especially) to utilise new sites, it is not considered that any mitigation is necessary against the loss of roost sites. Mitigation to reduce the impacts include use of soft piling techniques, sensitive use of machinery and timing piling works in the vicinity of key roosting areas identified. If this mitigation is put in place, the residual impact is considered to be **minor adverse**.

There will be a permanent loss of breeding habitat during the operation of the scheme, although the habitat loss is considered to be of low value, and the main species present could either relocate within the port to other areas of suitable habitat, or to nearby Shakespeare Beach (ringed plover, rock pipit) or were subject to control measures anyway (herring gull). Mitigation is proposed in order to combat the loss of habitat by continuing to control the nesting of herring gulls to mitigate against the detrimental effect

they have on other species within the site, and establishing a suitably vegetated enclosure in the vicinity of Shakespeare Beach, as a breeding site for ringed plover and other ground nesting birds. If the mitigation is carried out, the residual impact on breeding birds will be **minor adverse**.

There will be a loss of foraging habitat as a result of the scheme operation, mainly areas of hard-standing which are of limited/no value to feeding birds. However, there will be areas which are currently used by feeding birds which will be lost during operation of the scheme. Since these areas are relatively small, it is considered that birds will move around the site, or to nearby areas such as Shakespeare Beach to feed. As such, mitigation is not considered necessary, and there will remain a **negligible impact** on foraging birds.

There will be significantly increased levels of vehicle traffic, vessel traffic and personnel movement around this area of the port in the Western Docks. Although the site is already a heavily disturbed industrial site, the volume of traffic is anticipated to increase considerably, and this could possibly result in increased disturbance of roosting and foraging birds using the site. However, birds are already likely to be habituated to disturbance at the busy port site, and there are other suitable areas around the site and adjacent to the site which may be used for roosting. As such, no mitigation is proposed, and the impact will remain **negligible**.

6.6 Fisheries

6.6.1 Background

The impacts on the fisheries resources (which include natural marine fish resources and both commercial and recreational fish resources) have been determined from information derived from existing data sources provided by DHB and specially commissioned surveys conducted in August 2007 and July 2008. The timing and scope of the surveys were agreed through consultation with relevant key stakeholders.

Overall, the harbour supports a diverse array of marine fish species, some of which are commercially important (for example, plaice). Several species have stable juvenile numbers and are resident within the harbour, whilst others only pass through on an annual basis, such as sea trout, which migrate up the River Dour (November – February) to spawn.

6.6.2 Construction phase

The main potential negative impacts in relation to fisheries will be associated with the one-off capital dredge activities, piling activities and land reclamation works.

It is considered that the impact from dredging activities (i.e. disturbance and/or mortality) will be temporary, localised and unlikely to impact the long-term health and integrity of fisheries resources within the area. The impact of re-suspended sediment concentrations as a result of capital dredging will be less of an issue for resident species (that are subject to the effects of regular maintenance dredging that already takes place in the harbour) compared to transient migratory species. By adopting best practices during construction, the effects of the capital dredge will have a temporary, **minor adverse impact**.

Previous sampling has shown that sediments within Dover Harbour have consistently shown low concentrations of contaminants, and alongside the appropriate mitigation it is

expected that deterioration in water quality will have a **negligible impact** on fish resources. It is also anticipated that the potential for significant mortality and/or chronic effects on fish populations of commercial interest is **negligible**.

The effect of construction lighting is unlikely to have an effect on the fish species within the harbour, due to the high turbidity background levels which reduces light penetration through the water column. However, underwater noise and vibration will be generated during the pile driving operations. Highly mobile fish within these areas will be accustomed to moving away from temporary sources of noise and vibration disturbance. It is anticipated that noise may elicit a startle-response reaction, followed by avoidance from hearing sensitive species within the area (for example, herring). Appropriate piling techniques such as mechanical 'soft-start' will minimise underwater noise disturbance, with the overall residual impact on local fisheries resources reduced to temporary, **minor adverse**.

6.6.3 Operational phase

The main impacts on fisheries resources related to the operational phase are habitat loss, changes in water quality and sediment transport arising from the on-going programme of maintenance dredging and redirection of the River Dour, as well as noise and vibration impacts from increased vessel traffic and human activity around the harbour.

There will be a permanent loss of habitat and some reduction in available food resource. However, the sensitivity of the habitat should be looked at in the context of the wider Eastern English Channel; the Dover Straits in particular provides extensive nursery and spawning grounds. Any permanent habitat loss or reduction in fish food resource will have a **minor adverse impact** within the context of the wider area.

The infilling of the Western Docks will necessitate the redirection of the freshwater flow from the River Dour. Migratory fish, such as Salmonids are particularly sensitive to changes in salinity, using both visual and chemical cues to locate their destination. By keeping the opening and closing regime of the new dock gates consistent with the regime at the current Wellington Dock gates, it is anticipated that reclamation works and redirection of the River Dour will have a **negligible impact** upon the behavioural responses of migratory fish in the harbour. The redirected freshwater plume will also impact on the resident fish inhabiting the previously high salinity regime of the Shelf Area and Dover Beach. However, density and dilution effects will maintain lower salinities within the top 1m of water, away from seabed nursery and spawning areas. It is anticipated that changes in freshwater flow patterns will have a **minor adverse impact**.

6.7 Terrestrial and Coastal Ecology

6.7.1 Background

The impacts to terrestrial and coastal ecology have been assessed based on information obtained from Natural England and the UK Biodiversity Action Plan (UKBAP), in addition to surveys for habitats, bats and fiery clearwing moth which were carried out in 2007 and 2008. The study area comprises the boundary of the development and a 500m buffer zone for surveys and up to 5km for designated sites.

6.7.2 Construction phase

No works are planned within or immediately adjacent to any site designated for its nature conservation value, and there are not predicted to be any construction activities that will indirectly disturb the habitats or species within them. Accordingly, there will be **no impact** to designated sites.

Shakespeare Beach lies adjacent to the Western Docks on the southern boundary of the proposed Terminal 2 development site. The beach has areas of coastal vegetated shingle, a UK Biodiversity Action Plan (UKBAP) priority habitat, towards the eastern end of the beach. No works are planned to take place on Shakespeare Beach, and there are not predicted to be construction activities that will either directly or indirectly affect the beach's habitat. Accordingly, there will be **no impact** to Shakespeare Beach.

Fiery clearwing moth is known to be present on Shakespeare Beach and surveys identified suitable habitat within Western Docks and Shakespeare Beach. This moth is listed as a priority species on the UKBAP and its UK population is only known to breed on a very few number of sites on the coastline between Dover and Folkestone. It is also afforded protection under Schedule 5 of the Wildlife and Countryside Act 1981 and is part of Natural England's species recovery programme. The planned construction works will result in the loss, within the development footprint, of the foodplant (curled dock) of fiery clearwing moth, although weed control within the port already limits the growth and spread of plants. The potential exists that the loss of foodplant within the development could result in a reduction in available habitat for the moth, which would be viewed as a **moderate adverse impact** given the protected status of the species. However, surveys indicate that the docks do not support any significant populations of the moth. Mitigation measures including translocation of host plant species onto Shakespeare Beach and habitat to be created for ringed plover displaced by the works. Adoption of these mitigation measures would reduce the potential for this impact to an overall **minor adverse impact**.

Surveys have identified that bats are using Lord Warden House. No signs of bats were found in the heritage building at the entrance to the Admiralty Pier. Works to these buildings will have no impact to bats. There are no plans to develop or demolish Lord Warden House as part of the Terminal 2 development; however, lighting during construction could affect bats. Construction lighting should adhere to the recommendations made by the Bat Conservation Trust which will ensure that there are only **minor adverse impacts** to bats.

6.7.3 Operational phase

Minor beneficial impacts to bats are predicted through the implementation of a lighting strategy will follow best practice guidelines and standards of new lighting schemes. The design measures which have been implemented in the lighting strategy will result in reduced glare on roosts.

Coastal vegetated shingle, plants which support fiery clearwing moth and the designated sites may be vulnerable to nitrogen deposition as result of traffic emissions. Air quality screening considers that sites which lie over 200m from traffic routes are not considered likely to receive significant levels of nitrogen deposition. It can be concluded that operation of the Terminal 2 scheme will result in **no impact** to coastal vegetated shingle on Shakespeare Beach and fiery clearwing moth, and **negligible impacts** to the Alkham Lydden and Swingfield Woods Site of Special Scientific Interest (SSSI) located over

200m from any traffic routes and a **negligible impact** to the Lydden and Temple Ewell Downs SSSI, part of which is located just within 200m from the A2 traffic route..

Folkestone Warren SSSI, Dover to Kingsdown Cliffs SSSI and Western Heights Local Nature Reserve (LNR) are located within 200m of traffic routes. Air quality modelling for Folkestone Warren Special Area of Conservation (SAC), which is at the same location as the SSSI, identifies that future nitrogen and acid emissions as a result of the scheme are not significantly different from levels predicted without the scheme. The traffic modelling data indicates that the traffic increase will be marginally lower adjacent to Dover to Kingsdown Cliffs SSSI and Western Heights LNR and so it can be assumed that **negligible impacts** will also occur to these sites.

7 OVERVIEW OF POTENTIAL IMPACTS ON THE HUMAN ENVIRONMENT

7.1 Navigation

7.1.1 Background

The Port of Dover is Europe's busiest ferry port, and the Dover Strait is one of the busiest international seaways in the world, regularly used by over 400 commercial vessels daily. The impacts on commercial and recreational navigation have been assessed based on the information derived from a series of detailed marine operational and navigation simulation studies undertaken by Halcrow Ltd. and HR Wallingford on behalf of DHB. The study area focuses on navigational waters within the jurisdiction of DHB including Dover Harbour (Inner and Outer Harbours) and the waters within the Dover Strait up to 1 nautical mile beyond the harbour walls.

7.1.2 Construction phase

During the construction phase dredging will take place within the harbour. The presence of and activities of the dredging vessels will have a **negligible impact** on the majority of commercial vessel traffic which currently operates from the Eastern Docks.

Piling will be necessary for the new piers / berth structures, harbour walls, new marina and the channel entrance to the Wellington Dock. Barges and jack up rigs may be involved with this phase of the construction and the anchors of these vessels can potentially cause a hazard to passing commercial and recreational vessels. The works in the Western Docks will be undertaken using methods designed to minimise the impact of works on vessels using the Western Entrance.

The impacts to cruise ships and recreational traffic is expected to be restricted to potential disruption caused by the operation and manoeuvring of construction vessels within the harbour and in shipping lanes.

The navigation of commercial vessels entering and leaving Dover Harbour is and will be controlled by the Dover Port Control, and all vessels communicate using VHF radio on entering the harbour. This aids the safety of navigation and will reduce the likelihood of any collisions. 'Notice to Mariners', will be issued to port users and the UK Hydrographic Office (UKHO) informing them of the construction activities and construction timings to minimise disruption. Dredging vessels will also be fitted with appropriate lights and markers to minimise the likelihood of collisions.

An Emergency Response Plan will be developed such that the lines of responsibility and reporting are clear and predefined, to minimise any potential risks to human life and the environment and adequate provisions must be made to follow the standard tidal works requirements. The overall impact on commercial and recreational vessels during the construction phase with appropriate mitigation in place is deemed to be a **minor adverse**.

7.1.3 Operational phase

Various navigational scenarios were modelled to determine the impacts to commercial vessels in the Eastern Docks during the operational phase. The study concluded that the port operated satisfactorily and the maximum delay under the most severe combination of conditions tested was four hours and schedules were recovered quickly.

Therefore the impact on commercial vessels within the Eastern Docks is deemed to be **negligible**.

The potential for impacts on cruise ships berthing at Cruise Berths 1 and 2 was determined using model simulations, and the findings revealed that the navigation situation would be significantly improved. The impact on cruise ships berthing at Cruise Berths 1 and 2 is therefore deemed to be **moderate beneficial**.

Further findings on the simulation of ferry movements within the harbour revealed that Ro-Ro ferry manoeuvres are feasible through the Western Entrance in a wide range of wind and wave conditions. The overall impact on the navigation of commercial vessels within Dover Harbour during the operational phase is deemed to be **minor adverse**. However, providing all the necessary safety and lighting requirements are put in place, the impacts will be **negligible**.

There will be a change in the pattern of commercial shipping, with an increase in the frequency of movements of ferries navigating the central area of the Outer Harbour to reach the new ferry berths. Their line of travel directly crosses the route of recreational vessels into and out of the new marina. This change in commercial shipping has the potential to give rise to conflicts with recreational boat users.

The impact on the navigation of recreational yachts in various scenarios was simulated and assessed. Although the new Marina is located close to the Sea Sports Centre the approaches to it are via what will become the new 'Tug Haven'. This area of water will be separated from the beach recreational area by a series of channel marker buoys in a similar way that the southern limit of the existing Outer Harbour Recreational Area is marked now. As now, any leisure craft will request permission from Port Control before entering the recreational area.

With regard to cross harbour leisure craft movements there will be an adjustment to the location of two of the three distinct holding areas that are currently utilised by Port Control for holding leisure craft whilst other shipping movements take place:

1. The 'Admiralty Pier Waiting Area' already exists and there will be no change to this.
2. The 'Marina Waiting Area' for departing yachts will be in the area of the Tug Haven.
3. The current waiting area off the Southern Breakwater will remain but further use of sheltered water adjacent to and along a greater length of the breakwater will be made.

The direction and control of all leisure craft will continue to be made by Port Control with assistance from the Harbour Patrol Launch as required during busy periods.

There may be an increased risk of incidents through collisions between water users due to the new marina being located closer to the new Sea Sports Centre at the western end of Dover Beach, and increased interactions between recreational vessels and the general public who swim in the waters off the beach.

A Water Safety Strategy is currently in the process of being developed for recreational users between the Dover Sea Sport Centre and DHB along with various other users. This will take account of the navigational issues for recreational users during the

operational phase of the proposed development. With the suggested mitigation in place, the potential impact to recreational navigation during the operational phase is deemed to be **minor adverse**.

7.2 Historic Environment

7.2.1 Background

The impacts on historic environment have been assessed through a number of detailed studies carried out by specialist archaeological consultants (Maritime Archaeology Ltd.), supported by other studies and surveys that have been carried out during the EIA process.

For the purposes of the assessment, the site of the proposed development site has been characterised into seven areas:

- **Zone 1:** comprises part of the Old Pier District area and the Scheduled Ancient Monument of Archcliffe Fort; now occupied by the A20 road and roundabout, and old Dover Harbour station buildings;
- **Zone 2:** The Admiralty Pier complex;
- **Zone 3:** includes the Hoverport Terminal building, apron and ramp;
- **Zone 4:** primarily includes the Prince of Wales Pier;
- **Zone 5:** consists of the Granville Dock, Tidal Basin, and Wellington Dock;
- **Zone 6:** includes Snargate Street, the current A20 route and associated buildings between the Limekiln and York Street roundabouts; and
- **Zone 7:** includes the Wyke⁷ Channel, the Inner Harbour and the marine area around the Prince of Wales Pier.

7.2.2 Construction phase

During the construction phase a number of existing structures could be affected through removal or disturbance, including: the seaward end of Admiralty Pier (100m extension); the South Pier (covered by a road); and Custom Watch House (potential disturbance); the Hoverport complex (infilled and buildings removed); the Prince of Wales Pier (part removed and incorporated into a larger structure); the Granville Dock and associated Telfords Tunnel and sluices, the Tidal Basin and a small part of Wellington Dock (infilled and covered); the Clock Tower (relocated), and the Swing Bridge (replaced by a new one). These impacts could result in a **major adverse impact** on a number of locally, regionally and nationally important structures.

Consequently, mitigation measures have been identified that will insure the preservation of key structures (such as the Granville Dock, Tidal Basin, and the South Pier) from disturbance and minimise the encroachment into the Wellington Dock (using appropriate infilling and covering and avoiding piling through the covered structures). Measures have been identified to avoid undue disturbance, as well as recording of structures that will be removed or infilled; relocation of structures; and refurbishment. Also, during the detailed design, avoidance of structures or fixtures will be a key element to provide further mitigation of the scale and permanence and overall magnitude of impact.

⁷ The modern day name is 'Wick'; the name 'Wyke' dates back to the Medieval period.

Following mitigation, a **moderate adverse residual impact** will remain, due to the importance of the existing (and 16th century) harbour features and character.

There is a high potential for buried features (such as post-medieval deposits and prehistoric palaeochannels) across areas of the proposed development, although the watching brief for the land quality investigations indicated that there were also significant areas affected by modern (20th century) development within the port. Overall a potential **major adverse impact** could occur if historic deposits were disturbed and destroyed during construction.

Mitigation measures including pre-construction excavations; boreholing and analysis (of potential prehistoric landsurfaces; and raising ground levels and avoidance of piling and other ground disturbance in key areas (to be clarified in the detailed design stage). The implementation of these further works and mitigation measures would result in a reduction in the magnitude of impact to a **moderate adverse residual impact** (as some disturbance to potentially significant areas and features may still arise), as well as a **minor beneficial residual impact** from the resulting information arising from the works.

Geophysical survey and analysis identified a number of anomalies in the area of the proposed scheme footprint and capital dredge area, which could be of archaeological and historical origin. Of these, there are two of high archaeological potential and ten of medium archaeological potential. The disturbance from dredging could result in a potential **moderate adverse impact** on historical wreckage. Diver ground-truthing has recently been carried out to determine what these features are and ascertain whether they are of historical importance. The specification for the survey was agreed with English Heritage. Discussions will be carried out with English Heritage and other Historic Environment curators to agree what appropriate measures may need to be carried out prior to construction to avoid or reduce the likelihood of significant impact. It is predicted that, subsequent to the ground-truthing and discussions, a **negligible residual impact** will arise due to the opportunities for mitigation that can arise if any anomalies are determined to be of historical importance.

7.2.3 Operational phase

The proposed scheme will result in infilling and covering of visible elements of the 16th century (and later) port layout. The infill therefore removes a key component of the surviving maritime historic character of this area, and replaces it with a completely new landscape that will not reflect the long history and background of Dover Harbour. However, the scheme design has been altered to minimise the loss of historic character, including the use of at-grade access from the A20 rather than flyover, and also the inclusion of a channel from Wellington Dock to the new marina. In addition, this element of the scheme will be undertaken in accordance with the principles set out in the Design Framework. Overall, by the inclusion of the design measures as well as the earlier mitigation measures described for the construction phase, a **moderate adverse residual impact** will remain on the historic landscape character of the Port and its surroundings.

A **negligible residual impact** is anticipated as a result in the changing traffic flows and volumes in the long-term resulting in the potential increase in acid deposition and the likely increase in deterioration to external materials of some of the historic buildings within Dover.

7.3 Tourism and Recreation

7.3.1 Background

The impacts on tourism and recreation have been assessed based on information derived from published reports, consultation with relevant authorities and associated clubs and societies. The study area, for which the impacts on tourism and recreation have been based include Dover Harbour, Dover town, and the surrounding areas of Dover District and Kent County.

7.3.2 Construction phase

The proposed development will cause the loss of the existing Dover Marina facilities and moorings in the Granville Dock and Tidal Basin. However, the new marina will be built in advance of the reclamation, and the existing berths will be relocated to the new marina. The current navigable access route to the berths within the Wellington Dock will be infilled. A new navigation channel (with associated lock gates and moveable bridge) has been designed into the scheme to replace the existing access route to the berths within the Wellington Dock. The new channel will link the Wellington Dock to the new marina, to provide access to the Outer Harbour. Access to the berths and moorings will be maintained during construction and there should be no change to their availability. The impact will be a temporary and **minor adverse**.

The construction of the landside elements of the scheme may affect tourism and recreation through increased noise and pollution. Traffic will increase in the area due to the delivery of construction materials, the creation of operational infrastructure to facilitate the operation of the berths and the building of the highway works as required to connect with the A20 trunk road. In addition, increased traffic within the harbour itself may also result in additional noise and visual pollution. The impact on tourists visiting attractions will be short-term and **minor adverse**, with the greatest impacts on those attractions closest to the proposed development such as the western end of Dover Beach, the Prince of Wales Pier, Marine Parade, and the eastern end of Shakespeare Beach. Other attractions such as Dover Castle are unlikely to be affected by noise and traffic due to the distance from the development.

Public access to parts of Dover Harbour will be restricted during the construction phase for health and safety reasons. This will have an impact to visitors and local recreational users of the port. In addition, there are a number of listed buildings and historic sites which may not be accessible during the construction works. Access to the Prince of Wales Pier and the western end of Dover Beach will be lost during much of the construction phase. Angling will continue to be available on Admiralty Pier and the Southern Breakwater. The impact on public access is deemed short-term and **minor adverse**. During the construction of the proposed development some car parking spaces will be lost, however, there will be provisions have been put in place by DHB in the development of a future Parking Strategy.

A number of mitigation measures have been recommended including provision of a 'notice to mariners' notifying sea users and local clubs of the construction activities and timings. Educational signs and a website could be implemented, informing the tourists about the new development and the added benefits and initiatives promoted by the Tourism Board to alleviate against public perception and loss of tourism. A Communication Strategy could be developed to inform the public, in advance, of the location, extent and duration of the construction activities and implemented at all entry points into Dover. Provided the mitigation measures recommended are followed, the

residual impact on tourism and recreation during construction would be deemed a **minor adverse**.

7.3.3 Operational phase

An area around 18% of Dover Beach will be lost to the new marina. However, the new seafront location of the marina close to the new Dover Sea Sports Centre is considered to have the potential to provide a positive contribution to the ambience of Dover Beach. The overall impact for operation on the beach amenity is considered to be **minor adverse**. So no practicable mitigation is available, there will remain a **minor adverse residual impact**.

The proposed development will lead to the loss of public access to the Prince of Wales Pier, which will be shortened and will be incorporated into the commercial port and therefore not accessible for angling or to pedestrians. The Admiralty Pier and Southern Breakwater will remain accessible to anglers. The pier walkway alongside the newly created marina will provide a replacement facility which will be open to the public and there will be the potential for future enhancement opportunities (i.e. restaurants, café facilities and shops). Accordingly, there will be a localised, long-term **minor adverse impact** on sea angling and public access within Dover Harbour. Alternative public access areas should be offered as mitigation and the overall residual impact is deemed to be **negligible**.

The Master Plan for the proposed development makes no specific provision for future parking requirements at this stage and relies on the development of a separate Parking Strategy to identify the parking needs. Phase 2 of the Parking Strategy has been completed and is appended to the Environmental Statement..

The proposed development will result in reduced traffic congestion along the A20 which will benefit day visitors and tourism. Dover Harbour has a major influence on the amount of tourism coming into Dover providing a benefit to the local economy of Dover. The new marina will be supported by amenities which will provide additional recreational benefits, in addition to the Dover Sea Sports Centre which will attract many tourists interested in water sports during the summer months. The construction of Terminal 2 will lead to an increase in additional berths, moorings, facilities and opportunities creating a long-term **moderate beneficial residual impact** on tourism and recreation.

7.4 Traffic and Transport

7.4.1 Background

The assessment of the impacts of the proposed Terminal 2 scheme has been appraised against the background of six distinct aspects: severance, driver delay, pedestrian delay, pedestrian amenity, fear and intimidation, accidents and safety.

7.4.2 Construction phase

The overall the construction phase of the proposed Terminal 2 development would result in increased traffic, generally this would lead to no more than **negligible impacts** with regard to the distinct aspects mentioned above. This is particularly the case given that much of the construction materials will be transported to the site by sea. Also, in order to mitigate any impacts which could occur, both a Construction Management Strategy and Construction Workplace Travel Plan would be put in place to influence better travel habits during construction.

In terms of severance there would be no more than a **negligible impact** upon the highway network as against the 2014 background traffic there should be no more than a 30% increase in road traffic during the construction phase.

7.4.3 Operational phase

With the operation of Terminal 2 there would be a **beneficial impact** upon driver delay experienced across the network. This would be achieved as there would be more drivers able to pass through the network in the peak periods due to the improvements identified to the highway network.

The pedestrian delay impact would be **negligible** across the majority of the network, apart from Union Street due to its role as site access. The reduction of traffic along the A20 close to Dover Town Centre would result in a **positive impact** for pedestrians.

There is unlikely to be any adverse impacts to general pedestrian amenity. In terms of public transport amenity, likely modal share primarily for staff would increase typical service loadings by three persons and thus a **negligible (imperceptible) impact**.

In terms of fear and intimidation the changes in flows (some of which could be downwards) would only equate to a **negligible impact** at worst.

In terms of accidents and safety, given the localised and marginal increase during the peak operation phase, it is not considered likely that there would be any discernable change in the road-based personal injury accident patterns and frequency which could be directly attributed to operational activity at the site.

Based on the above assessment the operational phase of the development would similarly have an overall **negligible impact** above the 'without development' impact on the surrounding Dover area and depending upon the extent of latent demand passing through the Dover network without the realisation of Terminal 2 there could be decreases in traffic flows along the town centre stretch of the A20. This would be without any further modal shift as a result of a site-wide Travel Plan.

7.5 Noise and Vibration

7.5.1 Background

The noise and vibration impacts of the proposed Dover Terminal 2 development on the surrounding human environment have been assessed using a baseline noise survey and a desk-based prediction of likely future noise levels as they affect potentially sensitive (mainly residential) receptors near to the port.

7.5.2 Construction phase

Noise from daytime on-site construction activities was predicted to have a potentially temporary **negligible impact** on the nearest potential noise sensitive receptors (NSRs). Night-time construction noise was predicted to have a potentially **major adverse impact**. Application for a Section 61 'Prior Consent' is therefore recommended to control working practices and to ensure that details of the required construction noise mitigation are agreed with the local authority Environmental Health Department before construction works commence. Implementation of Best Practicable Means for construction noise mitigation was also recommended.

The increase in traffic flows on the public road network, due to construction-related traffic, was predicted to have a **negligible noise impact** on the NSRs close to the A20. Potentially temporary **minor adverse noise impacts** from construction traffic were predicted during peak-construction periods for the receptors close to The Viaduct and Union Street.

Potential ground-borne vibration impacts from piling activities during construction were assessed to have **no impact** with regard to potential for building damage. A potential temporary **minor to moderate adverse impact**, with regard to perceptible vibration at sensitive receptors along Waterloo Crescent, was predicted. Application for a Section 61 'Prior Consent' and implementation of suitable mitigation should ensure that perceptible vibration impacts are reduced to temporary **negligible**, or at worst **minor**, significance.

The proposed scheme includes the remodelling of the York Street roundabout to a signalled junction. The closest receptors, located on Snargate Street or Adrian Street, are between 50 m and 60 m from the existing roundabout. Assuming the footprint of the new junction is similar to that of the existing roundabout, and assuming that piling is not required, **negligible vibration impacts** are predicted.

7.5.3 Operational phase

Unmitigated operational noise from activities within the Dover Terminal 2 development was predicted to have a potentially **negligible to moderate adverse impact** on the NSRs during the night. Operational noise impacts during the day were **negligible** at all of the NRS. A 3m high noise barrier running along the northern boundary of the development is proposed to mitigate operational noise levels by reducing noise from vehicles within the terminal. Night-time operational noise impacts with mitigation in place were reduced to **negligible to minor adverse**, with the minor impacts occurring at Waterloo Crescent and Gateway flats.

Road traffic serving the Terminal 2 development will lead to changed traffic flows on roads in the surrounding area. The assessment showed that the road traffic noise associated with the development will have a **negligible impact** on potentially sensitive receptors close to the affected roads.

7.6 Air Quality

7.6.1 Background

The impact of atmospheric pollutants related to the construction and operation of Terminal 2 on local air quality was assessed. The pollutants considered were nitrogen dioxide (NO₂), particulate matter (PM₁₀) and sulphur dioxide (SO₂), those which are associated with road traffic exhaust and shipping emissions and which have the potential to impact on local ambient air quality. Also considered was the deposition of nitrogen and acid to the surface of ecologically sensitive sites.

Information from a preliminary construction programme was used to assess impacts from the construction phase using a risk based approach. To assess the impact from the operational phase, complex atmospheric dispersion modelling was undertaken to produce ambient air pollutant concentration estimates at specified locations in Dover, including the Wellington Dock and locations inside and around the town's air quality

management areas (AQMAs). Modelling was also carried out to determine the wet and dry deposition of pollutants to the surface of Special Areas of Conservation (SACs) adjacent to major roads.

For assessment years 2014 and 2026, predicted concentrations under the 'without development' or 'do nothing' scenario were compared to those made with the development in place in the same year. Ambient air pollutant concentration estimates were assessed against the Government's air quality Objectives. The impacts identified in the assessment are described according to the Institute of Environmental Management and Assessment (IEMA) impact criteria classification. Estimates of deposition to the SACs were assessed using the critical load (CL) benchmarks under which significant harmful effects on the environment are unlikely to occur.

7.6.2 Construction phase

Air quality impacts during the construction phase could arise from dredger exhaust emissions, construction dust, releases from on-site plant, and from road traffic. Given the scale of the development and the proximity of a small number of sensitive receptor locations to the site boundary, uncontrolled emissions or poorly managed activities could give rise to a moderate adverse impact at these locations. However, if good practice mitigation measures are adopted, the impact of construction dust is likely to be reduced. The impact should be reduced to **minor adverse** with robust site management and procedures within a Code of Construction Practice or equivalent.

7.6.3 Operational phase

Road traffic - ambient air quality

In 2014 and 2026, 'with' and 'without' the development in place, the annual average and hourly maximum NO₂ Objectives predicted to be met at the majority of receptors. For the annual average and hourly maximum concentration, in 2014 and 2026, the impact on the baseline condition at the range of receptor locations was predicted to be **negligible to moderate adverse**. There is a predicted increase in concentration along Union Street which would act as the Terminal 2 access road, but at the selected receptor locations within the Wellington Dock area there are no predicted exceedences of any pollutant Objective.

None of the Objectives for PM₁₀ or SO₂ were predicted to be exceeded in any future with-scheme scenario, and the associated impacts will be of **negligible to minor adverse significance**.

The impact assessment was based on a number of conservative assumptions, and the maximum potential impacts over 5-years of hourly dispersion conditions, with average traffic speeds at peak hour, are reported.

Operational phase – road traffic (deposition to SACs)

The assessment of current deposition rates against CLs at the Folkestone to Etchinghill Escarpment SAC showed that some damage from eutrophication⁸ may currently be occurring as the lower end of the CL deposition range is being exceeded. The indication is that acid deposition values are currently below the CL value. The impact of pollutants

⁸ Eutrophication is a process whereby excess nutrients stimulate excessive plant growth. Nutrients can come from a variety of sources, such as fertilisers from agriculture; however, in this instance it is potentially derived from the deposition of nitrogen from the atmosphere.

from traffic related to the scheme has been shown to be **negligible** at locations within this SAC.

Shipping – ambient air quality

Emissions produced by ferries manoeuvring in the harbour were shown to produce higher pollutant concentrations at landside receptor locations than those with the ferries at berth or at sea.

The long-term and short-term NO₂ Objective values were predicted to be met at all receptors. The predicted impact on the long-term NO₂ concentration is **minor adverse** at all receptors; the impact on short-term concentrations is **moderate adverse**. For PM₁₀, the long- and short-term Objectives were met at all receptors and the impacts at most receptors were shown to be **negligible**. For receptors outside the Wellington Dock, the worst-case impact on the short-term Objective was predicted to be **moderate adverse**. The SO₂ Objective values are predicted to be met at all receptors. For SO₂, the maximum concentration with the scheme in place was predicted to be of **moderate adverse significance**.

Cumulative Impact

The cumulative impact of road traffic and shipping emissions was assessed by adding the 2014 'with development' road traffic concentrations to those produced by ships manoeuvring in the harbour.

For annual mean NO₂ values, the addition of road traffic and shipping emission sources does not give rise to any additional exceedences of the Objective at relevant receptor locations. The primary SO₂ emission source is vessel releases, and road traffic emissions do not contribute significantly to the cumulative values at receptor locations. The cumulative concentrations at all receptor locations remain well below the 24-hour Objective value. The cumulative impact on the annual average NO₂ baseline was determined as **minor to moderate adverse** and on the 24-hour and hourly maximum SO₂ baseline, **minor adverse**.

7.7 Landscape and Visual Impact

7.7.1 Introduction

A Landscape, Townscape and Visual Impact Assessment (LVIA) has been undertaken to determine the effects of the proposed scheme on the surrounding area. As part of an assessment of the baseline conditions, desk-top and on-site surveys were undertaken. A number of landscape and heritage designations were identified within the study area including Kent Downs Area of Outstanding Natural Beauty (AONB), Heritage Coastlines, Conservation Areas, Listed Buildings, Scheduled Ancient Monuments, Public Rights of Way and Landscape and Townscape Character Areas.

A lighting impact assessment was undertaken to determine the effects of the proposed lighting scheme on the surrounding area outside the port boundary.

7.7.2 Construction phase

The effects on the landscape during the construction phase were assessed based on the Landscape Assessment of Kent character areas. From within those areas which would be impacted, only small portions of the view would be affected and the

construction activity would therefore result in minimal change to the overall composition. Any change that was perceptible from these areas would be considered to be **negligible** or slight, and impacts would be of a neutral significance on the landscapes which carry the AONB designation.

With regard to the townscape, adverse construction phase impacts are limited to those areas immediately adjacent to the site which do not have similar functions to the proposed development. The effect would be largest on the seafront (**moderate** and **adverse impacts**) with only **slight adverse impacts** experienced on Snargate Street and the Old Pier area. There would be **no impact** on areas within Dover town centre.

The visual impact of the construction phase will primarily affect the immediate context. This would include **moderate** and **adverse effects** along the Esplanade, although of a relatively more temporary nature further east on Marine Parade. Overall, the construction phase effects would be temporary and should be considered in the context of a harbour and surrounding areas which are already generally busy with vehicle and ferry movements and port activity.

Lighting

The effects of the lighting during the construction phase were assessed on the basis that best practice will be followed during the construction phase in providing only the necessary minimum levels of lighting to illuminate areas to provide a safe and secure working area to comply with health and safety requirements. As the site is already a port operational area and therefore contains lighting to comply with dock safety regulations, it is considered that there would not be any significant increase in the overall effect of construction lighting. The lighting scene would be dependant upon the construction sequences and layout of the construction site.

7.7.3 Operational phase

The coastal landscape character areas to the south-west and north-east of Dover Harbour may be impacted during the operational phase of the development. However, the effect on views experienced would be small as the harbour is already visible in the context of the coastline. Any perceptible change from these areas would be **negligible** or slight and impacts would be of neutral significance on the landscapes which carry the AONB designation.

A ferry terminal development of this scale will have operational impacts on some of its surrounding townscape which cannot be mitigated through the design process. The wholesale changes to the Granville Dock and the Prince of Wales Pier are typical of Dover's continuing evolution as a leading port, but represent a **substantial and adverse impact** to the overall character of this townscape area.

The project will have an effect on recreational users, but the assessment also considers that an important part of the character that is experienced by users relates to viewing the activity in the harbour and the overall impacts are therefore considered neutral. For most areas of the town, there will be no significant or **negligible impacts** on the townscape. The new marina will make a substantial contribution to the regeneration of the seafront which could be considered **beneficial**. Overall, the proposed changes do not have widespread adverse townscape impacts, despite the loss of specific features.

The greatest visual impacts during operation will occur on nearby viewpoints, especially those overlooking the Western Docks from the Western Heights which are considered to

be **substantial and adverse**. Although the interest of the harbour operation and coastal and historic context (Dover Castle) remains for the viewer, the infilling of the Granville Dock and Tidal Basin and operation of the Terminal and associated infrastructure will represent a substantial change to the near view which will have an adverse impact to the grain and character of the Western Docks.

The effect on views from the walkway alongside the Granville Docks would be **moderate adverse**. However, the significance of the impacts is neutral because much of the enjoyment for viewers comes from watching the harbour operations. From views further afield, the distance de-sensitises the viewer to specific changes and the overall composition remains intact. These impacts are therefore considered to be neutral, with **no adverse effect** on the composition or interest of the view and its coastal and historic context.

There will also be a **substantial impact** during operation on viewers at the western end of the Esplanade, although the impact is considered **neutral** because the change in views reflects a reconfiguration and intensification, with familiar elements such as masts, marinas and shipping related activity remaining. Further eastward on Marine Parade, the beach recharge will result in a **substantial and beneficial impact** on the views from this area.

In the wider landscape outside Dover, the occasional views to the harbour are sufficiently distant for impacts to be no worse than **slight and neutral** as the re-configuration of the Western Docks will be barely perceptible. The impact on Samphire Hoe Country Park has been assessed as **slight to moderate** and neutral.

In respect of distant seascape views, it is considered that the predominant context which includes the setting of the harbour, Dover and the White Cliffs will not be impacted upon. Within the harbour, changes to views will clearly be more marked, but impacts would be neutral because of the mitigation-by-design approach and the immediate character of the port operations will remain unchanged.

For the longer term, the detail design development will aim to see that interesting views are created through this development. Opportunities for creating good viewpoints should be identified, for example in the new marina and on access roads and ramps to the Terminal 2. New views will take in the new terminal, Dover's maritime and strategic heritage and the fine coastal setting.

Lighting

The existing levels and type of illumination observed at the Port of Dover are not wholly representative of the type of lighting that would be installed as part of the development with measures being implemented to improve the lighting conditions within the development area.

The lighting proposed for the Terminal 2 would result in a reduced impact outside the port boundary through better design and control and reduces the lighting level. The overall aim for the new lighting scheme will be to significantly reduce obtrusive lighting elements of sky glow, light into windows, source intensities and spill light received or viewed outside the port boundary. In addition, DHB is currently remodelling the lighting in the Eastern Docks which will reduce the overall lighting level.

7.8 Socio-economics

7.8.1 Background

The impacts on socio-economics have been assessed based on information derived from the UK 2001 census of population, official labour market statistics (NOMIS website), additional reports and consultation with DDC. The study area, for which the impacts on socio-economics have been based, includes Dover Harbour, Dover Town, and the surrounding areas of Dover District, and on a wider scale contributing to Kent County.

7.8.2 Construction phase

During the construction phase there are likely to be temporary minor impacts on the Ro-Ro ferries entering or leaving the harbour during the construction phase. Dover Port Control will continue to maintain the safety of navigation within the port. Where necessary, management measures will be put in place by DHB and through careful design of the construction programme, the disruption to freight traffic operational practices can be minimised. The passenger and cruise ships will continue to operate as normal in the Eastern Docks and from the Cruise Terminals at Admiralty Pier.

The impact on employment during the construction phase is deemed **minor beneficial** and where possible DHB will source construction labour from within the county as well as procuring materials from local firms. This would increase the positive impact of the construction phase on the local community. The impact would therefore be deemed temporary and a **moderate beneficial residual impact**.

7.8.3 Operational phase

The cruise industry is predicted to continue to increase which will create more jobs and bring additional passengers, with the associated additional spend. The port will also attract more visitors due to the improved amenities and recreational opportunities of the proposed development. The port will be able to harbour more freight traffic and with the predicted growth in the export/import industry a significant increase in trade and industry will result.

The total gross direct effect of the operation of the new terminal would be 2,043 Full-Time Equivalent (FTE) jobs. The net direct effect is estimated at an increase of 567 FTE jobs. Supplier and income linkages would support a further 106 jobs resulting in a total net employment effect of approximately 673 FTE. Based on Gross Value Added (GVA) per head data for the Dover District, this level of additional employment would contribute approximately £13.7 million to the local economy. The Port is estimated to contribute a total of £190 million to the GDP, based on estimated employment and local GVA per head, representing 1.1% of total GVA for Kent and 14% of estimated GVA for Dover. Overall the long-term impact on the economy of Dover and on a regional scale has been assessed as having a **major beneficial residual impact**.

The proposed development will increase the uptake of port related traffic and therefore increase the efficiency of movement on the road network in and around Dover for all traffic which will aid the success of the local area in the future. New and additional leisure facilities, in the form of the new marina, will be created at the Port of Dover. This provides a waterfront focus for the regeneration plans which will help diminish the segregation between the town and the seafront in Dover created by the A20. The design of the scheme has sought to ensure that access arrangements to the new

terminal make provision for a putative regeneration plan around the Wellington Dock based on the emerging Local Development Framework. Overall the long-term social aspects arising from the development has been assessed as having a **major beneficial residual impact**.

8 OFFSHORE DISPOSAL OF DREDGED MATERIAL

8.1 Background

The impacts on any offshore disposal site have been assessed based on information provided by DHB, the Marine and Fisheries Agency and Cefas. The study area is that of the designated offshore disposal sites DV010 Dover and DV011 Dover Emergency and their immediate environs.

8.2 Construction and Operational Phases

Few impacts are predicted for the offshore disposal site area, other than disturbance to the benthic fauna at the site, which is forecast to be **minor adverse** and obstruction to navigation during disposal operations, which will be mitigated though the issue of appropriate "Notices to Mariners" giving another potential minor adverse significance. Disturbance to fish and increased sediment contamination are both predicted to have a **negligible significance**, at worst.

During the operational phase, there will be an increased requirement for maintenance dredging, but the disposal of this material at the offshore disposal sites is not forecast to have more than a **negligible impact** for either the disturbance to the benthic fauna at the site, or for alteration to the hydrodynamic regime.

9 CUMULATIVE AND IN-COMBINATION EFFECTS

9.1 Background

The in-combination and cumulative effects have been assessed based on information from the environmental parameter sections of the Environmental Statement and that provided by Dover District Council, Kent County Council Department for Transport (DfT) and Department for Environment, Food and Rural Affairs (DEFRA). A list of potential projects that might provide in-combination or cumulative effects was compiled mainly from Dover District Council's Local Development Framework. Many of these projects did not contain sufficient information to allow an adequately objective consideration of the potential cumulative effects.

9.2 Impact Assessment

The major environmental parameters likely to give rise to in-combination or cumulative effects were determined to be traffic, air quality and noise. However, in the case of traffic and air quality, predictive modelling was undertaken utilising information encompassing all of the impending area developments, thus the worst case scenarios for both traffic and air quality given within the Environmental Statement include potential in-combination and cumulative aspects.

With respect to noise, insufficient information was available from any other project to provide a closely scrutinised assessment. However, other developments will be required to submit applications to the local authority for Section 61 'Prior Consent' as described in the Control of Pollution Act 1974 (COPA). This will ensure that suitable

construction noise mitigation is put into place that the cumulative noise from varying projects is kept within suitable levels. It is therefore considered that the significance of any noise-related in-combination or cumulative effects will be **minor adverse** at worst.

10 PROPOSALS FOR MONITORING

This section (**Table 10.1**) describes the monitoring measures that are recommended during the construction and/or operational works for the scheme. In addition to these, it is recommended that DHB adapt their Environmental Monitoring Programme sampling locations in relation to the new configuration. This should include monitoring of the benthic faunal communities within the capital dredge footprint, and monitoring pelagic and demersal fish populations within the harbour.

Table 10.1 Recommended monitoring measures

Environmental Parameter	Monitoring
Soil Quality and Geology	Ground gas monitoring should be undertaken to validate the initial ground gas risk assessment undertaken. Further ground water monitoring is required to assess the flow and direction of ground water on site to add information on potential sources of the ground water contamination encountered.
Marine Mammals	A safety zone should be set up to monitor for the presence of marine mammals within the harbour for a period of 30 minutes prior to commencement and during piling operations. Should marine mammals be sighted within the harbour, pile driven activities should be delayed at least 30 minutes until after the last mammal sighting has occurred. If no marine mammal is observed within the monitored zone during this time, then pile driving can be initiated. This will need to be agreed with Natural England.
Terrestrial Ecology	Reseeding of curled dock (<i>Rumex crispus</i>) and common sorrel (<i>R. acetosa</i>), both host plants for fiery clearwing moth, at Shakespeare Beach, should be overseen by a qualified ecologist and checked after six months to ensure it has established. During the summer season after the plants have established egg searches on the new habitat should be repeated to confirm the moths are using them. This will need to be agreed with Natural England.

11 IMPLICATIONS FOR EUROPEAN SITES

11.1 Need for Appropriate Assessment

Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (hereafter referred to as the 'Habitats Directive') allows for the establishment of Special Areas of Conservation (SAC) for habitats and species listed in Annex I and II of the Directive. The Habitats Directive is transposed into UK law in the Conservation (Natural Habitats &c.) Regulations 1994.

Regulation 48 of the Conservation Regulations defines the procedure for the 'assessment of implications for European Sites' (i.e. the Appropriate Assessment process). If the proposed development is unconnected with site management and is likely to significantly affect the designated site, under Regulation 48(1) the decision maker must then undertake an 'Appropriate Assessment' of whether the proposal will 'adversely affect the integrity of the site' in light of its conservation objectives. This assessment also needs to consider potential in-combination affects with other plans and projects. This section builds upon the EIA process to provide information to inform an 'appropriate assessment' of the proposed Dover Terminal 2 Project in relation to:

- Lydden and Temple Ewell Downs SAC;
- Folkestone to Etchinghill Escarpment SAC; and
- Dover to Kingsdown SAC.

The SACs includes the following designated features:

- Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) (important orchid sites).
- Vegetated sea cliffs of the Atlantic and Baltic coasts.

Natural England's conservation objectives for the SAC are to maintain the features in favourable condition, subject to natural change. The main way in which the SAC features could be affected is through increased Nitrogen and acid deposition as a result of increased traffic. Air quality modelling was undertaken to determine impacts to the designated features.

11.2 Implications for the Integrity of the SAC

An assessment predicted that none of the favourable condition targets are expected to be affected. It is therefore considered that the increased traffic associated with the ferry terminal facilities will not have an adverse long term effect on the integrity of the SACs. Nitrogen and acid emissions in 2014 and 2026 as a result of the scheme are not significantly different from levels predicted without the scheme. As a result, **negligible impacts** are predicted to the sites under consideration. Mitigation measures are not required.

12 CONCLUSION

12.1 Summary of Effects

An overview of the key predicted impacts associated with the proposed Dover Terminal 2 development on various environmental parameters is provided in this document. **Table 12.1** provides a full summary of the significance of all the potential impacts, mitigation measures and residual impacts of the proposed Terminal 2 development. If mitigation measures proposed are implemented, there are no remaining major adverse effects.

Table 12.1 Summary of potential impacts of the proposed development, where mitigation measures have been suggested to minimise impacts and the remaining residual impacts

Impact	Significance	Mitigation	Residual impact
HYDRODYNAMIC AND SEDIMENT REGIME			
Construction Phase			
Changes to sediment concentrations during capital dredging	Minor adverse		It is not appropriate to assess this predicted effect in terms of impact significance; the potential impact on other environmental parameters associated with this change is addressed elsewhere (e.g. water quality, marine ecology, etc)
Changes to sediment deposition due to capital dredging in the Inner Harbour	Moderate adverse		See above
Changes to sediment deposition due to capital dredging of Granville Dock, Tidal Basin, Tug Haven and Wick Channel	Minor adverse		See above
Changes to wave environment	Moderate adverse		See above
Operational phase			
Changes to wave activity	Minor adverse		See above
Changes to tidal propagation	Negligible		See above
Changes to tidal flow speed and direction	Minor adverse		See above
Freshwater flow towards Dover Beach	Minor adverse		See above
Changes to sedimentary regime	Minor adverse		See above
Changes to mud deposition	Negligible		See above
Changes to sand deposition	Negligible		See above
Changes to coastal geomorphology as a consequence of changing hydrodynamic and sedimentary regimes	Minor adverse		See above
Impact on sedimentary regime from maintenance dredging	Minor adverse		See above
Climate change	Minor adverse		See above
WATER AND SEDIMENT QUALITY			
Construction phase			

Impact on water quality due to releases of suspended solids and contaminants during land reclamation	Dredged material for infill - option 1 (material from the Goodwin Sands): Minor adverse Dredge material for infill - option 2 (material from the Thames Estuary) & option 3 (material from the continent): Moderate adverse	✓	Negligible
Impact on water quality due to releases of suspended solids and contaminants during capital dredging and construction	Minor adverse	✓	Negligible to Minor adverse
Impact on water and sediment quality due to accidental spillage of contaminants	Minor adverse	✓	Negligible
Operational phase			
Input of contaminants from roads, infrastructure and other hard-standing areas	No impact	✓	No impact
Discharges from the River Dour affecting bathing water quality and salinity	Dover Beach: Minor adverse Shakespeare Beach: Minor beneficial	x	Minor adverse
Discharges of waste materials by commercial and recreational vessels	Negligible	✓	Negligible
Maintenance dredging releasing suspended solids and contaminants	Minor adverse	✓	Minor adverse
SOIL QUALITY AND GEOLOGY			
Construction phase			
Risk to human health (construction workers) from contaminants	High (major adverse)	✓	Low to medium (minor adverse)
Impacts to groundwater as a result of disturbance causing the mobilisation of leachable contaminants	Medium to high (moderate to major adverse)	✓	Medium (moderate adverse)
Impact to surface waters due to potential contaminant mobilisation	High (major adverse)		Medium (moderate adverse)
Risk to ecological receptors from potential mobilisation of leachable contaminants during disturbance	Low to medium (minor to moderate)		Low (minor adverse)
Risk to neighbouring properties and landuse from potential mobilisation of contaminants	Low (minor adverse)	✓	Negligible
Risk to buildings and infrastructure from potential	Medium (moderate adverse)	✓	Low (minor adverse)

elevated contaminant levels			
Operational phase			
Risk to human health of future site users from direct contact with remaining sub-surface contaminants	Low (minor adverse)	✓	Low (minor adverse)
Impacts to groundwater from possible mobilisation of leachable contaminants	Low to medium (minor to moderate adverse)		Low (minor adverse)
Impact to surface waters due to potential contaminant mobilisation	Low		Low (minor adverse)
Risk to ecological receptors from potential mobilisation of leachable contaminants	Low		Low (minor adverse)
Risk to neighbouring properties and landuse from potential mobilisation of contaminants	Negligible	✓	Negligible
Risk to buildings and infrastructure from potential elevated contaminant levels	Low to medium (minor to moderate adverse)	✓	Low (minor adverse)
MARINE ECOLOGY			
Construction phase			
Alteration of intertidal and subtidal benthic invertebrate resources due to dredging	Minor adverse	x	Minor adverse
Direct loss of intertidal and subtidal benthic invertebrate resources due to reclamation works	Minor adverse	x	Minor adverse
Indirect smothering impacts on benthic habitats from deposition of suspended sediments released during capital dredging	Minor adverse	x	Minor adverse
Remobilisation of potentially contaminated sediments and subsequent effects on the benthic communities	Negligible	x	Negligible
Direct loss of artificial structures that provide habitat for flora and fauna	Minor adverse	x	Minor adverse
Impact on potential seahorse habitat due to reclamation	Minor adverse	x	Minor adverse
Impacts on phytoplankton communities as a result of elevated suspended sediment concentrations	Negligible	x	Negligible
Operational phase			
Long-term alteration of benthic sediments and fauna due to maintenance dredging	Minor adverse	x	Minor adverse

Implications for benthic communities arising from an increase in suspended sediment concentrations and turbidity during maintenance dredging	Negligible	x	Negligible
Impact on benthic communities due to redirecting the River Dour	Minor adverse	x	Minor adverse
Impacts on the epibenthic communities colonising artificial structures due to redirecting the River Dour	Negligible	x	Negligible
Impacts on the phytoplankton communities due to redirecting the River Dour	Negligible	x	Negligible
MARINE MAMMALS			
Construction phase			
Acoustic impacts from piling activities on marine mammals	Moderate adverse	✓	Negligible
Acoustic impacts from dredging activities on marine mammals	Negligible	x	Negligible
Impact on marine mammals from prey avoidance in the area	Negligible	x	Negligible
Impact on marine mammals due to vessel traffic and collision risk	Negligible	x	Negligible
Operational phase			
Impact on marine mammals due to increased vessel activity	Minor adverse	✓	Minor adverse
MARINE AND COASTAL ORNITHOLOGY			
Construction phase			
Impact on designated sites in relation to ornithology	Negligible	x	Negligible
Loss of breeding bird habitat from site clearance, building removal and the creation of hard standing	Moderate adverse	✓	Minor adverse
Loss of roosting habitat	Minor adverse	x	Minor adverse
Loss of foraging habitat	Negligible	x	Negligible
Disturbance/displacement of birds using the site	Moderate adverse	✓	Minor adverse
Operational phase			
Loss of breeding habitat	Moderate adverse	✓	Minor adverse
Loss of foraging habitat from site clearance and the creation of hard standing	Negligible	x	Negligible

Disturbance of birds using the site	Negligible	x	Negligible
FISHERIES			
Construction phase			
Direct uptake and disturbance of fish during capital dredging	Minor adverse	x	Minor adverse
Impact on fish as a result of elevated suspended sediment concentrations as a result of capital dredging	Minor adverse	x	Minor adverse
Indirect impacts on fish as a result of potential smothering of benthic food resources	Minor adverse	x	Minor adverse
Potential impacts on fish species caused by changes in water quality and remobilisation of contaminants	Minor adverse	✓	Negligible
Acoustic impacts on fish populations from the capital dredging and piling activities	Moderate adverse	x	Minor adverse
Effect of artificial lighting during construction on fish populations	Negligible	x	Negligible
Impact on commercial and recreational fishing due to habitat disturbance	Negligible	x	Negligible
Operational phase			
Loss/change of intertidal and subtidal habitat on fish populations	Minor adverse	x	Minor adverse
Impacts on fish from the long-term alteration of benthic fauna as a food source due to maintenance dredging	Minor adverse	x	Minor adverse
Impacts on anadromous fish due to redirecting the River Dour	Minor adverse	✓	Negligible
Impact of changes to freshwater flow patterns on the resident and migratory marine fish	Minor adverse	x	Minor adverse
Effect of artificial lighting during operation on fish populations	Minor adverse	✓	Negligible
Potential environmental impacts during maintenance dredging activities	Minor adverse	x	Minor adverse
TERRESTRIAL AND COASTAL ECOLOGY			
Construction phase			

Disturbance to designated sites	No impact	x	No impact
Disturbance to habitat at Shakespeare Beach	No impact	x	No impact
Disturbance/loss of fiery clearwing moth habitat	Moderate adverse	✓	Minor adverse
Disturbance to bats from construction activities to/adjacent to buildings potentially with bat roosts	Moderate adverse	✓	Minor adverse
Operational phase			
Potential impact to coastal vegetated shingle	No impact	x	No impact
Potential impact to fiery clearwing moth/moth habitat	No impact	x	No impact
Potential impact to bats	Minor beneficial	x	Minor beneficial
Impact to designated sites	Negligible	x	Negligible
NAVIGATION			
Construction phase			
Impact on commercial navigation due to construction equipment and vessels	Minor adverse	✓	Minor adverse
Impact on commercial navigation due to changes in wave environment	Moderate adverse	✓	Negligible
Impact on recreational navigation due to construction equipment and vessels	Minor adverse	✓	Minor adverse
Impact on recreational navigation due to changes in wave climate	Minor adverse	✓	Negligible
Operational phase			
Impact on commercial navigation during the operational phase with the reconfigured layout	Minor adverse	✓	Negligible
Potential impact of development on commercial and recreational vessels due to changes in wave activity	Commercial vessels: Negligible Recreational vessels; Minor adverse	✓	Commercial vessels: Negligible Recreational vessels; minor adverse
Impact on recreational navigation	Minor adverse	✓	Minor adverse
HISTORIC ENVIRONMENT			
Construction phase			
Impact on existing structures	Zone 1 – no impact Zone 2 – over all moderate adverse; a minor adverse impact is expected to the Custom Watch House. Zone 3 – minor adverse Zone 4 – moderate adverse	✓	Moderate adverse

	Zone 5 –major adverse, except for the Clock Tower or Fairbairn Crane: no impact. Zone 6 – no impact		
Impact on subsurface/potential buried structures	Zone 1 – moderate adverse Zone 2 – moderate adverse Zone 3 – no impact Zone 4 – moderate adverse Zone 5 – moderate adverse Zone 6 – moderate adverse	✓	Moderate adverse A minor beneficial residual impact would result from field evaluations providing information on the historical development of the harbour and prehistoric environment of the harbour.
Impact on marine structures, wrecks and wreckage from dredging	Moderate adverse	✓	Negligible
Impact on buried landsurface/palaeochannels from piling, reclaim and dredging works	Moderate adverse At Eastern end of dredge area (potential for 2 nd palaeochannel): minor adverse	✓	Moderate adverse However, from to the information obtained through the field evaluation, a moderate beneficial residual impact could result.
Operational phase			
Impact on historic landscape character	Major adverse	x	Moderate adverse ⁹
Impact of increased emissions to air on historic structures/buildings	Negligible	x	Negligible
Impact of hydrodynamic changes on wrecks and historic landsurfaces	No impact	x	No impact
TOURISM AND RECREATION			
Construction phase			
Impact on berthing and mooring	Minor adverse	✓	Minor adverse
Impact on general tourism and recreation in Dover – to be updated when LVIA, air quality, noise & vibration assessments completed	Minor adverse	✓	Minor adverse
Operational phase			

⁹ Mitigation measures were identified in the construction phase that reduces the scale of this impact.

Impact on berthing and mooring	Moderate beneficial	x	Moderate beneficial
Impact on beach amenity	Minor adverse	x	Minor adverse
Impact on general tourism and recreation	Minor beneficial	✓	Minor beneficial
Impact on public access	Minor adverse	✓	Negligible
Impact on car parking facilities	Minor adverse	✓	Negligible
TRAFFIC AND TRANSPORT			
Construction phase			
Severance	Negligible	x	Negligible
Driver delay	Negligible		Negligible
Pedestrian delay	Negligible		Negligible
Pedestrian amenity	Negligible		Negligible
Fear and intimidation	Negligible		Negligible
Accidents and safety	Negligible		Negligible
Operational Phase			
Severance	Negligible with the exception being along Union Street, where the increase in traffic flow would equate to a moderate adverse in the opening year of 2014 and a major adverse in the subsequent future year.	✓	Negligible
Driver delay	Major beneficial		Major beneficial
Pedestrian delay	Union Street: Negligible A20 (Prince of Wales Pier to Eastern Docks): Beneficial		Union Street: Negligible A20 (Prince of Wales Pier to Eastern Docks): Beneficial
Pedestrian amenity	Negligible		Negligible
Fear and intimidation	Negligible		Negligible
Accidents and safety	Negligible		Negligible
NOISE AND VIBRATION			
Construction Phase			
On-site construction noise	Day-time: temporary negligible Night-time: temporary major adverse	✓	Negligible to minor adverse
Noise impacts associated with off-site construction related traffic	NSRs close to A20: negligible NSRs close to The Viaduct and Union Street: minor adverse	x	Negligible
Vibration from construction	Building damage: no impact		No impact

	At Harbour house and Waterloo Mansions: minor to moderate adverse	✓	Negligible to minor adverse
Operational phase			
Noise impacts from activities within the port	Day-time: negligible Night-time: minor to moderate adverse	✓	Day-time: negligible Night-time: negligible Night-time at Waterloo Mansions and Gateway Flats: minor adverse
Noise impacts associated with off-site port related traffic	Negligible	x	Negligible
AIR QUALITY			
Construction phase			
Potential impact to air quality from construction dust and emissions from construction plant, non-road mobile machinery (NRMM) and road traffic	Moderate adverse	✓	Minor adverse: Medium risk sites have the potential for an intermittent or likely impact on sensitive receptors. Low risk sites for an infrequent impact on sensitive receptors.
Operational phase			
Road traffic impacts (nitrogen dioxide) on air quality in 2014	Inside AQMAs: negligible/minor adverse. Outside AQMAs: negligible to moderate adverse. Wellington Dock : minor adverse.	✓	Inside AQMAs: negligible/minor beneficial. Outside AQMAs: negligible/minor beneficial. Wellington Dock: minor/moderate adverse.
Road traffic impacts (nitrogen dioxide) on air quality in 2026	Inside AQMAs: minor adverse. Outside AQMAs: negligible to moderate adverse. Wellington Dock: minor adverse.	✓	Inside AQMAs: minor adverse /negligible. Outside AQMAs: minor adverse/negligible Wellington Dock minor adverse.
Road traffic impacts (particulate matter) on air quality in 2014 and 2026	Negligible	✓	Negligible/minor beneficial
Road traffic impacts (sulphur dioxide) on air quality in 2014	Minor beneficial	✓	Negligible/minor beneficial
Road traffic impacts (sulphur dioxide) on air quality in	Minor adverse	✓	Negligible/minor beneficial

2026			
Road traffic impacts from emission of pollutions on ecologically sensitive sites – Folkestone to Etchingill Escarpment SAC	Negligible from nitrogen deposition. Negligible from acid deposition.	x	Negligible
Road traffic impacts from emission of pollutions on ecologically sensitive sites – Dover to Kingsdown Cliffs SAC	Negligible from nitrogen deposition. Negligible from acid deposition.	x	Negligible
Road traffic impacts from emission of pollutions on ecologically sensitive sites – Temple Ewell Downs SAC	Negligible from nitrogen deposition. Negligible from acid deposition.	x	Negligible
Emission of pollutants from shipping activities: nitrogen dioxide	Annual average: minor adverse Short term (hourly) at berth, in harbour and in open sea: moderate adverse	✓	Potential reduction to negligible
Emission of pollutants from shipping activities: particulate matter	Annual average: negligible Short term (24 hour average): negligible Receptors R10, R9, R14, R15 and R24: Moderate adverse:		Potential reduction to minor adverse at receptors R10,9,14, 15 and 24
Emission of pollutants from shipping activities: sulphur dioxide	24 hour average: moderate adverse Hourly: moderate adverse 15 minute: moderate adverse		Potential reduction to minor adverse
Cumulative impact of NO ₂	St Martin's House: moderate All other receptors long term - minor to moderate adverse	x	Minor to moderate adverse
Cumulative impact of SO ₂	Minor adverse	x	Minor adverse
LANDSCAPE AND VISUAL IMPACT			
Construction phase			
Landscape impacts during the construction phase	Slight to negligible and neutral	x	No change to impact levels
Sensitivity to Townscape areas	The Seafront: moderate and adverse Snargate Street and Old Pier area: slight and adverse Dover town: no impact. Western Heights: moderate and neutral. Castle Hill area: slight and neutral. Hoverport area: slight to moderate, and neutral Wellington and Granville Docks: substantial and adverse	x	No change to impact levels

	Prince of Wales Pier: substantial and adverse		
Day-time visual impact	Effects would be moderate and adverse along the sea front. For the residents of flats on Snargate Street, the effect would be minor to negligible, given the proximity of a busy road. Moderate and adverse impacts are unavoidable for viewers within Granville Dock due to the viewpoint being within the construction site.	✓	Moderate and minor adverse for viewpoints in close proximity Slight to moderate and neutral for viewpoints further afield.
Night-time visual impacts	Moderate to slight and neutral of slight to negligible and neutral, with a substantial and neutral impact only experienced from one viewpoint (Esplanade)	✓	Temporary minor and adverse
Operational phase			
Landscape impacts	Negligible to slight and neutral	x	Negligible to slight and neutral
Townscape impacts	Granville Dock and Prince of Wales Pier: substantial and adverse Town area: Negligible and neutral	x	No change
Visual impacts	Western Heights: substantial and adverse Granville Dock and Prince of Wales Pier: moderate and adverse Seafront: substantial and neutral changing to substantial and beneficial further eastwards along the seafront Further away from the port: slight and neutral.	✓	Western Heights: substantial and adverse Within port: moderate and adverse Further away from the port: slight and beneficial
Night-time lighting impacts	Moderate - negligible and beneficial to neutral	✓	Slight and substantial beneficial
SOCIO-ECONOMICS			
Construction phase			
Impact on employment	Minor beneficial	x	Minor beneficial
Impact on freight industry	Negligible	x	Negligible
Impact on tourism	Negligible	x	Negligible
Operational phase			
Impact on employment	Major beneficial	x	Major beneficial
Impact on the economy	Major beneficial	x	Major beneficial
Impact on social and regeneration aspects	Major beneficial	x	Major beneficial
OFFSHORE DISPOSAL OF DREDGED MATERIAL			
Construction phase			
Disturbance to fish at the disposal site	Negligible	x	Negligible

Disturbance to benthic fauna at the disposal site	Minor adverse	x	Minor adverse
Re-suspension of potentially contaminated sediments	Negligible	x	Negligible
Obstruction due to navigation during disposal	Moderate adverse	✓	Minor adverse
Operational phase			
Alteration to benthic habitat and effect on benthic fauna at the disposal site	Negligible	x	Negligible
Alteration to the hydrodynamic regime at the disposal site	Negligible	x	Negligible